Online ISSN : 2249-4618
Print ISSN : 0975-5888
DOI : 10.17406/GJMRA

Global Journal

of Medical Research: G

Veterinary Science & Veterinary Medicine



Highlights

- Retail Markets in Khulna District
- Diagnostic Approach of Systemic Diseases
- Companion Animal Veterinary Hospital
- Transposition of the Semitendinous Muscle

Discovering Thoughts, Inventing Future

VOLUME 21 ISSUE 2 VERSION 1.0

© 2001-2021 by Global Journal of Medical Research, USA

Volume 21 Issue 32 was originally issued as G2

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine

Volume 21 Issue 32
Originally issued as G2

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 (Ver. 1.0)

Open Association of Research Society

© Global Journal of Medical Research. 2021.

All rights reserved.

This is a special issue published in version 1.0 of "Global Journal of Medical Research." By Global Journals Inc.

All articles are open access articles distributed under "Global Journal of Medical Research"

Reading License, which permits restricted use. Entire contents are copyright by of "Global Journal of Medical Research" unless otherwise noted on specific articles.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without written permission.

The opinions and statements made in this book are those of the authors concerned. Ultraculture has not verified and neither confirms nor denies any of the foregoing and no warranty or fitness is implied.

Engage with the contents herein at your own risk.

The use of this journal, and the terms and conditions for our providing information, is governed by our Disclaimer, Terms and Conditions and Privacy Policy given on our website http://globaljournals.us/terms-and-condition/menu-id-1463/

By referring / using / reading / any type of association / referencing this journal, this signifies and you acknowledge that you have read them and that you accept and will be bound by the terms thereof.

All information, journals, this journal, activities undertaken, materials, services and our website, terms and conditions, privacy policy, and this journal is subject to change anytime without any prior notice.

Incorporation No.: 0423089
License No.: 42125/022010/1186
Registration No.: 430374
Import-Export Code: 1109007027
Employer Identification Number (EIN):
USA Tax ID: 98-0673427

Global Journals Inc.

*(A Delaware USA Incorporation with "Good Standing"; **Reg. Number: 0423089**)*

Sponsors: Open Association of Research Society
Open Scientific Standards

Publisher's Headquarters office

Global Journals® Headquarters
945th Concord Streets,
Framingham Massachusetts Pin: 01701,
United States of America
USA Toll Free: +001-888-839-7392
USA Toll Free Fax: +001-888-839-7392

Offset Typesetting

Global Journals Incorporated
2nd, Lansdowne, Lansdowne Rd., Croydon-Surrey,
Pin: CR9 2ER, United Kingdom

Packaging & Continental Dispatching

Global Journals Pvt Ltd
E-3130 Sudama Nagar, Near Gopur Square,
Indore, M.P., Pin:452009, India

Find a correspondence nodal officer near you

To find nodal officer of your country, please email us at *local@globaljournals.org*

eContacts

Press Inquiries: *press@globaljournals.org*
Investor Inquiries: *investors@globaljournals.org*
Technical Support: *technology@globaljournals.org*
Media & Releases: *media@globaljournals.org*

Pricing (Excluding Air Parcel Charges):

Yearly Subscription (Personal & Institutional)
250 USD (B/W) & 350 USD (Color)

Editorial Board

Global Journal of Medical Research

Dr. Apostolos Ch. Zarros

DM, Degree (Ptychio) holder in Medicine, National and Kapodistrian University of Athens MRes, Master of Research in Molecular Functions in Disease, University of Glasgow FRNS, Fellow, Royal Numismatic Society Member, European Society for Neurochemistry Member, Royal Institute of Philosophy Scotland, United Kingdom

Dr. William Chi-shing Cho

Ph.D.,
Department of Clinical Oncology
Queen Elizabeth Hospital
Hong Kong

Dr. Alfio Ferlito

Professor Department of Surgical Sciences
University of Udine School of Medicine, Italy

Dr. Michael Wink

Ph.D., Technical University Braunschweig, Germany
Head of Department Institute of Pharmacy and Molecular Biotechnology, Heidelberg University, Germany

Dr. Jixin Zhong

Department of Medicine, Affiliated Hospital of Guangdong Medical College, Zhanjiang, China, Davis Heart and Lung Research Institute, The Ohio State University, Columbus, OH 43210, US

Dr. Pejcic Ana

Assistant Medical Faculty Department of Periodontology and Oral Medicine University of Nis, Serbia

Rama Rao Ganga

MBBS
MS (Universty of Health Sciences, Vijayawada, India)
MRCS (Royal Coillege of Surgeons of Edinburgh, UK)
United States

Dr. Ivandro Soares Monteiro

M.Sc., Ph.D. in Psychology Clinic, Professor University of Minho, Portugal

Dr. Izzet Yavuz

MSc, Ph.D., D Ped Dent.
Associate Professor, Pediatric Dentistry Faculty of Dentistry, University of Dicle Diyarbakir, Turkey

Dr. Sanjay Dixit, M.D.

Director, EP Laboratories, Philadelphia VA Medical Center
Cardiovascular Medicine - Cardiac Arrhythmia
Univ of Penn School of Medicine
Web: pennmedicine.org/wagform/MainPage.aspx?

Sanguansak Rerksuppaphol

Department of Pediatrics Faculty of Medicine
Srinakharinwirot University
NakornNayok, Thailand

Antonio Simone Laganà

M.D. Unit of Gynecology and Obstetrics
Department of Human Pathology in Adulthood and Childhood "G. Barresi" University of Messina, Italy

Dr. Han-Xiang Deng

MD., Ph.D
Associate Professor and Research Department
Division of Neuromuscular Medicine
Davee Department of Neurology and Clinical Neurosciences
Northwestern University Feinberg School of Medicine
Web: neurology.northwestern.edu/faculty/deng.html

Dr. Pina C. Sanelli

Associate Professor of Radiology
Associate Professor of Public Health
Weill Cornell Medical College
Associate Attending Radiologist
NewYork-Presbyterian Hospital
MRI, MRA, CT, and CTA
Neuroradiology and Diagnostic Radiology
M.D., State University of New York at Buffalo,
School of Medicine and Biomedical Sciences
Web: weillcornell.org/pinasanelli/

Dr. Roberto Sanchez

Associate Professor
Department of Structural and Chemical Biology
Mount Sinai School of Medicine
Ph.D., The Rockefeller University
Web: mountsinai.org/

Dr. Michael R. Rudnick

M.D., FACP
Associate Professor of Medicine
Chief, Renal Electrolyte and Hypertension Division (PMC)
Penn Medicine, University of Pennsylvania
Presbyterian Medical Center, Philadelphia
Nephrology and Internal Medicine
Certified by the American Board of Internal Medicine
Web: uphs.upenn.edu/

Dr. Feng Feng

Boston University
Microbiology
72 East Concord Street R702
Duke University
United States of America

Dr. Seung-Yup Ku

M.D., Ph.D., Seoul National University Medical College,
Seoul, Korea Department of Obstetrics and Gynecology
Seoul National University Hospital, Seoul, Korea

Dr. Hrushikesh Aphale

MDS- Orthodontics and Dentofacial Orthopedics.
Fellow- World Federation of Orthodontist, USA.

Santhosh Kumar

Reader, Department of Periodontology,
Manipal University, Manipal

Gaurav Singhal

Master of Tropical Veterinary Sciences, currently pursuing Ph.D in Medicine

Dr. Aarti Garg

Bachelor of Dental Surgery (B.D.S.) M.D.S. in Pedodontics and Preventive Dentistr Pursuing Phd in Dentistry

Sabreena Safuan

Ph.D (Pathology) MSc (Molecular Pathology and Toxicology) BSc (Biomedicine)

Getahun Asebe

Veterinary medicine, Infectious diseases, Veterinary Public health, Animal Science

Dr. Suraj Agarwal

Bachelor of dental Surgery Master of dental Surgery in Oromaxillofacial Radiology.
Diploma in Forensic Science & Oodntology

Osama Alali

PhD in Orthodontics, Department of Orthodontics, School of Dentistry, University of Damascus. Damascus, Syria. 2013 Masters Degree in Orthodontics.

Prabudh Goel

MCh (Pediatric Surgery, Gold Medalist), FISPU, FICS-IS

Raouf Hajji

MD, Specialty Assistant Professor in Internal Medicine

Surekha Damineni

Ph.D with Post Doctoral in Cancer Genetics

Arundhati Biswas

MBBS, MS (General Surgery), FCPS, MCh, DNB (Neurosurgery)

Rui Pedro Pereira de Almeida

Ph.D Student in Health Sciences program, MSc in Quality Management in Healthcare Facilities

Dr. Sunanda Sharma

B.V.Sc.& AH, M.V.Sc (Animal Reproduction, Obstetrics & gynaecology), Ph.D.(Animal Reproduction, Obstetrics & gynaecology)

Shahanawaz SD

Master of Physiotherapy in Neurology PhD- Pursuing in Neuro Physiotherapy Master of Physiotherapy in Hospital Management

Dr. Shabana Naz Shah

PhD. in Pharmaceutical Chemistry

Vaishnavi V.K Vedam

Master of dental surgery oral pathology

Tariq Aziz

PhD Biotechnology in Progress

Contents of the Issue

i. Copyright Notice
ii. Editorial Board Members
iii. Chief Author and Dean
iv. Contents of the Issue

1. Aproximación Diagnóstica De Las Enfermedades Sistémicas De Los Pacientes Con Signos Y Lesiones Oculares Atendidos En La Consulta Externa Del Hospital Veterinario De Animales De Compañía De La Universidad De San Carlos De Guatemala. *1-5*
2. Microbiological Evaluation of Poultry Meat Obtained from Different Retail Markets in Khulna District. *7-14*
3. Clinical Evolution of a Case of Perineal Hernia in a Canine Resolved through the Technique of the Transposition of the Semitendinous Muscle. *15-21*
4. Detection of Hepatic Problem in Dogs and Cats by Biochemical Assay and Imaging Technique (X-Ray and Ultrasonography). *23-29*
5. Characterization of Dogs and Cats Diagnosed with Diseases of the Urinary System in 2019: Veterinary Hospital, Faculty of Veterinary Medicine, University of San Carlos De Guatemala. *31-41*
6. Recurrence of Dental Malocclusion in a Fuzzy Lop Rabbit: A Case Report. *43-46*

v. Fellows
vi. Auxiliary Memberships
vii. Preferred Author Guidelines
viii. Index

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 Version 1.0 Year 2021
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Aproximación Diagnóstica De Las Enfermedades Sistémicas De Los Pacientes Con Signos Y Lesiones Oculares Atendidos En La Consulta Externa Del Hospital Veterinario De Animales De Compañía De La Universidad De San Carlos De Guatemala

By Laparra-Galindo, Julia Patricia & Mendez-Valenzuela Carlos Roberto

Abstract- The goal of this article is to show the most frequent types of differential diagnoses of systemic diseases in canines with ocular signs and lesions. For this purpose, a retrospective study was conducted on 510 medical records from patients of the Companion Animal Veterinary Hospital (HVAC) of the University of San Carlos (USAC) of Guatemala, from August to November 2017. The inclusion criteria were: canine species, having a differential diagnosis established list of possible systemic diseases and an eye examination by specialist. Through a descriptive analysis of the data, it was established that, of the 510 canines examined, 212 (42%) presented signs and ocular alterations, of these there were 550 differential diagnosis, which were categorized using the acronym DAMNIT V; from which it was determined that 40% are infectious / inflammatory, neoplasic (19%) followed by metabolic processes (13%), allergic / autoimmune (10%), degenerative (7%), idiopathic (5%), traumatic / toxic 4% and finally vascular (2%).

Keywords: *canine, DAMNIT V, differential diagnosis, veterinary ophthalmology.*

GJMR-G Classification: *NLMC Code: WA 360*



Strictly as per the compliance and regulations of:

© 2021. Laparra-Galindo, Julia Patricia & Mendez-Valenzuela Carlos Roberto. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at https://creativecommons.org/licenses/by-nc-nd/4.0/.

Aproximación Diagnóstica De Las Enfermedades Sistémicas De Los Pacientes Con Signos Y Lesiones Oculares Atendidos En La Consulta Externa Del Hospital Veterinario De Animales De Compañía De La Universidad De San Carlos De Guatemala

Laparra-Galindo, Julia Patricia [α] & Mendez-Valenzuela Carlos Roberto [σ]

Resumen- El objetivo de este trabajo es evidenciar los tipos de diagnósticos diferenciales de enfermedades sistémicas más frecuentes en caninos con signos y lesiones oculares. Para ello se realizó un estudio retrospectivo en 510 registros médicos de pacientes de la consulta externa del Hospital Veterinario de Animales de Compañía (HVAC) de la Universidad de San Carlos (USAC) de Guatemala, correspondientes al período de agosto a noviembre de 2017. Los criterios de inclusión fueron: pertenecer a la especie canina, tener una lista establecida de diagnósticos diferenciales de sus posibles patologías sistémicas y evaluación oftalmológica por especialista. A través de un análisis descriptivo de los datos se estableció que, de los 510 caninos evaluados, 212 (42%) presentaron signos y alteraciones oculares, de estos se totalizaron 550 diagnósticos diferenciales, los cuales fueron categorizados utilizando el acrónimo VITAMIND; de donde se determinó que el 40% son de tipo infeccioso/inflamatorio, neoplásicos (19%) seguidos de procesos metabólicos (13%), alérgicos/autoinmunes (10%), degenerativos (7%), idiopáticos (5%), traumáticos/tóxicos 4% y por último vasculares (2%).

Debido a una tendencia de obviar la enfermedad ocular, la importancia de este artículo radica en informar al clínico sobre la relación de las alteraciones oculares con procesos sistémicos, ya que la identificación de lesiones oftálmicas nos puede orientar al diagnóstico y monitorización de las enfermedades sistémicas y al mismo tiempo tratar los efectos secundarios que estas puedan tener a nivel ocular.

Palabras clave: canino, diagnóstico diferencial, oftalmología veterinaria, VITAMIND.

Abstract- The goal of this article is to show the most frequent types of differential diagnoses of systemic diseases in canines with ocular signs and lesions. For this purpose, a retrospective study was conducted on 510 medical records from patients of the Companion Animal Veterinary Hospital (HVAC) of the University of San Carlos (USAC) of Guatemala, from August to November 2017. The inclusion criteria were: canine species, having a differential diagnosis established list of possible systemic diseases and an eye examination by specialist. Through a descriptive analysis of the data, it was established that, of the 510 canines examined, 212 (42%) presented signs and ocular alterations, of these there were 550 differential diagnosis, which were categorized using the acronym DAMNIT V; from which it was determined that 40% are infectious / inflammatory, neoplasic (19%) followed by metabolic processes (13%), allergic / autoimmune (10%), degenerative (7%), idiopathic (5%), traumatic / toxic 4% and finally vascular (2%).

Due to a tendency to obviate ocular disease, the purpose of this article is to broaden the clinician's criteria to relate ocular alterations with systemic processes, since the identification of ocular manifestations can guide them in the diagnosis and monitoring of systemic diseases and at the same time treat the side effects that these can have at the ocular level.

Keywords: canine, DAMNIT V, differential diagnosis, veterinary ophthalmology.

I. Introducción

El ojo es un órgano muy complejo en términos de estructura y función. Además, es un órgano muy sensible, cuya función puede verse afectada con un leve insulto a su homeostasis debido a una lesión directa o a enfermedades locales y sistémicas (Kurup, Parikh, Mahla y Ratnu, 2017). La importancia de estas lesiones tiene relación con dos circunstancias: La primera es que la extensión de la patología sistémica puede provocar signos oftalmológicos. "La segunda circunstancia que hemos de considerar es que en ocasiones los signos oculares pueden ser la primera manifestación de alguna enfermedad sistémica y su aparición por lo tanto nos puede conducir al diagnóstico". En cualquiera de las circunstancias el hallazgo precoz de las lesiones oculares nos ayudara a implementar un tratamiento temprano para evitar lesiones irreversibles (Andonegui, 2008).

Otro aporte importante que nos da el examen ocular es que en ninguna otra parte del cuerpo se puede observar directamente el sistema circulatorio o examinar el tejido nervioso sin la necesidad de hacer una biopsia invasiva. Es por ello por lo que la valoración oftalmológica es de suma importancia como complemento del examen físico ya que nos permite el diagnóstico de alteraciones oculares y también el de enfermedades sistémicas que pueden haber pasado

Author α: e-mail: dra.patricialaparra@gmail.com
Author σ: e-mail: cmendezv@purdue.edu

© 2021 Global Journals

desapercibidas en el examen físico general (Ettinger y Feldman, 2017).

Además de lo anterior, las enfermedades cerebrovasculares cursan con diferentes expresiones clínicas neuro-oftalmológicas. Esto debido a que los vasos retinianos comparten características anatómicas, fisiológicas y embriológicas con los vasos cerebrales. La retina es una extensión del diencéfalo y posee una barrera hemato-retiniana similar a la hemato-encefálica (Gelatt y Plummer, 2017). "Los cambios en los vasos retinianos reflejan probablemente cambios en los vasos cerebrales. Sin embargo, la irrigación retiniana es la única que puede ser visualizada en vivo y de forma directa sin utilizar medidas o medios invasivos". Es por esto por lo que signos vasculares retinianos pueden darnos claves muy importantes para comprender las enfermedades cerebrovasculares relacionadas (Zabidi-Hussin, 2016). Estas, entre otras patologías de origen sistémico, representan una amenaza para la integridad funcional del órgano visual. Es por ello por lo que es importante que el médico esté familiarizado con el espectro de la afectación ocular en las enfermedades sistémicas, ya que la intervención adecuada y la derivación puede evitar secuelas importantes e incluso la ceguera del paciente. (Lenake y Du Toit, 2014)

De acuerdo con Andrade (2008) el veterinario general tiene conocimientos de anatomía y fisiología ocular para realizar un examen completo del ojo, pero se necesita una capacitación técnica para lograr un examen oftalmológico más completo y de calidad, especialmente con respecto al manejo del equipo específico que se requiere. Con el crecimiento de las especialidades en medicina veterinaria, herramientas tales como el oftalmoscopio se incluyen entre los principales utensilios del oftalmólogo veterinario, pero todavía son poco conocidos por los médicos veterinarios generales (Freitas, Montiani-Ferreira, y Ferreira, 2018).

La lista de diagnósticos diferenciales es uno de los aspectos más importantes para la aproximación diagnóstica. Esta debe de contemplar cada uno de los problemas que presente un paciente en la historia clínica de la enfermedad, exámen físico y pruebas diagnósticas (Gough, 2007). El acrónimo VITAMIND (V= vascular, I= infeccioso/inflamatorio, T= traumático/tóxico, A= autoinmunes, M= metabólicas, I= idiopáticas, N= neoplásicas/nerviosas, D= degenerativas) es una herramienta con categorías amplias de diagnósticos diferenciales utilizado como recordatorio de que cada problema tiene una multitud de causas potenciales que deben de considerarse hasta ser descartadas. (Englar, 2019) El examen ocular es un componente esencial que puede reducir esta lista de probables diagnósticos diferenciales en los pacientes con enfermedades sistémicas (Cullen y Webb, 2013).

II. Materiales y Métodos

Se realizó un estudio retrospectivo de 510 registros médicos correspondientes al período de agosto a noviembre del 2017 de pacientes que se presentaron a la consulta externa del HVAC de la USAC de Guatemala, ubicada en la zona 12 de la Ciudad de Guatemala. Los criterios de inclusión fueron: ser de especie canina, tener una lista establecida de diagnósticos diferenciales de su patología sistémica y poseer una evaluación ocular por especialista. El equipo utilizado para la evaluación oftalmológica fue una lámpara de hendidura, oftalmoscopio Panoptic, tonómetro neumático, lente de Goldman y una lente de 20 Dioptrías. Los insumos y medicamentos utilizados fueron test de Schirmmer, tinciones de fluoresceína, rosa de bengala, anestésico local y midriáticos. Las evaluaciones oftalmológicas se realizaron con el paciente despierto.

Del total de registros médicos analizados, fueron seleccionados 212 correspondientes a pacientes caninos con enfermedades sistémicas que cumplían los criterios de inclusión. De cada registro médico se recopiló la lista establecida de diagnósticos diferenciales de cada paciente. Posteriormente se utilizó el acrónimo VITAMIND para categorizar los diferentes diagnósticos diferenciales. Para el análisis de los datos se utilizó estadística descriptiva utilizando distribuciones de frecuencias para las variables.

III. Resultados

Se evaluaron un total de 510 registros médicos de pacientes atendidos en la consulta externa del HVAC de agosto a noviembre del 2017 y se determino que el 42% presentaban signos y lesiones oftalmológicas.

Tabla 1: Número de pacientes que presentaron signos y lesiones oculares

Tipo de paciente	Pacientes	%
Con signos y Lesiones Oftalmológicas	212	42%
Sin Signos y Lesiones Oftalmológicas	298	58%
Total	510	100%

© 2021 Global Journals

Tabla 2: Categoría de los diagnósticos diferenciales

Categoría	Diagnósticos diferenciales	%
Vasculares	13	2%
Infecciosos/Inflamatorios	222	40%
Traumáticos/Tóxicos	20	4%
Autoinmunes	54	10%
Metabólicos	71	13%
Idiopáticos	26	5%
Neoplásicos/Neurológicos	104	19%
Degenerativos	40	7%
Total	550	100%

IV. Discusión de Resultados

En este estudio se determinó que el examen ocular es un complemento importante del proceso del examen físico; ya que se reconocieron alteraciones oftalmológicas en el 42% de los pacientes caninos que se presentaron a la consulta general del HVAC. Porcentaje muy diferente al que reportan estudios realizados en clínicas veterinarias generales como el de Manizales, Colombia, en el que se concluyó que de los pacientes atendidos solo al 4.56% se les detecto afección oftalmológica (Muñoz, Ramírez, y Garcés, 2015). Porcentaje muy similar fue reportado por el sistema de vigilancia veterinaria de animales de compañía del Reino Unido con un 4.9%. (The People's Dispensary for Sick Animals, 2019). Esta diferencia de porcentajes puede atribuirse a que los médicos veterinarios generales tienden a considerar al ojo y sus anexos como estructuras diferentes al resto de los tejidos no oculares. Esto conduce a la omisión del examen oftálmico en pacientes con enfermedades sistémicas generales. Efectivamente, el ojo es un órgano con anatomía y fisiología muy similar a las de otros órganos y tejidos, pero se requiere de un entrenamiento y equipo especial para su exploración (Ettinger y Feldman, 2017). Mitchell (2011), también afirma que los exámenes oculares requieren equipo básico, buena observación clínica, mucha práctica y que además es importante que los clínicos estén familiarizados con la anatomía y fisiología normal del ojo, para que se puedan reconocer las anomalías y apreciar la importancia de las alteraciones oculares.

Otro hallazgo importante es que el 40% de los diagnósticos diferenciales establecidos para las patologías sistémicas de los caninos con signos y lesiones oculares fueron de tipo infeccioso-inflamatorio. Datos similares fueron encontrados en un estudio prospectivo de enfermedades oculares y perioculares en animales en Minas, Brasil, donde por medio de necropsia y examen a otros órganos, se concluyó que numerosos animales que presentaron lesiones oculares tenían enfermedades sistémicas de tipo infeccioso-inflamatorio (Moreira, Neto, Langohr, y Ecco, 2018). Un dato importante que hay que considerar en este grupo es que las enfermedades de tipo infeccioso, como en el caso del distemper canino, los signos oculares son las primeras manifestaciones de la enfermedad sistémica, presentándose lesiones fáciles de identificar como conjuntivitis aguda de leve a grave, bilateral, serosa a mucopurulenta y principalmente con afectación de la conjuntiva palpebral. Cuando la enfermedad ha avanzado causando trombocitopenia y vasculitis, los signos oculares son más complejos e incluyen uveítis hemorrágica, hifema y hemorragias retinianas que provocan desprendimiento de retina y neuritis óptica (Aroch, Ofri, y Sutton, 2008). Y aunque en este grupo de pacientes la etiología de lesiones oculares secundarias a procesos infecciosos-inflamatorios puede ser diversa, Massa, Gilger, Miller y Davidson (2002), demostraron que el 17.6% de la inflamación del tracto uveal es debida a causas infecciosas siendo el agente causal más común en perros la Ehrlichia canis. La uveítis no es solo un signo ocular importante en perros infectados con E. canis, pues se reportan, además, casos de desprendimiento de retina, conjuntivitis, petequias y equimosis en iris, edema de córnea, glaucoma secundario, neuritis óptica, hifema y hemorragias (Trujillo D., Quijano J., Padilla B. y Sánchez M., 2019).

El segundo grupo de diagnósticos diferenciales de enfermedades sistémicas con signos y lesiones oculares más frecuente con el 19% es de tipo neoplásico – nervioso. Este resultado es porque los pacientes con neoplasias sistémicas pueden cursar con procesos oculares inflamatorios secundarios o debido a metástasis intraoculares como documentan Conceicão, Ribeiro, Piso, y Laus, (2010), quienes indican que el linfoma en perros es la metástasis intraocular más común presentándose en el 37% y se manifiesta como anomalías en el segmento anterior, uveítis moderada a grave, hemorragias, hipopión, infiltración corneal, desprendimiento de retina y hemorragias retinianas. También los adenocarcinomas de tejido mamario, tiroides, hígado, páncreas y útero

© 2021 Global Journals

son frecuentes. Otras neoplasias secundarias para considerar en este grupo son los condrosarcomas, hemangiosarcomas, melanomas cutáneos y orales, carcinoma de las células transicionales de la vejiga urinaria, sarcomas neurogénicos, seminomas, osteosarcomas, rabdomiosarcomas entre otras.

En cuanto a los pacientes con diferenciales de enfermedad sistémica nerviosa, el HVAC cuenta con una ficha en la cual se incluyen los signos y lesiones neuro oftalmológicas. Estos se pueden agrupar en cuatro categorías: 1. trastornos de la visión (ceguera central / pérdida parcial de la visión), 2. trastornos del tamaño y función pupilar (miosis, midriasis, anisocoria, Síndrome de Horner, 3. trastornos de la posición del globo ocular (estrabismo) 4. movimientos oculares involuntarios (nistagmo), (Brisimi, 2018). Estos signos son de importancia para la neurolocalización de una lesión, como por ejemplo el nistagmo, que al igual que en la medicina humana, podría sugerir una localización neuroanatómica cerebelosa (Ives, MacKillo y Olby, 2018). También hay otras alteraciones oftalmológicas en las que el sistema nervioso central puede estar involucrado como son los trastornos del párpado (ptosis), protrusión del tercer párpado y epífora. En sí, el conocimiento de la neuroanatomía y la localización precisa de las lesiones optimizaría los diagnósticos diferenciales para llegar a un diagnóstico final y tratamiento adecuado. (Brisimi, et al 2018)

Un grupo no menos importante es el de pacientes con alteraciones oftalmológicas y diagnósticos diferenciales de tipo metabólico. En este estudio se identificaron lesiones oculares en el 13% de los pacientes con diferenciales de enfermedad metabólica. Esto puede ser debido a que, según López S, Laparra J, Chávez, Villatoro D, (2019), el hipotiroidismo y la obesidad resultaron ser los desórdenes metabólicos más frecuentes en el HVAC de la USAC Guatemala y los pacientes con endocrinopatías desarrollan diversas afecciones oftálmicas como resultado de los desequilibrios hormonales. Por ejemplo, los animales diabéticos desarrollan cataratas, uveítis, queratopatías, retinopatías y al igual que los pacientes con Cushing, desarrollan lesiones oculares secundarias a hipertensión sistémica y a los trastornos en el metabolismo de los lípidos. (Plummer, Specht, y Gelatt, 2007). Otra causa de la pérdida de la transparencia corneal en este tipo de patologías sistémicas es por el acúmulo de calcio o su combinación con lípidos que provocan degeneración corneal (Zapata, Mv, Pn, y Gl, n.d.). Se debe de tener en cuenta que en todas las especies existen posibles manifestaciones oculares cuando se elevan las lipoproteínas circulantes. (Crispin, 2002). Meana y colaboradores sostienen que el diagnóstico de degeneración corneal en el canino amerita un examen semiológico completo del paciente para diagnosticar enfermedades sistémicas que alteren la lipemia e instaurar un tratamiento para mantener la normolipemia y por ende la transparencia corneal (Zapata et al., n.d.).

Según los resultados de este estudio los procesos de carácter autoinmune tuvieron un 10% de los pacientes que presentaron alteraciones oculares. Esto debido a que las enfermedades de tipo inmunológico que ocurren a nivel oftálmico son similares a las del resto del organismo. Los procesos inmunológicos pueden llegar a afectar el tracto uveal, siendo esta la etiología de una serie de inflamaciones del globo ocular que pueden resultar en secuelas permanentes. Estas inflamaciones requieren especial distinción de otras patologías oculares locales que producen ojo rojo. (Ettinger y Feldman, 2017)

Abreviaturas:

HVAC: Hospital Veterinario de la Facultad de Medicina Veterinaria y Zootecnia

USAC: Universidad de San Carlos

References Références Referencias

1. Andonegui, J. (2008). Manifestaciones oculares de las enfermedades sistémicas. Anales Del Sistema Sanitario de Navarra.
2. Andrade, A. (2008). Semiología do Sistema Visual dos Animais Domésticos. Semiología Veterinaria, Sao Pablo, Cap. 14, p. 623-653.
3. Aroch, I., Ofri, R., & Sutton, G. A. (2008). Ocular Manifestations of Systemic Diseases. Slatter's Fundamentals of Veterinary Ophthalmology, 374. https://doi.org/10.1016/B978-072160561-6.50021-6
4. Brisimi N., Liatis Th., Komnenou A., Charalambidou G., Soubasis N. y Polizopoulou Z., (2018). Neuro-ophthalmological abnormalities in neurological diseases of dogs and cats: a retrospective study of 114 cases (2010-2015). Journal of the Hellenic Veterinary Medical Society, 68(3), 433-444. doi: https://doi.org/10.12681/jhvms.15538
5. Conceicão, L. F. da, Ribeiro, A. P., Piso, D. Y. T., & Laus, J. L. (2010). Considerations about ocular neoplasia of dogs and cats. Ciência Rural, 40(10), 2235–2242. https://doi.org/10.1590/S0103-84782010005000165
6. Crispin, S. (2002). Ocular lipid deposition and hyperlipoproteinemia. Progress in Retinal and Eye Research. https://doi.org/10.1016/S1350-9462(02)00004-6
7. Cullen, C. L., & Webb, A. (2013). Ocular manifestations of systemic disease. Part 1: The Dog. In Veterinary Ophthalmology.
8. Gough A., 2007. Diagnosis in Small Animal Medicine, Blakwell Publishing, USA, first edition, 453 p.p.
9. Englar, R. E. (2019). The Problem-Oriented Approach to Clinical Medicine. Common Clinical

© 2021 Global Journals

Presentations in Dogs and Cats, 1–10. https://doi.org/10.1002/9781119414612.CH1
10. Ettinger, S. J., & Feldman, E. C. (2017). Textbook of veterinary internal medicine: diseases of the dog and the cat. Elsevier.
11. Freitas, H. D. M., Montiani-Ferreira, F., & Ferreira, T. A. C. (2018). A HISTÓRIA DA OFTALMOSCOPIA NA CIÊNCIA MÉDICA E VETERINÁRIA. Archives of Veterinary Science. https://doi.org/10.5380/avs.v23i4.57689
12. Gough A., 2007. Diagnosis in Small Animal Medicine, Blakwell Publishing, USA, first edition, 453 p.p.
13. Ives, E., MacKillop, E y Olby N., (2018). Saccadic oscillations in 4 dogs and 1 cat. Journal of Veterinary Internal Medicine, 32(4), 1392–1396. https://doi.org/10.1111/JVIM.15144
14. Lenake, M., & Du Toit, N. (2014). The eye in systemic disease. South African Family Practice. https://doi.org/10.1080/20786204.2014.10844577
15. Massa K., Gilger B., Miller T, and Davidson M., (2002). Causes of uveitis in dogs: 102 cases (1989–2000), American College of Veterinary Ophthalmologists, Veterinary Ophthalmology, 5, 93–98.
16. Meana M., Cassagne P. y Zapata G., 2011, Corneal degeneration in a canine as only sign of hypothyroidism, report of a case, Anacleta Vet, 31 (2): 33- 36.
17. Moreira, M., Teixeira R., Langohr, I., y Ecco, R. (2018). Prospective study of ocular and periocular diseases in animals: 188 cases. Pesquisa Veterinaria Brasileira, 38(3), 502–510. https://doi.org/10.1590/1678-5150-PVB-5044
18. Muñoz, J., Ramírez, G. F., & Garcés, L. F. (2015). Consulta externa en clínicas veterinarias de Manizales. Análisis epidemiológico en Caninos. Spei Domus, 11(23). https://doi.org/10.16925/sp.v11i23.1364
19. Plummer, C., Specht, A., & Gelatt, K. (2007). Ocular manifestations of endocrine disease. Compendium Continuing Education for the Practising Veterinarian. https://doi.org/10.1016/B978-1-56053-442-6.50036-X
20. López, S., Laparra, J., Chávez, J., Villatoro, D., (2019). Caracterización De Pacientes Caninos De Raza Pura Con Diagnostico De Enfermedad Metabólica Atendidos En El Hospital Veterinario De La Universidad De San Carlos De Guatemala. Global Journal of Medical Research, 19(2), 33–39. https://doi.org/10.34257/gjmrgvol19is2pg33
21. The People's Dispensary for Sick Animals, 2019. PDSA ANIMAL WELLBEING (PAW) REPORT 2019. Retrieved May 1, 2021, from https://www.pdsa.org.uk/media/7420/2019-paw-report_downloadable.pdf
22. Trujillo D., Quijano J., Padilla B. y Sánchez M., (2019). Hallazgos oculares como factores predictivos y diagnósticos de ehrlichiosis canina. Revista de Investigaciones Veterinarias del Perú, 30, (3), 1226-1233.
23. Zapata, G., Mv, M., Pn, C., & Gl, Z. (n.d.). Degeneración corneal canina 33 Impresa Dirección para correspondencia: Corneal degeneration in a canine as only sign of hypothyroidism, report a case.

© 2021 Global Journals

This page is intentionally left blank

© 2021 Global Journals

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 Version 1.0 Year 2021
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Microbiological Evaluation of Poultry Meat Obtained from Different Retail Markets in Khulna District

By Bidyut Matubber, Joyanta Kumar Das, Md. Ahsan Habib, Sabuj Kanti Nath & Md. Uzzal Hossain

Khulna Agricultural University

Abstract- The research work conducted to evaluate microbial load in poultry meat from different retail markets in the Khulna district (Nirala, Dumuria, and Fultola). The objective of the present study was to get quality poultry products from commercial farms and retail markets. A total of 48 samples collected and brought to Quality Feed Lab. for laboratory assay. Samples were propagating in nutrient agar followed by culture on selective media, Eosin Methylene Blue Agar, Mac-Conkey agar, Brilliant Green Agar, Salmonella-Shigella Agar. Total numbers of 48 samples examined, and 30 samples were found positive to *E. coli*, and the prevalence of *E. coli* in this study was 62.20 %. 37.50% of thigh meat samples were positive for *E. coli* within 24 tested samples whereas 87.50% of breast meat samples were positive within 24 tested samples for this bacteria. On the other hand, 23 samples were found positive for *Salmonella* spp, and the prevalence of *Salmonella* spp in this study was 49.91 %. 29.16% of thigh samples were positive for *Salmonella* spp within 24 tested samples whereas 66.66% of litter samples were positive within 24 tested samples for this bacteria. Total Viable Count (TVC), Total Coliform Count (TCC), Total Salmonella Count (TSC), and Total Campylobacter Count (CPC) in meat samples of different broiler markets like Nirala market at Khulna city corporation, Dumuria, and Fultola were determined.

GJMR-G Classification: *NLMC Code: QW 70*



Strictly as per the compliance and regulations of:

© 2021. Bidyut Matubber, Joyanta Kumar Das, Md. Ahsan Habib, Sabuj Kanti Nath & Md. Uzzal Hossain. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at https://creativecommons.org/licenses/by-nc-nd/4.0/.

Microbiological Evaluation of Poultry Meat Obtained from Different Retail Markets in Khulna District

Bidyut Matubber [α], Joyanta Kumar Das [σ], Md. Ahsan Habib [ρ], Sabuj Kanti Nath [Ω] & Md. Uzzal Hossain [¥]

Abstract- The research work conducted to evaluate microbial load in poultry meat from different retail markets in the Khulna district (Nirala, Dumuria, and Fultola). The objective of the present study was to get quality poultry products from commercial farms and retail markets. A total of 48 samples collected and brought to Quality Feed Lab. for laboratory assay. Samples were propagating in nutrient agar followed by culture on selective media, Eosin Methylene Blue Agar, Mac-Conkey agar, Brilliant Green Agar, Salmonella-Shigella Agar. Total numbers of 48 samples examined, and 30 samples were found positive to *E. coli*, and the prevalence of *E. coli* in this study was 62.20 %. 37.50% of thigh meat samples were positive for *E. coli* within 24 tested samples whereas 87.50% of breast meat samples were positive within 24 tested samples for this bacteria. On the other hand, 23 samples were found positive for *Salmonella* spp, and the prevalence of *Salmonella* spp in this study was 49.91 %. 29.16% of thigh samples were positive for *Salmonella* spp within 24 tested samples whereas 66.66% of litter samples were positive within 24 tested samples for this bacteria. Total Viable Count (TVC), Total Coliform Count (TCC), Total Salmonella Count (TSC) ,and Total Campylobacter Count (CPC) in meat samples of different broiler markets like Nirala market at Khulna city corporation, Dumuria, and Fultola were determined. Mean of TVC, TCC, TSC, and TCpC for the Nirala market at Khulna city corporation, Dumuria and Fultola markets were 5.61, 5.84, 6.29 log10 CFU/g, 4.72, 4.50, 4.47 log10 CFU/g, 3.19, 3.44, 3.49, log10 CFU/g and 2.31, 2.50, 2.54 log10 CFU/g, respectively. It observed that the mean values of TVC, TCC, TSC and TCpC in the case of Dumuria, and Fultola market exceeded the ICMSF recommendations, which may cause alarm to consumer's health.

Author α: Lecturer, Department of Microbiology and Public Health, Khulna Agricultural University, Khulna, Bangladesh.
e-mail: bidyutm78@gmail.com
Author σ: MS, Department of Microbiology and Public Health, Patuakhali Science and Technology University, Patuakhali, Bangladesh.
e-mail: joydvm99@gmail.com
Author ρ ¥: Lecturer, Department of Livestock Production and Management, Khulna Agricultural University, Khulna, Bangladesh.
e-mail: ahhelal313@gmail.com
Author Ω: Lecturer, Department of Animal Nutrition, Khulna Agricultural University, Khulna, Bangladesh.

I. Introduction

Poultry meat is equally important as a microbiological safety and quality to producers, retailers, and consumers (Mead et al., 2004). Because of advantages such as easy digestibility and acceptance, poultry meat is becoming more popular in the consumer market by most people (Yashoda et al., 2001). However, chicken meat consists of high-quality protein and many other nutrients that are very important for body function (Kralik et al., 2017). Poultry meats to be optimally incorporated into the diet at all ages because of their high-biological-value protein, vitamin, and mineral content associated with a low-fat content (Marangoni et al., 2015). The consumption of poultry meat has increased worldwide as it's a highly nutritious and safe food (Gonzalez-Ortiz et al., 2013). About 90 percent of the rural families are consuming small numbers of chickens (Das et al., 2008). Poultry meat contaminated by different types of microorganisms during processing in the processing plants (Maharjan et al., 2019). During slaughtering, poultry meat contaminated because of the malpractices in handling and management with remains foodborne pathogens remains important health-hazardous issue (Javadi and Safarmashaei et al., 2011). Chicken meat products from retail markets contaminated with foodborne pathogens, namely, *Staphylococcus aureus*, Salmonella, *E. coli*, and *Listeria monocytogenes*, and contamination with mold and yeasts (Khalafalla et al., 2019). Pathogenic strains of salmonella, *S. aureus*, *S. epidermidis*, shigella, enterobacter, and Citrobacter are serious health threats for a human beings (Alam et al., 2015). Foodborne pathogens are causing many diseases with significant effects on human health and the economy (Bintsis, 2017). The food-borne pathogen causes various of illness and death that loses billions of dollars for medical care, medical and social costs (Fratmico et al., 2005). Food-borne illnesses are still public health issue in both developing and developed countries despite applying many control and preventive measures (Zhou et al., 2010). The aim of this study to detect food-borne pathogens in Poultry meat of different areas in the Khulna district and to know the potential risk factor of food-borne pathogens in Khulna district.

© 2021 Global Journals

II. Materials and Methods

a) Study Area and Sample Collection

The present research work was conducted at different retail markets in Khulna district from July 2016 to November 2018 in Quality Feed Lab, Khulna. A total no. of 48 samples collected from the retail markets (Nirala market at Khulna city corporation, Dumuria, and Fultola market) in Khulna district.

Table 1: List of the retail market for sample collection

SL. No.	Name of the retail markets	No. of collected samples Meat (Thigh + Breast)	Total No. of collected samples
01.	Nirala	16(8+8)	48
02.	Dumuria	16(8+8)	
03.	Fultola	16(8+8)	

b) Preparation of sample for bacteriological studies

Each of the raw meat samples was macerated in a mechanical blender using a sterile diluent as per the recommendation of the International Organisation for Standardisation (ISO, 1995). Ten grams of the thigh meat sample was taken aseptically with sterile forceps and transferred into sterile containers containing 90 ml of 0.1% peptone water. A homogenized suspension made in a sterile blender. Thus 1:10 dilution of the samples were obtained. Later on, using a whirly mixture machine, different serial dilutions ranging from 10-2 to 10-6 were prepared according to the standard method (ISO, 1995).

c) Enumeration of TVC

For total bacterial count, 0.1 ml of each ten-fold dilution transferred and spread on duplicate PCA using a fresh pipette for each dilution. Then the diluted samples spread as quickly as possible on the surface of the plate with a sterile glass spreader. One sterile spreader used for each plate. The plates then kept in an incubator at 37 ^{0}C for 24-48 hours. Plates exhibiting 30-300 colonies following incubation. The average number of colonies in a particular dilution multiplied by the dilution factor to obtain the total viable count. The TVC calculated according to ISO (1995). The results of the total bacterial count expressed as the number of organism or colony-forming units per gram (CFU/g) of meat sample.

d) Enumeration of TCC

For TCC, 0.1 ml of each ten-fold dilution transferred and spread on Mac Conkey agar using a sterile pipette for each dilution. Then the diluted samples spread as quickly as possible on the surface of the plate with a sterile glass spreader. One sterile spreader used for each plate. The plates then kept in an incubator at 37 ^{0}C for 24-48 hours. The growth of the organism confirmed by the appearance of turbidity. Results calculated from MPN tables.

e) Enumeration of TSC

For total salmonella count, the procedures of sampling, dilution and streaking were similar to those followed in total viable bacterial count. Xylose lysine deoxycholate agar (XLDA) used only in the case of salmonella count. The calculation for TSC was similar to that of the total viable count.

f) Enumeration of TCpC

For TCpC, 0.1 ml of each ten-fold dilution transferred and spread on the selective blood base agar with 5% sheep or cattle blood. The diluted samples spread as quickly as possible on a 0.45 mm filter placed on blood agar base agar no 2 with a sterile glass spreader. The plates then kept in an incubator at 42^0 C for 24-48 hours. Plates exhibiting 30-300 colonies following incubation. The average number of colonies in a particular dilution multiplied by the dilution factor to obtain the total viable count. The total viable count calculated according to ISO (1995). The results of the total bacterial count expressed as the number of organism or colony-forming units per gram (CFU/g) of meat sample. In young culture, the organism is comma-shaped and S-shaped. In old culture, organisms cling together. Gram (–ve) colonies were round, smooth, and translucent with a dewdrop appearance.

g) Cultural and biochemical examination of samples

The cultural examination of chicken thigh meat samples for bacteriological analysis done according to the standard method (ICMSF, 1985). The examination followed a detail study of colony characteristics, including the morphological and biochemical properties. To find out different types of microorganisms in chicken thigh meat samples, different kinds of bacterial colonies isolated in pure culture from the plate count agar (PCA), Mac Conkey agar (MCA), blood agar (BA), and xylose lysine deoxycholate agar (XLDA) and subsequently identified according to the methods described by Krieg et al., 1994. The isolated organisms supporting growth characteristics on various media subjected to different biochemical tests such as sugar fermentation test, indole production test, catalase test, coagulase test, methyl-red, and Voges-Proskauer (VP) test. In all cases, standard methods as described by Cowan (1985) followed for conducting these tests.

h) Statistical analysis

The data on TVC TCC, TSC, and TCpC obtained from the bacteriological examination of meat samples of the poultry carcass collected from Nirala,

© 2021 Global Journals

Dumuria, and Fultola markets of Khulna district were analyzed in a completely randomized design (CRD) using a computer package subjected to Analysis of Variance using SPSS Software (Version 16, 2007). The differences between means evaluated by Duncan's Multiple Range Test (Gomez and Gomez, 1984).

III. Results and Discussion

The mean and standard deviation of the TVC in poultry meats of Nirala market, Dumuria, and Fultola markets are presented in (Tables 2, 3, and 4). The variation of TVC in meats of different poultry markets was significant ($P<0.05$) a 5% level of probability, as shown in (Table 5). The result of TVC in three different retail markets was differed significantly ($P<0.05$). The maximum and minimum range of TVC in poultry meat recorded at Nirala market, Dumuria market, and Fultola markets were log 6.5, log 6.59, log 6.8 and log 4.80, log 5.30, log 5.90, respectively (Table 6). However, the average value of TVC at three markets are log 5.65, log 5.94, and log 6.35, as shown in (Table 6). In the Nirala market the value of TVC was lower than the Dumuria market, but it is the highest in the Fultola market shown in (Tables 2, 3, and 4). The possible cause of this variation in microbial load might be thought to be due to differences in management and hygienic practices. Observation of the investigation revealed the fact that in the case of the Nirala market, the slaughter hygiene and process of poultry meat production were relatively more hygienic in respect of sanitation and handling systems. The butchers generally are skilled, and the consumers are well conscious about risk factors and hazardous elements associated with meat production and handling. On the contrary, in Fultola markets, these are not so, the butchers are unskilled and illiterate, and the consumers mostly are poor and do not hesitate to purchase poor quality meat. The results obtained were in close agreement with the findings of Mahami et al. (2019), Sultan et al. (2017), and Adu-Gyamfi et al. (2012), respectively. The mean and standard deviation of the TCC of Poultry meat processed at slaughter yards of Nirala, Dumuria, and Fultola markets are summarized in (Tables 2, 3 and 4). The result evaluated in (Table 5) revealed that the mean values of TCC in meats of Nirala market, Dumuria and Fultola market were not significant ($P>0.05$). Nevertheless, no significant variation demonstrated between the interactions of the three markets. The interpretation of TCC in three different retail markets was not differed significantly (Table 5). The maximum and minimum range of TCC in thigh meat recorded at Nirala market, Dumuria, and Fultola markets was log 6.40, log 4.92, log 5.25 and log 3.90, log 4.20, log 4.10, respectively (Table 6). However, the average value of TCC at three markets were log 5.16, log 4.56, and logged 4.68, as shown in (Table 6). These findings are closely related to the observations of Faruque et al. (2019), Bhandari et al. (2013), and Datta et al. (2012), respectively. The mean values of TSC in Poultry meat of three different areas like Nirala market, Dumuria market, and Fultola market are summarized in (Tables 2, 3, and 4). The mean values of TSC in Poultry meat of three different areas like Nirala market, Dumuria market, and Fultola market were logged 3.19 ± 0.55, log3.44 ± 0.21, and log3.49 ± 0.75 CFU/g, respectively (Table 5). The variation of TSC in meats of the different market areas was not significant ($P>0.05$) presented in (Table 5). The interpretation of TSC in three different retail markets was not differed significantly ($P>0.05$). The maximum and minimum range of TSC in meat recorded at Nirala, Dumuria, and Fultola markets were log 3.8, log 3.78, log 4.00 and log 2.50, log 3.22, log 3.00 ,respectively (Table 6). However, the average value of TSC at three markets was log 3.15, log 3.50, and logged 3.50, as shown in (Table 6). The TSC value in the Nirala market was lower than the Dumuria market, but it is the highest in the Fultola market. This signifies the fact that all these meats are more or less handled in the same manner. The findings are also closely related to the findings of several other researchers (Sultan et al. 2017 and Bhandari et al., 2013).

The mean values of TCpC in broiler meat of three different markets like Nirala market, Dumuria ,and Fultola markets are summarized in (Tables 2, 3 ,and 4). The mean values of TCpC in Poultry meat of three different markets like Nirala, Dumuria, and Fultola markets were logged 2.31 ± 0.16, log 2.50 ± 0.02, and log 2.34 ± 0.05 CFU/g, respectively (Table 5). The result presented in Table 5 revealed that the mean values of TCpC in meats of Nirala, Dumuria, and Fultola market were highly significant with a 1% level of probability ($P<0.01$). Similarly, this variation of TCpC is observed in meats of different Poultry carcass as significant ($P<0.05$). The value of Total Campylobacter Count in three different retail markets were differed significantly ($P<0.01$). The maximum and minimum range of TSC in thigh meat estimated at Nirala, Dumuria, and Fultola markets were logged 2.60, log 2.90; log 3.10 and log 2.00, log 2.20, log 2.10 respectively evaluated in (Table 6). The average value of TSC at three markets a log 2.30, log 2.55, and log 2.60 evaluated in (Table 6). The CPC value of the Nirala market is lower than the Dumuria market, but it is the highest in the Fultola market. These findings are more similar to the findings of Isohanni (2013). Bodhidatta et al. (2013) reported a higher TCpC value from fresh broiler meat and was log 2.5 to log 3.1.

The value of TCpC at the Nirala market of Khulna City Corporation is the lowest (log 2.31) and the highest in the Fultola market (log 2.54); the findings are closely related to Hasan et al. (2015), Bjorkroth et al. (2000), and Shane et al. (2000) respectively.

© 2021 Global Journals

Table 2: Enumeration of microbial load in broiler meat obtained from the Nirala market of Khulna City Corporation.

Place of collection	Sample no.	Microbial load			
		TVC (CFU/g)	TCC (CFU/g)	TSC (CFU/g)	TCpC (CFU/gm)
Nirala Market	1	4.80	4.50	3.00	2.20
	2	6.00	5.20	3.80	2.40
	3	5.70	6.40	3.50	2.30
	4	5.00	3.90	3.40	2.40
	5	4.80	4.00	3.20	2.30
	6	5.60	4.50	3.60	2.60
	7	6.50	5.00	3.40	2.13
	8	6.00	4.00	2.60	2.31
	9	5.85	4.72	3.00	2.40
	10	6.40	5.80	3.20	2.30
	11	5.61	5.20	3.19	2.40
	12	5.40	4.50	3.20	2.50
	13	5.70	3.90	3.30	2.30
	14	5.20	4.00	2.50	2.40
	15	5.00	5.00	3.10	2.10
	16	6.20	5.00	3.00	2.00
Mean ± SD		5.61± 0.27	4.72± 0.15	3.19± 0.55	2.31± 0.17

All counts expressed in logarithms and CFU/g of meat.

Table 3: Enumeration of microbial load in Poultry meat obtained from the Dumuria market.

Place of collection	Sample no.	Microbial load			
		TVC (CFU/g)	TCC (CFU/g)	TSC (CFU/g)	TCpC (CFU/g)
Dumuria Market	1	5.80	4.70	3.50	2.50
	2	5.40	4.38	3.50	2.50
	3	5.40	4.92	3.60	2.40
	4	5.70	4.56	3.78	2.60
	5	6.30	4.85	3.29	2.90
	6	6.20	4.50	3.40	2.50
	7	5.80	4.40	3.53	2.45
	8	6.30	4.55	3.60	2.77
	9	6.20	4.88	3.35	2.45
	10	6.59	4.28	3.40	2.50
	11	6.10	4.20	3.50	2.60
	12	5.30	4.20	3.20	2.45
	13	5.84	4.30	3.24	2.35

© 2021 Global Journals

	14	5.60	4.50	3.22	2.20
	15	5.50	4.30	3.44	2.50
	16	5.40	4.50	3.60	2.50
Mean ±SD		5.84± 0.48	4.50±0.28	3.44±0.21	2.50±0.02

All counts expressed in logarithms and CFU/g of meat.

Table 4: Enumeration of microbial load in Poultry meat obtained from the Fultola market.

Place of Collection	Sample no.	Microbial load			
		TVC (CFU/g)	TCC (CFU/g)	TSC (CFU/g)	TCpC (CFU/g)
Fultola Market	1	6.50	4.60	4.00	2.70
	2	6.45	5.00	3.90	3.10
	3	6.30	4.55	3.50	2.65
	4	5.90	4.70	3.60	2.70
	5	6.80	5.00	3.70	3.00
	6	5.70	4.20	3.29	2.10
	7	6.70	4.00	4.20	2.60
	8	5.98	4.30	3.59	2.40
	9	6.29	4.50	3.20	2.60
	10	6.50	4.47	3.33	2.34
	11	6.00	5.00	3.49	2.10
	12	6.25	4.10	3.45	2.20
	13	6.40	4.00	3.00	2.30
	14	6.38	4.33	3.25	2.50
	15	6.10	4.00	3.00	2.60
	16	6.48	5.25	3.45	2.30
Mean±SD		6.29±0.12	4.47±0.06	3.49±0.75	2.34±0.05

All counts expressed in logarithms and CFU/g of meat.

Table 5: Determination of mean and standard deviation for statistical analysis of microbiological quality of poultry meat from different retail markets in Khulna District.

Retail Market	TVC Mean ± SD	TCC Mean ± SD	TSC Mean ± SD	TCpC Mean ± SD
Nirala Market	5.61 ± 0.27^{b}	4.72± 0.15^{a}	3.19 ± 0.55^{a}	2.31± 0.17^{b}
Dumuria Market	5.84 ±0.44^{ab}	4.50 ± 0.28^{a}	3.44 ± 0.21^{a}	2.50 ± 0.02^{a}
Fultola Market	6.29 ±0.12^{a}	4.47 ± 0.06^{a}	3.49 ± 0.75^{a}	2.54 ± 0.05^{a}
LSD	0.36	0.28	0.27	0.19
Level of sig.	*	NS	NS	**

** = Single asterisk (*) means Significant at 5% level of probability; ** = Double asterisk (**) means Significant at 1% level of probability; NS = Not significant*

In a column, figures with the same letters do not differ significantly ($p>0.05$), whereas figures with dissimilar letters differ significantly (as per SPSS).

© 2021 Global Journals

Table 6: Range of total viable bacteria, coliform, salmonella, and campylobacter count in poultry meats obtained from the Nirala at Khulna City Corporation, the Dumuria, and the Fultola markets.

Source	Examine	TVC			TCC			TSC			TCpC		
		Max	Min	Av.	Max	Min	Av.	Max	Min	Av.	Max	Min	Av.
Nirala Market	Meat	6.5	4.80	5.65	6.40	3.90	5.19	3.80	2.50	3.15	2.60	2.0	2.30
Dumuria Market	Meat	6.59	5.30	5.94	4.92	4.20	4.56	3.78	3.22	3.50	2.90	2.20	2.55
Fultola market	Meat	6.80	5.90	6.35	5.25	4.10	4.68	4.00	3.00	3.50	3.10	2.1	2.60

All counts expressed in logarithms and CFU/gm of meat; Av. = Average

Table 7: Cultural prevalence of E. coli in the selected retail market

No. of retail market	Type of sample	No. of samples	Positive for E. coli	Percentage
3	Thigh meat	24	9	37.50(n=24)
	Breast meat	24	21	87.50(n=24)
Total		48	30	62.20(n=48)

a) Isolation of E. coli from the selected retail market

E. coli isolated and identified from the samples after cultivation on NA, EMB agar, and MC agar. *E. coli* detected from total of 48 samples. Among them, 30 samples were found positive for *E. coli,* and the prevalence of *E. coli* in that study was 62.20% (Table 7).

Table 9: Cultural prevalence of *Salmonella spp* in the selected retail market

No. of retail market	Type of sample	No. of samples	Positive for *Salmonella*	Percentage
3	Thigh	24	7	29.16(n=24)
	Breast	24	16	66.66(n=24)
Total		48	23	49.91(n=48)

b) Isolation of Salmonella spp from the selected retail market

Salmonella spp. isolated and identified from the samples after cultivation on NA, MC agar, EMB agar, SS agar, BGA medium. *Salmonella spp.* detected from total of 48 samples 23 were found positive for *Salmonella spp*, and the prevalence of *salmonella spp* in that study was 49.91% (Table 9). The positive samples collected from the Fultola market.

IV. Conclusion

The findings of this study provide valuable data about the hygienic level for retail markets. The presence of *Escherichia coli, Salmonella spp, and Campylobacter spp* in meat must receive particular attention. These organisms are food-borne pathogens and highly responsible for causing a hazard to public health. It also reflects the poor hygienic quality of poultry meat. So the need for microbial assessment of fresh meats for human consumption is emphasized and recommended to reduce the possible hazards. Also, use of antibiotics should be considered as many strains get resistant to common antibiotics. The evidence suggests that efforts to improve food safety in poultry production should start at the village level with simple regulations directed towards addressing the most prominent deficiencies in the food-safety system into the food chain.

Acknowledgements

We acknowledge the laboratory support from Quality Feed Lab, Khulna, Bangladesh.

Conflict of Interest

None of the authors have a conflict of interest to declare.

References

1. Adu-Gyamfi A, Torgby-Tetteh W and Appiah V. 2012. Microbiological Quality of Chicken Sold in Accra and Determination of D10-Value of E. coli. Food and Nutrition Sciences, 3: 693-698.
2. Alam ST, Howard Mb, Fatema K and Haque KMF. 2015. Antibiogram of pre-processed raw chicken meat from different supershops of dhaka city, Bangladesh. Daffodil International University Journal of Allied Health Sciences. 2: 45–52.
3. Bhandari N, Nepali DB and Paudyal S. 2013. Assessment of bacterial load in broiler chicken meat from the retail meat shops in Chitwan, Nepal. Int J Infect Microbiol; 2(3):99-104. DOI: http://dx.doi.org/10.3126/ijim.v2i3.8671
4. Bintsis T. 2017. Foodborne Pathogens. AIMS Microbiol. 3(3): 529-563. doi: 10.3934/microbiol.2017.3.529.
5. Bjorkroth KJ, Geisen R, Schillinger U, Weiss N, De-Vos P, Holzapfel WH, Korkeala HJ and Vandamme P. 2000. Characterization of

© 2021 Global Journals

Leuconostocgasicomitatum sp. nov. associated with spoiled raw tomato-marinated broiler meat strips packaged under modified atmosphere conditions. Applied and Environmental Microbiology, 66: 3764-3772.
6. Bodhidatta L, P McDaniel and S Sornsakrin. 2010. Case-control study of diarrheal disease etiology in a remote rural area in Western Thailand. The American Journal of Tropical Medicine and Hygiene, 83: 1106-9.
7. Cowan ST. 1985. Cowan and Steel's manual for identification of medical bacteria. 2nd edition. Cambridge University Press, Cambridge, London, pp. 138-139.
8. Das SC, Chowdhury SD. Khatun MA, Nishibori M, Isobe N. & Yoshimura Y . 2008. Poultry production profile.
9. Datta S, Akter A, Shah IG, Fatema K, Islam TH, Bandyopadhyay A, Khan ZUM and Biswas D. 2012. Microbiological quality assessment of raw meat and meat product and antibiotic susceptibility of isolated staphylococcus aureus. Agriculture, Food and Analytical Bacteriology 2:187-194.
10. Faruque M, Mahmud S, Munayem M, Sultana R, Molla M, Ali M, Wasim M, Sarker S and Evamoni F. 2019. Bacteriological Analysis and Public Health Impact of Broiler Meat: A Study on Nalitabari Paurosova, Sherpur, Bangladesh. Advances in Microbiology; 9, 581-601. doi: 10.4236/aim.2019. 97036
11. Fratmico PM, Bhunia AK and Smith JL. 2005. Foodborne Pathogens. Microbiology and Molecular Biology, Caister Academic Press, Wymondham, Norfolk, UK, pp: 273.
12. Gomez KA and AA Gomez. 1984. Statistical procedures for agricultural research. John Wiley and sons, Inc. London, UK (2nd edtn).
13. Gonzalez-Ortiz G, Sala R, Canovas E, Abed N and Barroeta AC. 2013. Consumption of dietary n-3 fatty acids decreases fat deposition and adipocyte size, but increases oxidative susceptibility in broiler chickens. Lipids. 48(7): 705–17.
14. Hasan MM, Kabir SML, Hoda N and Amin MM. 2015. Assessment of Microbial Load in Marketed Broiler Meat at Mymensingh District of Bangladesh and its Public Health Implications. Research in Agriculture Livestock and Fisheries. 2(1): 87-95. DOI: 10.3329/ralf.v2i1.23033
15. ICMSF. 1985. Microorganism in foods; samples for Microbiological Analysis: Principles and specific applications. Recommendation of the International Commission on Microbiological Specification for Foods. Association of Microbiological Societies. Toronto, University of Toronto Press.
16. ISO. 1995. Recommendation of the meeting of the subcommittee, International Organization for Standardization, on meat and meat products. ISO/TC-36/Sc-6. The Netherlands.10-18.
17. Isohanni P, Huehn S, Aho T, Alter T and Lyhs U. 2013. Heat stress adaptation induces cross protection against lethal acid stress conditions in Arcobacterbutzleri but not in Campylobacter jejuni. Food Microbiology, 34: 431-435.
18. Javadi A and Safarmashaei S. 2011. Study of Enterobacteriacea contamination level in premises of poultry slaughterhouse with HACCP system. Journal of Animal and Veterinary Advances, 10: 2163- 2166.
19. Khalafalla FA, Fatma, Ali HM and El-Fouley A. 2019. Microbiological evaluation of chicken meat products. Journal of Veterinary Medical Research. 26(2): 151-163.
20. Kralik G, Kralik Z, Grcevic M, Hanzek D, Yiicel B and Taşkin T. 2017. Quality of Chicken Meat. Animal Husbandry and Nutrition; Ch.4 https://doi.org/ 10.5772/intechopen.72865.
21. Mahami T, Togby-Tetteh W, Kottoh DI, Amoakoah-Twum L, Gasu E, Annan SNY, Larbi D, Adjei I, and Adu-Gyamfi A. 2019. Microbial Food Safety Risk to Humans Associated with Poultry Feed: The Role of Irradiation. Hindawi International Journal of Food Science, 7 pages https://doi.org/10.1155/2019/ 6915736.
22. Maharjan S, Rayamajhee B, Chhetri VS, Sherchan SP, Panta OP and Karki TB. 2019. Microbial quality of poultry meat in an ISO 22000:2005 certified poultry processing plant of Kathmandu valley. International Journal of Food Contamination., 6:8. https://doi.org/10.1186/s40550-019-0078-5.
23. Marangoni F, Corsello G, Cricelli C, Ferrara N, Ghiselli A, Lucchin L and Poli A. 2015. Role of poultry meat in a balanced diet aimed at maintaining health and wellbeing: an Italian consensus document. Food Nutr Res. 59: doi: 10.3402/fnr.v59.27606
24. Mead GC. 2004. Microbiological quality of poultry meat: a review. Brazilian journal of poultry science, 6 (3): 135-142.
25. Shane SM. 2000. Campylobacter infection of commercial poultry: Rev Sci Tech OffIntEpiz, 19: 376- 395.
26. Sultana N, Haque MA, Rahman MA, Akter MR, Begum MD, Fakhruzzaman M, Akter Y and Amin MN. 2017. Microbiological quality of commercially available poultry feeds sold in Bangladesh. Asian Journal of Medical and Biological Research. 3(1): 52-60; doi: 10.3329/ajmbr.v3i1.32036.
27. Yashoda KP, Sachindra NM, Sakhare PZ and Rao DN (2001). Microbiological quality of broiler chicken carcasses processed hygienically in a small scale poultry processing unit. Journal of Food Quality, 24: 249–259.

© 2021 Global Journals

28. Zhou GH, Xu XL and Liu Y, 2010. Preservation technologies for fresh meat-a review. Meat Science. 86: 119-128. DOI: 10.1016/j.meatsci.2010.04.033.

© 2021 Global Journals

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 Version 1.0 Year 2021
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Clinical Evolution of a Case of Perineal Hernia in a Canine Resolved through the Technique of the Transposition of the Semitendinous Muscle

By González, R, Britez, C, Bazán, Y, Caballero, MJ & Portillo, C

Summary- The objective of the present research was to determinate the clinical evolution of a case of perineal hernia in an 11 - year - old canine half breed, solved by the technique of the transposition of the semitendinous muscle. Postoperative clinical evaluations were made, evaluating presence / absence of pathologies of healing such as ulcers, fistulas, hypertrophic scar, keloids, seromas and tumefactions. The results obtained at 30 days of evaluation showed no pain, inflammation, ulcer, fistula, seroma, hypertrophic scar, keloid and recurrent bulging, all considered favorable signs within the present study. The tissue manipulation, due to the fairly wide incision, did not generate complication beyond the hemorrhage, being an effective technique.

Keywords: *perineal hernia, canine, transposition of the semitendinous muscle.*

GJMR-G Classification: *NLMC Code: WA 360*



Strictly as per the compliance and regulations of:

© 2021. González, R, Britez, C, Bazán, Y, Caballero, MJ & Portillo, C. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at https://creativecommons.org/licenses/by-nc-nd/4.0/.

Clinical Evolution of a Case of Perineal Hernia in a Canine Resolved through the Technique of the Transposition of the Semitendinous Muscle

Evolución Clinica De Un Caso De Hernia Perineal En Un Canino Resuelto Por Medio De La Tecnica De Transposición Del Musculo Semitendinoso

González, R [α], Britez, C [σ], Bazán, Y [ρ], Caballero, MJ [ω] & Portillo, C [¥]

Resumen- El objetivo del presente trabajo de investigación fue determinar la evolución clínica de un caso de hernia perineal en un animal de la especie canina, mestizo, macho de 11 años, resuelto por la técnica de transposición del musculo semitendinoso. Se realizaron evaluaciones clínicas post operatorias, evaluando presencia/ausencia de recidivas del abultamiento, y además presencia/ausencia de patologías de la cicatrización como ser las ulceras, fístulas, cicatriz hipertrófica, queloides, seromas, también dehiscencia y tumefacción. Los resultados obtenidos a los 30 días de evaluación arrojaron ausencia de dolor, inflamación, dehiscencia, úlcera, fístula, seroma, cicatriz hipertrófica, queloide y recidivas del abultamiento, todos considerados signos favorables dentro del presente estudio. La técnica operatoria resultó muy sencilla, el anclaje de los puntos fue fácil, sin ninguna dificultad. La manipulación tisular, debido a la incisión bastante amplia, no generó ninguna complicación más allá de la hemorragia siendo una técnica bastante efectiva.

Palabras Claves: hernia perineal, canino, transposición del musculo semitendinoso.

Summary- The objective of the present research was to determinate the clinical evolution of a case of perineal hernia in an 11 - year - old canine half breed, solved by the technique of the transposition of the semitendinous muscle. Postoperative clinical evaluations were made, evaluating presence / absence of pathologies of healing such as ulcers, fistulas, hypertrophic scar, keloids, seromas and tumefactions. The results obtained at 30 days of evaluation showed no pain, inflammation, ulcer, fistula, seroma, hypertrophic scar, keloid and recurrent bulging, all considered favorable signs within the present study. The tissue manipulation, due to the fairly wide incision, did not generate complication beyond the hemorrhage, being an effective technique.

Keywords: perineal hernia, canine, transposition of the semitendinous muscle.

Author α σ: Cátedra de Técnica Operatoria, -Facultad de Ciencias Veterinarias – Universidad Nacional de Asunción – San Lorenzo – Paraguay. e-mail: rgonzalez@vet.una.py
Author ρ ω: Departamento de Post Grado de Grado, Facultad de Ciencias Veterinarias – Universidad Nacional de Asunción – San Lorenzo – Paraguay.
Author ¥: Tesista de Grado, Facultad de Ciencias Veterinarias – Universidad Nacional de Asunción – San Lorenzo – Paraguay.

I. Introducción

La hernia perineal es el resultado de la falla del diafragma pélvico muscular para soportar a la pared del recto, el cual se estira y desvía. El contenido pélvico, y en ocasiones el abdominal, puede protruir entre el diafragma pélvico y el recto. Se produce una tumefacción subcutánea ventrolateral al ano, y en las hernias bilaterales también es factible observar la proyección caudal del ano. (Slatter, 2006)

El contenido de la hernia está rodeado por una fina capa de fascia perineal (saco herniario), tejido subcutáneo y piel. El saco puede contener grasa pélvica o retroperitoneal, líquido seroso, un recto desviado o dilatado, un divertículo rectal, la próstata, la vejiga de la orina o el intestino delgado. La retroflexión vesical ocurre en aproximadamente el 20 % de los pacientes. Las hernias perineales son frecuentes en perros y raras en gatos. Ocurren casi exclusivamente en perros machos enteros (93%). En perras a menudo están relacionadas con traumatismos. La mayoría de las hernias perineales ocurre en perros de más de 5 años de edad. La edad media de presentación es de aproximadamente 10 años tanto en perros como en gatos. (Fossum, 2009, Bojrab, 2000)

La herniación perineal puede ser unilateral o bilateral. Algunos investigadores comunicaron una mayor incidencia de hernia perineal sobre el lado derecho, pero el criterio empleado para determinar unilateral vs bilateral e izquierda vs derecha es subjetivo. (Bojrab, 2000; Konig, 2008).

Los signos clínicos incluyen el abultamiento del periné, generalmente reducible, a uno o ambos lados del ano, según se trate de una hernia uní o bilateral. Se puede hallar también: estreñimiento, tenesmo y disquecia, que en ocasiones alternan con diarreas o incontinencia fecal. Si la vejiga forma parte del contenido de la hernia y se encuentra en retroflexión, el cuadro clínico puede agravarse al ser imposible la micción, llegándose a producir una azoemia postrenal (Rodríguez et al., 2005; Couto 2000).

La hernia perineal puede resolverse quirúrgicamente mediante múltiples técnicas. La

© 2021 Global Journals

elección de la más adecuada para cada caso depende principalmente del estado de la musculatura del periné (tamaño y localización del anillo, mayor o menor grado de atrofia muscular); el tipo de contenido herniario (intestino, vejiga); la experiencia del cirujano con cada una de las técnicas. Entre las técnicas quirúrgicas indicadas para la resolución de la hernia perineal se encuentran: herniorrafia simple, elevación o transposición del músculo obturador interno, transposición del músculo glúteo superficial, transposición del músculo semitendinoso, colocación de prótesis tipo malla, cistopexia, deferentopexia, colopexia (Rodríguez et al., 2005; Ettinger, 2007).

La recurrencia de la herniación perineal canina luego de la herniorrafia tradicional puede alcanzar hasta el (46%). Se comunicaron tasas de recurrencia de apenas 5% para la técnica de herniorrafia con transposición del musculo obturador interno. Cuando la técnica falla o se considera con escasas posibilidades de éxito, se recomienda optar por algunas de las siguientes metodologías: transposición del músculo semitendinoso para la reconstrucción perineal o colopexia o cistopexia mediante fijación del conducto deferente para prevenir la herniación de estructuras importantes. La transposición del músculo semitendinoso es de particular utilidad para las reconstrucciones en las cuales la zona ventral del perineo está muy afectada, como es el caso de algunas hernias perineales bilaterales. Para la herniación perineal unilateral, el músculo semitendinoso contralateral se recomienda para la reconstrucción del diafragma pélvico (Bojrab, 2000, Moller, 2015).

La presente investigación tuvo como Objetivo General determinar la evolución clínica de un caso de hernia perineal unilateral en un canino resuelto por medio de la técnica de transposición del musculo semitendinoso.

II. Materiales y Metodos

Para el estudio de caso se utilizó un animal de la especie canina, con diagnóstico clínico de hernia perineal con hiperplasia prostática, de raza mestiza, peso de 4,3 kg, 11 años de edad, de sexo macho entero, de 6 meses de evolución, y según lo manifestado por el propietario, el paciente reportaba aparte del abultamiento; tenesmo y estreñimiento. Durante el examen clínico, la palpación indicó la presencia de un abultamiento indoloro reducible, sin aumento de temperatura local, y fue realizada una palpación rectal con el dedo índice provisto de un guante de procedimiento lubricado con vaselina, no detectándose saculaciones ni materia fecal impactada, obteniéndose el diagnóstico presuntivo de hernia perineal. Para detectar alteraciones relacionadas con la próstata (prostatomegalia: Hiperplasia Prostática), se solicitó una ecografía, cuyo resultado reportó una próstata de tamaño aumentado (1,8 cm de diametro), localización abdominal, parénquima heterogéneo, bordes irregulares, con zonas anecoicas en su interior, dando el diagnóstico imagenológico de hiperplasia prostática (próstata de tamaño aumentado) y hernia perineal con contenido intestinal. Realizados los estudios pre quirúrgicos de rutina, y los exámenes complementarios, se procedió a la programación del procedimiento quirúrgico en forma rutinaria.

El día de la cirugía, el campo operatorio fue adecuadamente preparado y el paciente fue colocado inicialmente en decúbito dorsal para proceder a la orquiectomía pre escrotal de rutina a testículo y cordón cubierto, previo embrocado con solución de clorhexidina al 0,5 %, mediante aspersión, para el tratamiento de la patología prostática. Finalizada la orquiectomía, se posicionó al paciente en decúbito esternal, con los miembros posteriores suspendidos, se preparó el campo de la manera ya descrita, colocando los paños de campo correspondientes y realizando una sutura en jareta del ano. Con el perro en la posición perineal, se realizó una incisión cutánea en la piel perineal desde la base del rabo hasta el rafe medio en ventral, similar a la reparación tradicional y con la trasposición del musculo obturador interno y se la continuó a través de la línea media hacia la tuberosidad isquiática, donde se curvó y dirigió distalmente sobre la zona caudal del miembro pélvico finalizando en el área caudo medial de la transición entre la rodilla y caña de la pierna. Los contenidos herniarios se expusieron y redujeron, como en otras técnicas de herniorrafía, antes de aislar el musculo semitendinoso. Los tejidos subcutáneos sobre el musculo semitendinoso se seccionaron para su exposición. El musculo semitendinoso se aíslo en forma roma desde las estructuras circundantes, con la cautela de no lesionar el pedículo vascular proximal (arteria y vena glúteas caudales) (Figura 1)

© 2021 Global Journals



Figura N°1: Sección del musculo semitendinoso

El músculo semitendinoso se transepto lo más distal que sea posible cerca de la rodilla y se lo aisló para movilizarlo hasta la región perineal. Empleando poliamida 0, la porción transeptada del musculo semitendinoso se suturo sobre el defecto de la hernia. (Figura 2).



Figura N°2: Sutura del musculo semitendinoso sobre el defecto de la Hernia.

La piel se suturó mediante puntos simples entrecortados. (Figura 3)El sitio quirúrgico se lavó con solución salina estéril, y se mantuvo limpio durante el post operatorio inmediato. La regulación de la dieta facilitó una defecación regular y evitó excesivos esfuerzos, y la misma consistió en alimentación líquida o pastosa fácilmente digestible.



Figura N°3: Cirugía finalizada. Notese la extensa incisión realizada.

© 2021 Global Journals

Se administró al paciente, durante el post operatorio: cefalexina oral a dosis de 22 mg/kg cada 12 horas por 10 días, ketorolaco por vía oral a dosis de 2 mg/kg cada 24 horas por 3 días y tramadol vía oral 2 mg/kg cada 6 horas por 2 días. Para el estudio del resultado de la técnica, se estudió la evolución clínica a los 2, 8, 15 y 30 días en cuanto a presencia/ausencia de recidivas del abultamiento, y además presencia/ ausencia de patologías de la cicatrización: úlceras, dehiscencia, fístulas, cicatriz hipertrófica, queloides y seromas.

III. Resultados y Discusión

Tabla N°1: Signos clínicos evaluados en el paciente en estudio. San Lorenzo Paraguay 2018

Día de Evaluación	Úlceras	Fístulas	Seroma	Cicatriz Hipertrófica	Queloides
Día 2	Ausente	Ausente	Presente	Ausente	Ausente
Día 8	Ausente	Ausente	Ausente	Ausente	Ausente
Día 15	Ausente	Ausente	Ausente	Ausente	Ausente
Día 30	Ausente	Ausente	Ausente	Ausente	Ausente

La primera evaluación post operatoria fue realizada a las 48 hs. (Figura 4) de finalizado el procedimiento. Se presentó aumento de la sensibilidad a la palpación de la región (tumefacción) y secreción de tipo serosanguinolenta que emanaba por la herida (seroma), lo cual se consideró normal dentro del proceso fisiológico de lacicatrización, debido a la manipulación tisular, no observándose ulceras, dehiscencia, fistulas, cicatriz hipertrófica ni queloides. Todos estos signos encontrados (tumefacción local, edema y dolor a la palpación presión) son coincidentes con Smith y Jones,1987 que afirman que los signos cardinales de la inflamación son rubor, tumor, calor y dolor.



Figura N°4: Evolución de 48 hs.

El rubor se debe al gran aumento de sangre en la zona inflamada. El tumor o hinchazón resulta del aumento de la sangre y de la presencia adicional de sustancias que exudan de los vasos sanguíneos en los tejidos vecinos. El calor también resulta del aumento de la corriente sanguínea que lleva el calor de los órganos internos a la periferia. El dolor es atribuido a un aumento en la presión sobre las terminales nerviosas.

En el día 8 (Figura 5), a la palpación de la zona presentó sensibilidad con una ligera inflamación, sin dehiscencia ni fistula, ausencia de seroma y otras patologías de la cicatrización, los fenómenos inflamatorios disminuyeron en intensidad. La fase fibroblástica de la cicatrización dura entre 2 a 4 semanas dependiendo de la herida, y a medida que el contenido de colágeno en la herida aumenta, disminuye

© 2021 Global Journals

el contenido en glicoproteínas y mucopolisacáridos y la síntesis de fibroblastos.

Los capilares empiezan a regresar y el porcentaje final del colágeno sintetizado, disminuye para equilibrar finalmente la proporción de colágeno destruido (Slatter, 2006).



Figura N°5: Evolución de 8 días.

A los 15 días fueron retirados los puntos de sutura. Tanto en el día 15, como en el 30 (Figura 6), ya no se percibió aumento de sensibilidad, inflamación, fistulas, seromas, ni ninguna otra patología de la cicatrización, recidivas del abultamiento. La técnica de transposición del musculo semitendinoso puede usarse en animales con una musculatura perineal muy debilitada o atrofiada, así como también en hernias de presentación bilateral. En casos de hernia unilateral, para su reconstrucción, se utiliza el músculo semitendinoso contralateral.



Figura N°6: Evolución de 30 días.

En el estudio realizado por Möller, 2015, evaluó la misma técnica estudiada en este trabajo donde los perros intervenidos no presentaron problemas locomotores o de movimiento articular en el miembro operado; por otro lado, se observó que el músculo traspuesto se mantuvo contráctil por 90 días, pero posteriormente sufrió un proceso atrófico. Algunas de las mayores complicaciones observadas al aplicar esta técnica fueron la acumulación de secreciones o la dehiscencia de los puntos, que pueden ser reducidas mediante el uso de drenajes. En el paciente utilizado para el estudio no se observó ningún tipo de problema locomotor.

Ramírez, et al 2015, realizaron un estudio retrospectivo de los casos de hernia perineal en el Hospital Clínico Veterinario de la Universidad de Extremadura (España). Los casos de hernia perineal representaron 0,96% de la población. Los machos

© 2021 Global Journals

constituyeron un 98,2% y las hembras 1,2%. Los pacientes tenían una edad media de 8,69 años, y una desviación típica de 2,19 años. El peso fue de 16,4 kg ± 11,44 kg (media ± desviación típica).

Se encontraron 18 hernias perineales bilaterales, 40 unilaterales derechas y 20 unilaterales izquierdas, con 96 hernias perineales. Fueron intervenidos 67 pacientes, sumando 80 hernias perineales operadas. Presentaron retroflexión de vejiga el 13,6% de los casos y afectación de la próstata el 21%. Estos datos reportados, fueron resueltos por medio de la técnica de transposición del obturador interno, son parcialmente coincidentes con los presentados en el paciente estudiado en esta investigación, el cual reportaba una hernia unilateral derecha el cual representa mayor casuística; también con afectación de la próstata Cuenca 2014 realizo un estudio en el Hospital Veterinario de la Facultad de Ciencias Veterinarias – UNA, con el objetivo de determinar la frecuencia de caninos afectados por hernias perianales entre los años 2007 al 2012, los resultados obtenidos indicaron que los caninos mayormente afectados fueron machos (92.5 % de un total de 80 caninos), mayores de 5 años (87.5 %) alimentados con comida cacera y balanceado. Estos resultados coinciden con lo presentado en el paciente estudiado ya que en la anamnesis el propietario manifestó alimentar a su mascota con comida casera y balanceado.

Según el estudio de Ramírez, et al. 2015, la tasa de recidiva de la enfermedad depende de diversos factores. Hay autores que señalan que la inexperiencia del cirujano podría ser un factor clave, con unas tasas de recidiva muchísimo mayor para cirujanos inexpertos comparado con expertos.

La técnica quirúrgica también puede considerarse un factor clave en la tasa de recidiva, siendo muy variable dependiendo de la técnica empleada. Para la transposición del músculo obturador interno hay referencias de una recurrencia de entre el 2,4% y el 19%, no se encontraron estudios sobre la recurrencia empleando la técnica de transposición del musculo semitendinoso. La anatómica recoge en este estudio tasas de recurrencia mucho más altas, en otro estudio en el que también se usaron ambas técnicas, describe una tasa de recidiva del 8% y dicho porcentaje se ciñe exclusivamente a la anatómica.

En cualquier caso, la tasa de recidiva utilizando técnicas de colgajos musculares son muy bajas; está claro que requiere un aprendizaje previo para reducir las recidivas por inexperiencia del cirujano, pero debe considerarse una técnica fiable y segura para la herniorrafia perineal. Así mismo, no se considera necesario adicionar una malla de polipropileno a la técnica, ya que tanto estos resultados como los encontrados en la bibliografía no muestran una disminución significativa de las recidivas, además de que la colocación de la malla supone un costo extra, que no parece necesario, y prolonga el tiempo de cirugía (Fernández, 2016).

En cuanto a la valoración del método, procedimiento y la técnica operatoria, debido a la gran manipulación tisular en la región del procedimiento quirúrgico se pueden evidenciar muchos fenómenos relacionados a la inflamación, la hemorragia fue moderada aplicando dicha técnica y el cierre del defecto herniario se produjo de manera completa, no existiendo tensión excesiva en la rrafia muscular.

IV. Conclusión

Se concluye, según los resultados obtenidos a los 30 días de avaluación fueron: ausencia de seromas, ulceras, fistulas, recidiva del abultamiento, considerando favorable dentro del presente estudio, y no fueron observadas patologías de la cicatrización dentro de los tiempos esperados.

Se recomienda la realización de estudios similares a fin de tener mayor base de datos y respaldo a la hora de implementar esta técnica quirúrgica ya sea en otros caninos o en diferentes especies animales, utilizando otras técnicas, como la trasposición del obturador interno, cistopexia, deferentopexia, o colopexia.

Refencias Bibliograficas

1. SLATTER, D. 2006. Tratado de cirugía en pequeños animales. 3a ed. Buenos Aires: Intermédica. 895 p.
2. FOSSUM, T. 2009. Cirugía en pequeños animales. 3a ed. Barcelona: Elsevier. 1610 p.
3. BOJRAB, J.; ELLISON, G.; SLOCUM, B. 2000. Técnicas actuales en cirugía de pequeños animales. 4a ed. Buenos Aires: Intermédica. 1276 p.
4. KONIG, H. E.; LIEBICH, H. 2008. Anatomía de los animales domésticos. 2a ed. Buenos Aires: Panamericana. 400 p.
5. RODRIGUEZ GOMEZ, J.; GRAUS MORALES, J.; MARTINEZ SAÑUDO, M. 2005. Cirugía en la clínica de pequeños animales. la parte posterior. Zaragoza, España: Servet. 296 p.
6. COUTO, C. G.; NELSON, R. W. 2000. Medicina interna de animales pequeños. 2a ed. Buenos Aires, Argentina: Intermédica. 1467 p.
7. ETTINGER, S. J. 2007. Tratado de medicina interna veterinaria: enfermedades del perro y el gato. 6a ed. Amsterdan: Elsevier. V.1, 912 p.
8. DYCE, K. M.; SACK, W. O.; WENSING, C. J. 2012. Anatomia veterinaria. 4a ed. Mexico: El Manual Moderno. 833 p.
9. FERNANDEZ MARTIN, A. 2016. Hernia perineal canina: reconstrucción del diafragma pélvico con malla de polipropileno a través de doble abordaje.

© 2021 Global Journals

Tesis (Doctor en Veterinaria). Madrid: Universidad Complutense de Madrid, Facultad de Veterinaria. 69 p.

10. MÖLLER, R. 2015. Evaluación y caracterización de las mallas de polietileno de alta densidad para su uso como implantes en cirugía veterinaria (en línea). Consultado 28 abr. 2018. Disponible en: https://buleria.unileon.es/bitstream/handle/10612/4180/tesis_504cd9.PDF
11. SMITH, H. A.; JONES, T. C. 1987. Patología veterinaria. 2ª ed. México: Hispano Americana. 1023 p.
12. RAMÍREZ, A.; PASTOR, N.; DURÁN, M. E.; GUTIÉRREZ, A.; EZQUERRA, L. 2015. Hernia perineal en el perro, un studio de prevalencia de 81 casos (en línea). Consultado 6 abr. 2018. Disponible en: http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?vid=9&sid=5913f3f8-5cbc-452c-bf33-8e32ea353f85%40sessionmgr120.
13. CUENCA SIMON, J. A. 2014. Frecuencia de hernias perineales en caninos que concurrieron al Hospital de la Facultad de Ciencias Veterinarias de la Universidad Nacional de Asunción, en los años 2007 al 2012. Tesis (Doctor en Ciencias Veterinarias). San Lorenzo, Paraguay: Orientación Medicina Veterinaria. FCV. U.N.A.

© 2021 Global Journals

This page is intentionally left blank

© 2021 Global Journals

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 Version 1.0 Year 2021
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Detection of Hepatic Problem in Dogs and Cats by Biochemical Assay and Imaging Technique (X-Ray and Ultrasonography)

By Mizanur Rahman, Mohammad Bayazid Bostami, Aparna Datta, Tridip Das, Mir Md. Afzal Hossain & Abdul Mannan

Chattogram Veterinary and Animal Sciences University

Abstract- Keeping pet (dogs and cats) has become a cultural phenomenon throughout the world including Bangladesh. Hepatic problem is an important health issue that may cause mortality of these pet. This study was conducted with the aimed to detect the hepatic problem in dogs and cats along with its frequency in different sex, age and breeds of animals. A total of 100 clinically suspected animals (50 dogs and 50 cats) were included in the study. After thorough clinical examination, 2 ml bloods were collected by venue puncture in serum vials for biochemical analysis. After that all animals were subjected to x-ray and ultrasonography. In biochemical analysis standard deviation of hepatic enzymes (902.48 u/l ALP, 626.66 u/l ALT, 722.98 u/l AST in dog and 564.22 u/l ALP, 300.06 u/l ALT, 340.00 u/l AST in cat) and bilirubin (2.02 mg/dl in dog and 5.22 mg/dl in cat) were remarkably above the mean value (333.86±127.63 u/l ALP, 256.36±88.62 u/l ALT, 261.62±102.24 u/l AST, bilirubin 0.72±0.29 mg/dl in dog and 245.42±79.79 u/l ALP, 180.16±42.43 u/l ALT, 188.99±48.08 u/l AST, 1.81±0.74 mg/dl bilirubin in cat).

Keywords: serum biochemistry, x-ray, ultrasonography, hepatic problem, dogs and cats.

GJMR-G Classification: NLMC Code: QW 70



Strictly as per the compliance and regulations of:

© 2021. Mizanur Rahman, Mohammad Bayazid Bostami, Aparna Datta, Tridip Das, Mir Md. Afzal Hossain & Abdul Mannan. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at https://creativecommons.org/licenses/by-nc-nd/4.0/.

Detection of Hepatic Problem in Dogs and Cats by Biochemical Assay and Imaging Technique (X-Ray and Ultrasonography)

Mizanur Rahman [α], Mohammad Bayazid Bostami [σ], Aparna Datta [ρ], Tridip Das [ω], Mir Md. Afzal Hossain [¥] & Abdul Mannan [§]

Abstract- Keeping pet (dogs and cats) has become a cultural phenomenon throughout the world including Bangladesh. Hepatic problem is an important health issue that may cause mortality of these pet. This study was conducted with the aimed to detect the hepatic problem in dogs and cats along with its frequency in different sex, age and breeds of animals. A total of 100 clinically suspected animals (50 dogs and 50 cats) were included in the study. After thorough clinical examination, 2 ml bloods were collected by venue puncture in serum vials for biochemical analysis. After that all animals were subjected to x-ray and ultrasonography. In biochemical analysis standard deviation of hepatic enzymes (902.48 u/l ALP, 626.66 u/l ALT, 722.98 u/l AST in dog and 564.22 u/l ALP, 300.06 u/l ALT, 340.00 u/l AST in cat) and bilirubin (2.02 mg/dl in dog and 5.22 mg/dl in cat) were remarkably above the mean value (333.86±127.63 u/l ALP, 256.36±88.62 u/l ALT, 261.62±102.24 u/l AST, bilirubin 0.72±0.29 mg/dl in dog and 245.42±79.79 u/l ALP, 180.16±42.43 u/l ALT, 188.99±48.08 u/l AST, 1.81±0.74 mg/dl bilirubin in cat). The standard deviation of other parameters like albumin, total protein, BUN, glucose and cholesterol were below the mean value. Some abnormal morphology (misshaped and enlarged liver) and pharenchymal lesions (hypoechoic zone and thickened capsule) were also found in some animals in x-ray and ultrasonography respectively. Hepatic problems were recorded 18% and 12% by serum biochemistry and 6% and 4% by imaging techniques (x-ray and USG) in case of dogs and cats respectively. In age wise distribution, old animals (more than 5 years) (50% in both dog and cats) were more susceptible for hepatic problem that was statistically significant ($P<0.05$). In conclusion, a good percentage of hepatic problems were identified in both dogs and cats and was more in old animals. So, it is encouraging the pet owner to regular check up their pet in older age to diagnose the hepatic problems in earlier stage. This early diagnosis will be helpful for effective treatment.

Keywords: serum biochemistry, x-ray, ultrasonography, hepatic problem, dogs and cats.

Author σ ρ ¥ §: Teaching and Training Pet Hospital and Research Center, Chattogram Veterinary and Animal Sciences University, Chattogram-4225, Bangladesh. e-mails: bayazid.vet39@gmail.com, aparnadvm12@gmail.com, afzalhossaindvm@gmail.com, mannanhasmi_2008@yahoo.com

Author ω: Poultry Research and Training Centre, Chattogram Veterinary and Animal Sciences University, Chattogram-4225, Bangladesh. e-mail: tridipdas@cvasu.ac.bd

Corresponding author α: Mizanur Rahman, Teaching and Training Pet Hospital and Research Center, Chattogram Veterinary and Animal Sciences University, Chattogram-4225, Bangladesh. e-mail: mizan.dvm20@gmail.com

I. Introduction

Keeping pet has become a cultural phenomenon in the advanced world. Currently around 13 million of households (48%) own a pet (excluding fish) in the UK (Islam et al., 2013). Dogs (23%) and cats (18%) are the most common pet animals in their houses in Britons currently. In the USA, around 62% of all households have a pet (Pet Industry Market Size and Ownership Statistics, 2013). In terms of number of dogs and cats the figures are around 78.2 million and 86.4 million respectively in the USA. A similar picture has been observed in Europe, Australia, and South East Asia including China, Japan and India. In Bangladesh the pet populations are also increasing day by day. Hypothetically, dog and cat populations in Bangladesh are predicted as 1.6 million and 1 million respectively. This increasing trend of having a pet in the home has been attributed to various reasons including 'misfiring of parental instincts, biophilia (a hypothetical biologically based love of nature), social contagion, the tendency for the middle class to emulate the customs of the rich, the need to dominate the natural world, social isolation in urban societies, and the desire to teach responsibility and kindness to children' (Herzog, 2011). But several health problems of the pet make their owners more tensed and worried. These health problems sometimes may cause mortality in pets. Hepatic problem is one of them. Infectious and inflammatory hepatobiliary diseases are common causes of morbidity and mortality in canine and feline patients (Callahan et al., 2011). The prevalence of the hepatic problems in dog and cat is 1.24% and 0.41% respectively (Apalkova, 2013). The common liver problems in dogs are hepatitis, chirrosis, bile duct obstruction, gall bladder inflammation, circulatory or blood vessels abnormalities, cancer and toxins (Willard et al., 2012). In case of cat, cholangiohepatitis, hepatic lipidosis and chronic hepatitis are the common problems of liver (Fluen et al., 2019). Liver diseases are considered often to remain under diagnosed. Clinical signs can be absent for a long time until the disease has progressed to a severe stage. Therefore laboratory findings, such as elevated liver enzymes in multiple samples, are what lead to suspect a liver disease more often than clinical signs.

© 2021 Global Journals

Presence of the liver disease is then usually confirmed with more specific laboratory tests that give clue on liver function (Apalkova, 2013). Although serum biochemistry is considered as important preliminary tools for proceeding toward the correct diagnosis and treatment protocol, radiography is also useful to evaluate the morphologic abnormalities and ultrasonography (USG) is an excellent non-invasive way to evaluate liver parenchyma (Kumar et al., 2012). The literature about biochemical alteration and imaging technique in liver problems is scarce. As per our knowledge, there were no previous published reports on clinical finding and laboratory alterations of liver disorders under Bangladeshi conditions. Hence, the present study was undertaken to detect hepatic problems by assessing several aspects of blood biochemical profile and using imaging techniques (X-ray and USG) in clinically suspected animals. The study was basically focused on only hepatic problems broadly not specific causes or condition in the liver.

II. Materials and Methods

a) Ethical statement

The study was carried out with the permission of the director of clinics. The verbal consent from the animal's owner was taken as they visited to the clinics for treatment purpose of the animals. The sample was collected with minimum discomfort of the animal.

b) Study area, period and animals

The present study was conducted through the period of October, 2020 to March, 2021 on 100 animals (50 dogs and 50 cats) that were presented at Teaching and Training Pet Hospital and Research Center of Chattogram Veterinary and Animal Sciences University. Animals of sexes (male and female), different age category like young (upto 1 year), adult (<1 to 5 years) and old (<5 years) and breeds were included in the study. The animals that had signs like anorexia, polyuria (PU), polydipsia (PD), abdominal distension, weight loss, anemia, and jaundice were considered for sample collection.

c) Clinical examination

Each animal was subjected to a detailed clinical examination. Each animal was thoroughly evaluated for its general condition, inspection of mucous membranes, hydration status, signs of pain, and abdominal distension. Information regarding feeding history, polyuria, polydipsia and weight loss were known from the owner by face to face interview.

d) Blood and data collection

Blood sample (2.5 ml) was collected from cephalic vein of each animal using sterile disposable needle. Before collection, the puncture area was cleaned and disinfected with 70% alcohol. The collected blood was stored in serum vials for biochemical analysis. Data regarding age, sex and breed were collected from hospital case record sheet.

e) Serum biochemistry

After clotting, serum was separated by centrifugation and transferred to a dry clean vial for further evaluation. Humalyzer 3000 semi-automated chemistry system was used to determine the serum activities of alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), bilirubin, total proteins, albumin, blood urea nitrogen (BUN), creatinine, cholesterol, and glucose. The hepatic problems were considered in those animals where the bilirubin, ALP, ALT and AST value were significantly above the reference value.

f) Imaging technique (x-ray and ultrasonography)

All the animals were subjected to chest and abdominal x-ray. After x-ray exposure, abdominal ultrasonography was performed following appropriate procedure. Before USG scanning, the whole ventral abdomen was shaved in each animal. Abnormal morphology (altered size, shape and structure) in x-ray and parenchymal changes in ultrasonography were helped in diagnosis of hepatic problems in some animals.

g) Statistical analysis

All data were stored in excel sheet 2007 and descriptive statistics were calculated in its by using excel sheet software. Frequency distributions were analyzed by using statistical software stata 2017. Significant was considered when p-value<0.05 for chi square test. The occurrences were calculated by dividing total animals with positive case and multiplied by hundred.

III. Results

a) Biochemical analysis findings

The standard deviation were found 2.02 mg/dl (bilirubin), 902.48 u/l (ALP), 626.66 u/l (ALT), 722.98 u/l (AST) for dog and 5.22 mg/dl (bilirubin), 564.22 u/l (ALP), 300.06 u/l (ALT), 340.00 u/l (AST) for cat. The mean values were 0.72±0.29 mg/dl (bilirubin), 333.86±127.63 u/l (ALP), 256.36±88.62 u/l (ALT), 261.62±102.24 u/l (AST) for dog and 1.81±0.74 mg/dl (bilirubin), 245.42±79.79 u/l (ALP), 180.16±42.43 u/l (ALT), 188.99±48.08 u/l (AST) for cat. The higher standard deviation value for bilirubin, ALP, ALT and AST in both dogs and cats indicates that the data above the mean value and were not clustered around the mean. The data showed that there were remarkable changes on bilirubin, ALT, ALP and AST value that indicated hepatic problems in some study animals (Table 3 and 4).

© 2021 Global Journals

b) Imaging techniques (x-ray and ultrasonography) findings

In x-ray and ultrasonography, abnormal structural morphology (misshaped and enlarged liver), abdominal fluid and abnormal parenchymal lesion (hypoechoic foci and thickened capsule with hyperechoic foci) were found in some dogs and cats respectively (Figure 1 and 2).

c) Occurrence and frequency distribution of hepatic problem in dogs and cats

The occurrence of hepatic problems in dogs and cats were recorded 18% (9/50) and 12% (6/50) through biochemical analysis respectively. In imaging techniques (x-ray and USG) it was found 6% (3/50) and 4% (2/50) hepatic problems in dogs and cats respectively. The occurrence of hepatic problems was higher in older dogs (50%) and cats (50%) followed by young (0% in dog and 20% in cat) and adult (0% in dog and 5.13% in cat) which is statistically significant ($P<0.05$) (Table 3 and 4). In case of sex, male dogs (22.22%) and cats (20.0%) were more susceptible for hepatic problems than female (13.04% in dogs and 3.85% in cat) (Table 3 and 4). German shepherd dog breeds (42.86%) were more prone to hepatic problems followed by Lash apsu (28.57%), Mixed breed (20.0%) and Local dogs (12.50%) in dogs (Table 3). Local cat breeds (19.05%) were highly susceptible followed by Persian cat (10.53%), Mixed (0%) and Exotic cat (0%) for hepatic problems (Table 4). The hepatic problems were considered in those animals where the bilirubin, ALP, ALT and AST value were significantly above the reference value. Additionally abnormal morphology (altered size, shape and structure) in x-ray and parenchymal changes in ultrasonography were also helped in some animals.

IV. Discussion

Hepatic enzyme assay are performed widely as a popular measurement of the condition of the liver (Watson et al., 2009). These are alanine transaminase (ALT), aspartate transaminase (AST) and alkaline phosphatase (ALP). Among these ALT and AST are present higher concentrations in cytosol of hepatocytes and elevated if there is hepatocyte damage. The ALP and GGT enzymes are epithelial, membrane-bound produced from biliary tract in response to certain stimuli, such as cholestasis (Watson et al., 2009). Increased level of these liver enzymes may be a sign of damage to the liver (Center et al., 2007). In our study animal, standard deviation values (902.48 u/l ALP, 626.66 u/l ALT, 722.98 u/l AST in dog and 564.22 u/l ALP, 300.06 u/l ALT, 340.00 u/l AST in cat) of these enzymes were significantly larger than mean values (333.86±127.63 u/l ALP, 256.36±88.62 u/l ALT, 261.62±102.24 u/l AST in dog and 245.42±79.79 u/l ALP, 180.16±42.43 u/l ALT, 188.99±48.08 u/l AST in cat) indicate remarkably elevation of these enzymes resulting from hepatic problems. These findings were supported by the previous literature. Hyperbilirubinemia is found when the hepatic problem becomes severe stage (Watson et al., 2009). As bilirubin may be normally found in the urine of dogs, very high levels suggest a liver disease. In case of cats bilirubinuria is a clinically important finding (Watson et al., 2009). Standard deviations of bilirubin (2.02 mg/dl in dog and 5.22 mg/dl in cat) were also higher than the mean value (0.72±0.29 mg/dl in dog and 1.81±0.74 mg/dl in cat) in case of both dogs and cats that represents elevation in some animals. As there were changes in the hepatic enzymes value, it might be related to the hepatobilliary problems in both dogs and cats. Decreased albumin and total protein levels may be related to a liver disease, since liver is the only organ producing albumin (Apalkova et al., 2013). Standard deviations of albumin and total protein were below the mean values indicates data points were closed to the average in our study. Liver also metabolizes ammonia to urea, so blood urea nitrogen concentration may fall (Watson et al., 2009). Liver play role in metabolism, its dysfunction may affect numerous other processes and thus change various laboratory findings, such as glucose and cholesterol levels (Watson et al., 2009). Standard deviations value of albumin, total protein, BUN, glucose and cholesterol were below the mean values indicate data points were closed to the average in our study. These findings were not lined with the previous study. These variations may be due to initial stage of hepatic problems or changes of these values were not significant in all hepatic problems diagnosed animal.

Abdominal ultrasonography (US) is the most useful technique for detecting a hepatobiliary disease (Guillot et al., 2009, Feeney et al., 2008). It shows the changes in the parenchymal structure as variation in echogenicity. This helps comparing hepatic tissue to other soft tissues, as well as determining heterogeneous structures within the hepatic parenchyma (Watson et al., 2009). Similarly, some parenchymal lesions like thickened hepatic capsule and hypoechoic lesion (cyst or tumor) in advance stage of hepatic problems were found in this study.

Radiography usually helps in liver diagnostics mostly to detect the size and shape of the liver and possibly to point the lesions more specifically (Watson et al., 2009). Hepatomegaly may be seen as caudal dislocation of gastric axis and pylorus in lateral view of the abdomen (Apalkova et al., 2013). Microhepatia is not as clearly seen, but may be visible as a more perpendicular angle of gastric fundus to the spine in the right lateral projection (Watson et al., 2009). Focal enlargement of one hepatic lobe is shown as dislocation of the organs nearest to the lobe. Agreed with these statements there were some abnormal morphologies

© 2021 Global Journals

(enlarged and misshaped) of liver were detected in radiology in the current study.

The occurrence of hepatic problems in our study was recorded 18% and 12% in dogs and cats respectively in serum biochemistry. On the other hand, 6% and 4% hepatic problems were recorded in dogs and cats respectively in imaging techniques (x-ray and USG). These observations were so far higher than the observations of some studies where they recorded 1.24% and 0.41% in dogs and cats respectively (Apalkova et al., 2013) and 3.51% in dogs only (Bagherwal et al., 2018). Besides, our findings were also lower than a separate report on dogs (55.12%) conducted by Lakshmi et al., (2017). This variation in prevalence may be due to study on clinically suspected animals, difference in sample size and geographical variation. The figure in imaging techniques was lower and it may be due to morphological and parenchymal changes occurs only when the hepatic problem becomes more severe and in advance stage.

Though all ages are susceptible for liver disease in dogs and cats, older animals (more than 5 years old) were more susceptible (Bagherwal et al., 2018). Similarly, the hepatic problems were higher (50% both in dogs and cats) in old animals (more than 5 years old) than young (0% and 20% in dogs and cats respectively) and adults (0% and 5.17% in dogs and cats respectively) in our study. Similar observations were found by Maindigers et al., (2004) where reported highest hepatic problems were in older animals aged more than five years or more. This may be due to mechanical use of the liver and also reduced in body self immunity with progression of age.

In sex wise measurements, males (22.22% and 20.83% in dogs and cats respectively) were highly susceptible for hepatic problems than female (13.04% and 3.85% in dogs and cats respectively) in our study. This observation was opposed with the observations of Bagherwal et al., (2018) where reported females were more susceptible than male. But supported with the findings of Lakshmi et al., (2017) where they found males were more prone to hepatic problems. This difference may be due to disproportionate sampling in the study animals.

Breed wise predisposition revealed German shepherd (42.86%) was highest proportion followed by Lash Apsu (28.57%), Mixed breed (20.0%) and Local dog (12.50%). This finding was not agreement with study of Bagherwal et al., (2018) and Lakshmi et al., (2017) where they found higher proportion in Labrador Retriever followed by German Shepherd, Cross breed, Rottweiler etc. Higher proportion in German shepherd may be due to higher population of in the study area or disproportionate in sampling. In case of cat higher percentage of hepatic problems were found in local cat (19.05%) followed by Persian cat (10.53%). Although there is no breed predisposition for hepatic problems in cats (Apalkova et al., 2013), higher percentage in local cat in this study may be due to increase tendency to visit outside that increase the chance of contact with other cats and dust.

V. Conclusion

Hepatic problems were highly found in clinical patients (dog and cat). Different breeds of male older aged animals were highly susceptible for hepatic problems in case of both dog and cat. Clinical history, clinical examination gave a clue of hepatic problems. Significantly altered hepatic enzymes made definitive diagnosis of hepatic problem as clinical signs become prominent in advance stage. Ultrasonography and x-ray were also helped to definitive diagnosis of hepatic problem in advance stage in some animals. According to our findings, it is highly suggestive to the pet owner to check their pets especially in older animal regularly to detect the hepatic problem in earlier and it will be helpful for effective treatment.

Acknowledgements

The author would like to thank director and all staff of Teaching and Training Pet Hospital and Research Center of Chattogram Veterinary and Animal Sciences University (CVASU) for their assistance and support during study. The author also expressed gratitude to directorate of research and extension, CVASU and university grant commission (UGC), Bangladesh for their financial support to conduct the study.

Abbreviations and acronyms

ALP- Alkaline phosphatase
ALT- Alanine transaminase
AST- Aspartate aminotransferase
BUN- Blood urea nitrogen
CVASU- Chattogram Veterinary and Animal Sciences University
UGC- University grant commission
USG- Ultrasonography
P value- Pearsion value
ml- mili liter
mg- mili gram
dl- deci liter
u/l- micro liter
%- percentage

Conflict of interest

There is no conflict of interest.

References Références Referencias

1. Pet Industry Market Size & Ownership Statistics, 2013. [Online]. Available: http: //www.americanpetproducts.org/press_industrytrends.asp.[Accessed: 13-Jul-2013].

© 2021 Global Journals

2. Apalkova I. 2013. Prevalence and diagnosis of liver diseases in small animal university hospital 2007-2010: a Retrospective Study. / Dissertations and theses / Master's Theses / Faculty of Veterinary Medicine / View Item.
3. Bagherwal RK, Kumbhkar Y, Mehta HK, Badsar P. A preliminary study on prevalence of hepatic disorders in dogs in Indore District (MP). The Indian Journal of Veterinary Sciences and Biotechnology 2018 Jan 9; 13(03): 87-9. http://dx.doi.org/10.21887/ijvsbt.v13i3.10617.
4. Callahan Clark JE, Haddad JL, Brown DC, et al. Feline cholangitis: a necropsy study of 44 cats (1986-2008). J Feline Med Surg 2011; 13: 570–6. doi: 10.1016/j.jfms.2011.05.002.
5. Center SA, Slater MR, Manwarren T, Prymak K. Diagnostic efficacy of serum alkaline phosphatase and gamma-glutamyltransferase in dogs with histologically confirmed hepatobiliary disease: 270 Cases (1980-1990). J Am Vet Med Assoc 1992; 201:1258-1264. PMID: 1358870
6. Center SA. Interpretation of liver enzymes. Vet Clin North Am Small Anim Pract 2007; 37:297-333, vii. doi: 10.1016/j.cvsm.2006.11.009
7. d'Anjou MA, Penninck D, Cornejo L, Pibarot P. Ultrasonographic diagnosis of portosystemic shunting in dogs and cats. Vet Radiol Ultrasound 2004; 45: 424-437. https://doi.org/10.1111/j.1740-8261.2009.01572.x
8. Feeney DA, Anderson KL, Ziegler LE, et al. Statistical relevance of ultrasonographic criteria in the assessment of diffuse liver disease in dogs and cats. Am J Vet Res 2008; 69:212-221. doi: 10.2460/ajvr.2005.66.113.
9. Fluen T, Hardcastle M, Smith HL, Gear RN. Retrospective study of the relative frequency of feline hepatobiliary disease in New Zealand based on 10 years of hepatic biopsy samples. Vet Rec Open 2019 Jan; 6(1): e000367. doi: 10.1136/vetreco-2019-000367.
10. Guillot M, Danjou MA, Alexander K, et al. Can sonographic findings predict the results of liver aspirates in dogs with suspected liver disease?. Vet Radiol Ultrasound 2009; 50: 513-518. https://doi.org/10.1111/j.1740-8261.2009.01572.x
11. Herzog H. The Impact of pets on human health and psychological well-being: Fact, Fiction, or Hypothesis?, Curr Dir Psychol Sci 2011; 20(4): 236–239. doi: 10.1177/0963721411415220.
12. Islam A, Towell T. Cat and dog companionship and well-being: A systematic review. Int J Appl Psychol 2013; 3(6):149-55. doi: 10.5923/j.ijap.20130306.01.
13. Kumar V, Kumar A, Varshney AC, Tyagi SP, Kanwar MS, Sharma SK. Diagnostic imaging of canine hepatobiliary affections: A review. Vet Med Int 2012 Jan 1; 2012. doi: org/10.1155/2021/5542372.
14. Lakshmi K, Padmaja K, Nagaraj P, Reddy AG, Prakash MG. Incidence of hepatobiliary disorders in dogs. J Pharm Innov 2017 May 1; 6(5, Part B):70. doi: http://dx.doi.org/10.22271/tpi.
15. Mandigers PJJ, Van den Ingh TS, Spee B, Penning LC, Bode P, Rothuizen, J. Chronic hepatitis in Doberman Pinschers: A review. Vet Q 2004; 26: 98-106. doi: 10.1080/01652176.1979.9693713.
16. Watson PJ, Bunch SE. Hepatobiliary and exocrine pancreatic disorders. In: Nelson RW, Couto CG, eds. Small animal internal medicine. 4th ed. ed. St. Louis, Mo: Mosby/Elsevier; cop. 2009; 485-578.
17. Willard, MD, et al., Small animal clinical diagnosis by laboratory methods 2012; 208-209.
18. Yeager AE, Mohammed H. Accuracy of ultrasonography in the detection of severe hepatic lipidosis in cats. Am J Vet Res 1992; 53:597-599. doi: 10.2460/ajvr.2005.66.113.

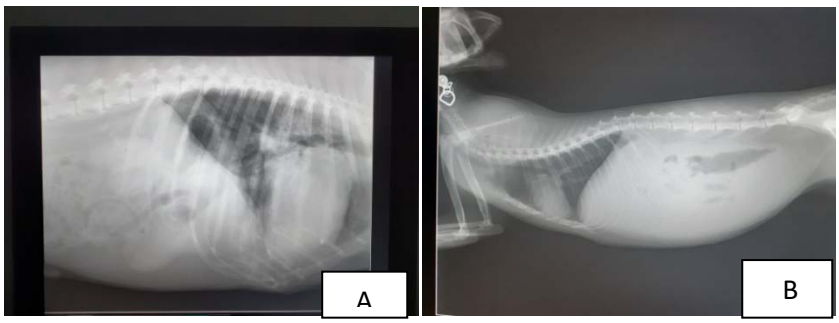


Figure 1: Hepatomegaly and borders are not sharpen (A); Fluid filled abdomen due to hepatic problem (B)

© 2021 Global Journals

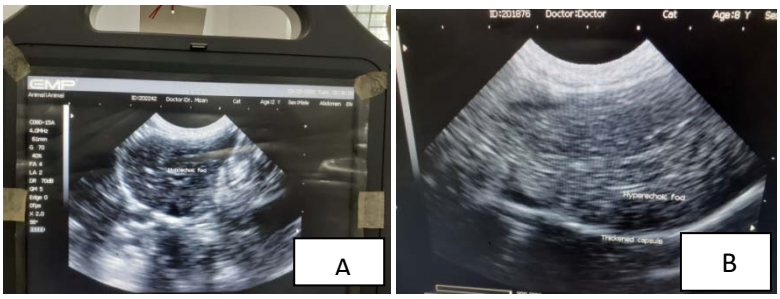


Figure 2: Hypoechoic foci on liver parenchyma (cyst or tumor) (A); Hyper echoic foci (necrosis or fibrosis tissue) and thickened liver capsule (B)

Table 1: Standard deviation and mean values of different biochemical parameters in dogs (n=50)

Parameters	Mean	Median	Standard deviation	Minimum	Maximum	Reference value
Bilirubin (mg/dl)	0.72±0.29	0.20	2.02	0.00	11.70	0.10-0.30
Total protein (mg/dl)	6.68±0.19	6.50	1.32	4.00	10.20	5.40-7.50
Albumin (mg/dl)	2.91±0.10	2.80	0.69	1.20	4.50	2.70-4.40
ALP (u/l)	333.86±127.63	61.35	902.48	10.70	5196.00	5.00-131.00
ALT (u/l)	256.36±88.62	67.45	626.66	18.50	3717.30	12.00-118.00
AST (u/l)	261.62±102.24	45.85	722.98	17.8	4154.40	15.00-66.00
Glucose (mg/dl)	84.92±2.96	84.60	20.97	37.5	130.80	70.00-138.00
Creatinine (mg/dl)	1.60±0.26	1.20	1.85	0.40	12.30	0.50-1.60
BUN (mg/dl)	29.46±3.90	20.17	27.58	10.30	154.40	6.00-25.00
Cholesterol (mg/dl)	132.52±6.71	120.00	47.43	59.00	280.60	92.00-324.00

Table 2: Standard deviation and mean values of different biochemical parameters in cats (n=50)

Parameters	Mean	Median	Standard deviation	Minimum	Maximum	Reference value
Bilirubin (mg/dl)	1.81±0.74	0.20	5.22	0.00	27.40	0.10-0.40
Total protein (mg/dl)	6.97±0.15	6.90	1.09	4.90	9.20	5.20-8.80
Albumin (mg/dl)	2.82±0.09	2.80	0.66	1.67	4.10	2.50-3.90
ALP (u/l)	245.42±79.79	34.60	564.22	7.80	2804.00	10.00-50.00
ALT (u/l)	180.16±42.43	45.65	300.06	12.30	1258.00	10.00-100.00
AST (u/l)	188.99±48.08	54.25	340.00	11.90	1704.40	10.00-100.00
Glucose (mg/dl)	98.22±4.95	87.40	35.02	45.60	232.60	50.00-170.00
Creatinine (mg/dl)	1.32±0.15	1.00	1.07	0.50	5.80	0.60-1.50
BUN (mg/dl)	31.52±2.56	27.10	18.12	12.60	110.40	14.00-36.00
Cholesterol (mg/dl)	119.26±6.10	104.00	43.11	67.00	218.60	75.00-220.00

Table 3: Frequency and percentage of different variables for hepatic problems in dogs

Explanatory variable	Co-variable	Total	+ve	Percentage	P value (χ^2 test)
Age	Adult	25	0	0	0.00
	Old	18	9	50	
	Young	7	0	0	
Sex	Female	23	3	13.04	0.40
	Male	27	6	22.22	
Breed	German shepherd	7	3	42.86	0.53
	Labrador	2	0	0.0	

© 2021 Global Journals

	Lash apsu	7	2	28.57	
	Local	16	2	12.50	
	Mixed	10	2	20.0	
	Retriever	2	0	0.0	
	Rottweiler	2	0	0.0	
	Spitz	4	0	0.0	

Table 4: Frequency and percentage of different variables for hepatic problems in cats

Explanatory variable	Co-variable	Total	+ve	Percentage	P value (χ^2 test)
Age	Adult	39	2	5.13	0.00
	Old	6	3	50.0	
	Young	5	1	20.0	
Sex	Female	26	1	3.85	0.06
	Male	24	5	20.83	
Breed	Exotic	1	0	0.0	0.49
	Local	21	4	19.05	
	Mixed	9	0	0.0	
	Persian	19	2	10.53	

© 2021 Global Journals

This page is intentionally left blank

© 2021 Global Journals

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 Version 1.0 Year 2021
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Characterization of Dogs and Cats Diagnosed with Diseases of the Urinary System in 2019: Veterinary Hospital, Faculty of Veterinary Medicine, University of San Carlos De Guatemala

By Alvarado-García, Sharon Denise, Villatoro-Chacón, Daniela Mariel & Arizandieta-Altán, Carmen Grizelda

Universidad de San Carlos de Guatemala

Abstract- If determined the casuistry of diseases that affect the urinary system in dogs and cats. A retrospective study was carried out at the Veterinary Hospital of the University of San Carlos de Guatemala. It was characterizing patients with diseases of the urinary system. 1,205 canine and feline medical records were evaluated in 2019. The variables breed, sex, age, pathology and geographic area were considered. The prevalence of urinary system diseases in dogs and cats in 2019 was 10.45%, 9.21% corresponding to dogs and 1.24% to cats. In both species, males had a higher frequency of urinary system disease, compared to females (dog = 58.56% and cat = 66.67%). The most common etiologies in dogs were lower urinary tract infections (24.65%), bladder urolithiasis (16.90%), and acute and chronic kidney disease (28.16%); while in cats lower urinary tract disease (100%) and kidney disease (5.26%) were the main pathologies observed. In dogs, the most affected age range was in patients older than 8 years (52.25%), while in cats it ranged from 3 to 8 years (73.34%).

Keywords: *urinary system, canine, feline, prevalence.*

GJMR-G Classification: *NLMC Code: WA 360*

Strictly as per the compliance and regulations of:

© 2021. Alvarado-García, Sharon Denise, Villatoro-Chacón, Daniela Mariel & Arizandieta-Altán, Carmen Grizelda. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at https://creativecommons.org/licenses/by-nc-nd/4.0/.

Characterization of Dogs and Cats Diagnosed with Diseases of the Urinary System in 2019: Veterinary Hospital, Faculty of Veterinary Medicine, University of San Carlos De Guatemala

Caracterización De Perros Y Gatos Diagnosticados Con Enfermedades Del Sistema Urinario En El Año 2019: Hospital Veterinario, Facultad De Medicina Veterinaria, Universidad De San Carlos De Guatemala

Alvarado-García, Sharon Denise [α], Villatoro-Chacón, Daniela Mariel [σ] & Arizandieta-Altán, Carmen Grizelda [ρ]

Resumen- El presente estudio tiene como finalidad determinar la casuística de enfermedades que afectan el sistema urinario en perros y gatos. Se realizó un estudio retrospectivo en el Hospital Veterinario de la Universidad de San Carlos de Guatemala caracterizando a los pacientes con enfermedades del sistema urinario. Se evaluaron 1,205 registros médicos de caninos y felinos en el año 2019. Se consideraron las variables raza, sexo, edad, patología y zona geográfica. La prevalencia de enfermedades del sistema urinario en perros y gatos en el año 2019 fue de 10.45%, correspondiendo el 9.21% a perros y 1.24% a gatos. En ambas especies los machos presentaron mayor frecuencia de enfermedad del sistema urinario, respecto a las hembras (perro=58.56% y gato=66.67%). Las etiologías más comunes en perros fueron las infecciones del tracto urinario bajo (24.65%), urolitiasis vesical (16.90%) y enfermedad renal aguda y crónica (28.16%); mientras que en los gatos la enfermedad del tracto urinario inferior (100%) y la enfermedad renal (5.26%) fueron las principales patologías observadas. En los perros el rango etario más afectado fue en pacientes mayores de 8 años (52.25%) mientras que en los gatos oscila entre 3 a 8 años (73.34%). Las razas con mayor frecuencia fueron el French poodle (19.82%), pacientes sin raza definida (18.92%) y Golden Retriver (11.7%); mientras que en los gatos en su totalidad fueron sin raza definida. Con el presente estudio se pueden observar las principales diferencias en cuanto a las etiologías que afectan a cada especie, sexo, edad y raza. Esta información permite al médico veterinario tener un panorama general del estado de salud de los pacientes, así como una línea de investigación para estudios del comportamiento epidemiológico de las patologías observadas a largo plazo y la capacitación de médicos veterinarios que aborden adecuadamente las patologías observadas.

Palabras clave: *sistema urinario, caninos, felinos, prevalencia*

Abstract- If determined the casuistry of diseases that affect the urinary system in dogs and cats. A retrospective study was carried out at the Veterinary Hospital of the University of San Carlos de Guatemala. It was characterizing patients with diseases of the urinary system. 1,205 canine and feline medical records were evaluated in 2019. The variables breed, sex, age, pathology and geographic area were considered. The prevalence of urinary system diseases in dogs and cats in 2019 was 10.45%, 9.21% corresponding to dogs and 1.24% to cats. In both species, males had a higher frequency of urinary system disease, compared to females (dog = 58.56% and cat = 66.67%). The most common etiologies in dogs were lower urinary tract infections (24.65%), bladder urolithiasis (16.90%), and acute and chronic kidney disease (28.16%); while in cats lower urinary tract disease (100%) and kidney disease (5.26%) were the main pathologies observed. In dogs, the most affected age range was in patients older than 8 years (52.25%), while in cats it ranged from 3 to 8 years (73.34%). The breeds with the highest frequency were the French poodle (19.82%), patients without a defined breed (18.92%) and Golden Retriver (11.7%); while in cats as a whole they were without a defined breed. With the present study, the main differences can be observed in terms of the etiologies that affect each species, sex, age and breed. This information allows the veterinarian to have a general overview of the health status of the patients, as well as a line of research for studies of the epidemiological behavior of the long-term pathologies observed and the training of veterinarians who adequately address the observed pathologies.

Keywords: *urinary system, canine, feline, prevalence.*

I. Introducción

La tenencia de perros y gatos como animales de compañía ha incrementado en los últimos años. Esto debido a que son usados para llenar espacios afectivos hombre-mascota en el entorno

Author α σ ρ: Departamento de ayudas diagnósticas, Hospital Veterinario, Facultad de Medicina Veterinaria y Zootecnia, Universidad de San Carlos de Guatemala.
Author σ: Autor al que se dirige la correspondencia.
e-mail: danavilla47@profesor.usac.edu.gt

© 2021 Global Journals

familiar, guardianía, aumento de la capacidad económica de las clases sociales y el desplazamiento de familias del área rural al área metropolitana. La suma de estos factores ha influenciado a que exista un aumento en las consultas de los propietarios a los hospitales o clínicas veterinarias, para detectar anomalías en las mascotas y recibir un tratamiento adecuado (Flores, 2002). Esto a generado que las bases de datos con las que cuentan los hospitales y clínicas veterinarias sean una fuente valiosa para determinar la prevalencia de diferentes enfermedades y así predecir el comportamiento de las mismas. El realizar investigaciones de algunas enfermedades por sistemas, permite la planificación, organización e implementación de programas preventivos que son importantes para la supervivencia de los pacientes (Gonzales, 2018).

Tanto en caninos como en felinos, las enfermedades del sistema urinario, pueden aparecer en cualquier momento de vida del paciente. Es común que los propietarios de la ciudad tengan animales en espacios inadecuados para su tamaño y una alta cantidad de ellos. Esto puede ser a su vez la causa del incremento en la presentación de patologías de tipo urinario, debido a que las deposiciones diarias son controladas por los dueños, además de horarios restringidos y limitado acceso al agua, lo que se traduce en un deterioro progresivo de las funciones renales (Urbina y Campos, 2009).

Estas enfermedades son comunes, sin embargo, se encuentra escasa y anecdótica información sobre las mismas. Por lo cual se hace necesario el realizar un estudio epidemiológico que evidencie las características de la población afectada para determinar los factores de riesgo en la población estudiada. De esta manera, el médico veterinario tendrá información que facilitan su práctica clínica y brindan una mejor comprensión la presentación, fisiopatología y manejo de las enfermedades.

II. Metodología

El estudio se realizó en el Hospital Veterinario de la Facultad de Medicina Veterinaria y Zootecnia de la Universidad de San Carlos de Guatemala. Se realizó un estudio retrospectivo evaluando 1,205 registros médicos de los cuales 1,101 registros corresponden a perros y 104 a gatos que asistieron a consulta médica en el año 2019.

Los datos fueron clasificados según el diagnóstico clínico del médico tratante, utilizando hojas de registro. Se consideraron las variables raza, sexo, edad, patología y zona geográfica.

Para el análisis de datos se utilizó estadística descriptiva utilizando distribuciones de frecuencias para las variables. Además, se determinó la prevalencia de los pacientes con enfermedad del tracto urinario (Blair y Taylor, 2008). El software estadístico utilizado fue SPSS Statistics.

III. Resultados

De los 1,205 registros evaluados, la prevalencia total de enfermedades del sistema urinario en perros y gatos para el año 2019 fue de 10.45%; correspondiendo el 9.21% (n=111) a perros y 1.24%(n=15) a gatos.

En cuanto a la procedencia de los caninos y felinos, la zona geográfica más frecuente fue de la ciudad capital 54.95% (n=61) y 60% (n=9) respectivamente. En el caso de caninos el municipio de Mixco 20.72% (n=23) y Villa Nueva 13.51% (n=15) fueron otras áreas frecuentes (tabla 1).

Tabla 1: Procedencia de los pacientes según área geográfica.

Procedencia	Caninos n=111	%	Felinos n=15	%
Capital	61	54.95	9	60
Mixco	23	20.72	2	13.33
San Miguel Petapa	6	5.41	3	20
San José Pinula	1	0.90	1	6.67
Villa Nueva	15	13.51		
Chinautla	2	1.80		
Santa Catarina Pinula	1	0.90		
Villa Canales	1	0.90		
Livingston, Izabal	1	0.90		

a) Resultados de caninos

La prevalencia en perros con enfermedad del sistema urinario fue de 10.08% (n=111). Respecto al sexo, el 41.44% (n=46) fueron hembras, mientras que el 58.56% (n=65) corresponde a los machos.

En cuanto a la raza, el French Poodle (19.82%), pacientes sin raza definida (18.92%) y Golden Retriver (11.71%) fueron las más frecuentes en presentar enfermedad del tracto urinario. En otras razas se incluyen: Beagle, Bulldog inglés, Chow chow, Collie,

© 2021 Global Journals

Dashound, Lhasa apso, Maltes, Pastor alemán, Pastor belga, Pug, Sharpei, Yorshire terrier con 10.81% (tabla 2).

Tabla 2: Frecuencia de enfermedades del tracto urinario en caninos por sexo y raza

Raza	Machos n=65	%	Hembras n=46	%	Total n=111	%
French Poodle	11	9.91	11	9.91	22	19.82
Sin raza definida	13	11.71	8	7.21	21	18.92
Golden Retriever	9	8.11	4	3.60	13	11.71
Schnauzer	6	5.41	4	3.60	10	9.01
Cocker spaniel	4	3.60	2	1.80	6	5.41
Labrador Retriever	2	1.80	3	2.70	5	4.50
Husky	3	2.70	1	0.90	4	3.60
Chihuahua	2	1.80	2	1.80	4	3.60
Shih tzu	2	1.80	2	1.80	4	3.60
Viejo Pastor ingles	1	0.90	1	0.90	2	1.80
Akita	1	0.90	1	0.90	2	1.80
Boxer	2	1.80	0	0	2	1.80
Pitbull	2	1.80	0	0	2	1.80
Pomerania	1	0.90	1	0.90	2	1.80
Otras	6	5.41	6	5.41	12	10.81

El rango etario con mayor frecuencia de presentar enfermedad del tracto urinario fueron los pacientes mayores de 8 años (tabla 3), correspondiendo a un total del 52.25% (n=58).

Tabla 3: Frecuencia de enfermedad del sistema urinario en caninos por rango etario y sexo

Rango etario	Macho N	Macho %	Hembra N	Hembra %
0-12 meses	1	0.9	2	1.80
1-2 años	6	5.41	3	2.70
3-5 años	11	9.91	10	9.01
6-8 años	11	9.91	9	8.11
Mayor a 8 años	36	32.43	22	19.82

Respecto al diagnóstico etiológico se clasificaron las enfermedades según el rango etario, siendo los pacientes mayores de 8 años (52.25%), los que presentaron mayores frecuencias como infecciones del tracto urinario bajo (11.27%), urolitiasis (7.75%) y enfermedad renal (7.04%).En pacientes de 6 a 8 años la frecuencia de enfermedades fue de 20.42%, siendo la infección del tracto urinario (4.93%), la enfermedad renal (4.23%) y la urolitiasis (3.52%) las causas más frecuentes. Sin embargo, en los pacientes de 3 a 5 años la frecuencia de enfermedades del tracto urinario fue de 17.61%, presentándose la infección del tracto urinario (5.63%) y urolitiasis (4.23%) las más frecuentes (tabla 4).

b) Resultados de felinos

La prevalencia en gatos con enfermedad del sistema urinario fue de 14.42% (n=15). Respecto al sexo, el 33.33% (n=5) fueron hembras, mientras que el 66.67% (n=10) corresponde a los machos.

Respecto a la raza en la especie felina, el 100%(n=15) de los pacientes fueron clasificados sin raza definida.

En los felinos, tanto los machos entre 1-2 años y 3-5 obtuvieran similares frecuencias (26.67%, n=4). Por su parte, las hembras entre 6-8 años presentaron mayor frecuencia de enfermedad sistema urinario (26.67 %, n=4). En la tabla 5 se describen los rangos etarios por sexo y sus frecuencias.

© 2021 Global Journals

Tabla 5: Frecuencia de enfermedad del sistema urinario en gatos por rango etario y sexo.

Rango etario	Macho N	Macho %	Hembra N	Hembra %
0-12 meses	0	0	0	0
1-2 años	4	26.67	0	0
3-5 años	4	26.67	1	6.67
6-8 años	2	13.33	4	26.67
Mayor a 8 años	0	0	0	0

En los gatos, el diagnóstico etiológico también fue clasificado según el rango etario, siendo los pacientes entre 1-2 años y de 6-8 las edades más frecuentes con las que se presentan las enfermedades del sistema urinario (tabla 6). Los demás rangos etarios obtuvieron bajas frecuencias.

Tabla 4: Frecuencia de enfermedad del sistema urinario en perros por etiología y rango etario

	0 -12 meses n=3	%	1 - 2 años n=11	%	3 - 5 años n=25	%	6 - 8 años n=29	%	> 8 años n=74	%	Total n=142*	%
Infección del tracto urinario (ITU)	1	0.70	3	2.11	8	5.63	7	4.93	16	11.27	35	24.65
Urolitiasis			2	1.41	6	4.23	5	3.52	11	7.75	24	16.90
Enfermedad renal crónica (Sin estadificar)	1	0.70	2	1.41	2	1.41	6	4.23	10	7.04	21	14.79
Lesión renal aguda			1	0.70	2	1.41	3	2.11	7	4.93	13	9.15
Cistitis					3	2.11	3	2.11	6	4.23	12	8.45
Prostatitis			1	0.70	1	0.70	3	2.11	3	2.11	8	5.63
Glomerulonefritis			2	1.41					4	2.82	6	4.23
Hiperplasia prostática benigna							1	0.70	5	3.52	6	4.23
Neoplasia vesical (carcinoma de células transitorias)					1	0.70			4	2.82	5	3.52
Enfermedad renal grado II									4	2.82	4	2.82
Obstrucción uretral					1	0.70			1	0.70	2	1.41
Incontinencia urinaria por causa neurológica									1	0.70	1	0.70
Incontinencia urinaria idiopática	1	0.70									1	0.70
enfermedad renal grado I					1	0.70					1	0.70
Enfermedad renal grado III									1	0.70	1	0.70
Quiste prostático							1	0.70			1	0.70
Neoplasia prostática									1	0.70	1	0.70

**Algunos pacientes fueron diagnosticados con más de una patología*

Tabla 6: Frecuencia de enfermedad del sistema urinario en gatos por etiología y rango etario.

	1 - 2 años n= 6	%	3 - 5 años n=6	%	6 - 8 años n=7	%	Total n=19*	%
Cistitis idiopática	4	21.05	4	21.05	4	21.05	12	63.15
Neoplasia vesical			1	5.26	1	5.26	2	10.52
Infección urinaria	1	5.26			1	5.26	2	10.52
Enfermedad renal	1	5.26					1	5.26
Obstrucción uretral			1	5.26			1	5.26
Urolitiasis					1	5.26	1	5.26

**Algunos pacientes fueron diagnosticados con más de una patología*

© 2021 Global Journals

IV. Discusión

Las enfermedades del tracto urinario son un conjunto de enfermedades que afectan tanto a caninos como felinos en sus diferentes estructuras: riñones, uréteres, vejiga, uretra y próstata. En este estudio, los diagnósticos presentados con mayor frecuencia en caninos son: la infección del tracto urinario, urolitiasis vesical, enfermedad renal crónica y lesión renal aguda. Según el estudio de Mendoza (2015) las principales patologías son urolitiasis, infección del tracto urinario, alteraciones de la micción, mientras que el estudio de Urbina y Campos (2009) señala que las principales son: infecciones del tracto urinario, insuficiencia renal aguda y cistitis. Estas variaciones pueden deberse a la cantidad de años estudiados, sin embargo, las infecciones del tracto urinario prevalecen como punto en común entre la presente investigación y los estudios citados.

En relación con el sexo de los caninos, se encontró que los machos presentan más patologías del tracto urinario respecto a las hembras. Estos datos son similares a los obtenidos en otros estudios como Mendoza (2015); López-Villa, et al. (2014) y Urbina y Campos (2009) en donde los más afectados fueron los machos que obtuvieron frecuencias de 74.22%, 71.96% y 57.51% respectivamente. Esto se debe a una asociación estadísticamente significativa de los machos a una mayor predisposición de una enfermedad del tracto urinario, por la conformación anatómica de estos, al presentar una uretra más estrecha y larga y la presencia de la próstata a diferencia de las hembras (Mendoza, 2015; Chew, 2003).

Con base a la edad, se encontró que afecta principalmente a los caninos mayores a 8 años. Urbina y Campos (2009) encontraron frecuencias similares en este rango etario. Esto se debe a un aumento en la susceptibilidad a este tipo de patologías debido a que existen diferentes factores subyacentes que alteran los mecanismos de defensa del tracto urinario o bien por un diagnóstico no temprano que desencadena problemas crónicos (Mendoza, 2015).

Respecto a la raza, se evidencio principalmente poodle, mestizos (razas no definidas), golden retriever, schnauzer, cocker spaniel como los más afectados. Datos similares se encontraron en el estudio de Mendoza (2015) que señala a las más afectadas poodle, labrador, pastor alemán, Schnauzer, cocker spaniel y chihuahua. Urbina y Campos (2009), señalan que las enfermedades del tracto urinario afectan principalmente a las razas pequeñas (<10 kg, 34%) lo cual se debe principalmente al menor volumen de orina producido, menor número de micciones y por consiguiente mayor concentración de minerales, bacterias, toxinas nefrotóxicas entre otros. Además, la rutina y comportamiento de los dueños al tener a las mascotas en espacios inadecuados para su tamaño, en las deposiciones controladas por los dueños y la restricción del consumo de agua, provoca el deterioro progresivo de las funciones renales (Urbina y Campos, 2009). A su vez, Dibartola (2004), señala que las razas con predisposición a presentar enfermedades del sistema renal son las pequeñas y medianas como el Schnauzer miniatura, Bichón Frise, Lasha Apso, Shi tzu, York Shire Terrier y Caniche Toy.

Respecto a la procedencia de los pacientes, la ciudad capital fue la más frecuente, seguido de diferentes municipios cercanos a la ubicación del Hospital Veterinario. Estos resultados pudieron darse, debido al bajo costo que se maneja en la institución, la diversidad de servicios y por la cercanía de los diferentes usuarios al Hospital Veterinario.

En cuanto a las etiologías encontradas, las infecciones del aparato urogenital se encuentran con mayor frecuencia en la práctica clínica de los pequeños animales. Esta puede afectar más de un órgano, localizándose en el tracto superior o en el tracto inferior. La infección de una parte del tracto urinario aumenta la posibilidad de que el resto se infecte posteriormente (Greene, 2008). Las infecciones del tracto urinario (ITU) representaron el 3.18%, del total de pacientes caninos atendidos durante el periodo descrito. Se estima que aproximadamente un 10 a 14% de los caninos llevados al veterinario presentan ITU en algún momento de su vida (Senior, 2007; Westropp, 2009; Windahl, 2015).

Con respecto al sexo, se encontró que las hembras presentan con mayor frecuencia infecciones del tracto urinario con respecto a los machos. Estos datos son similares al estudio realizado por Wong et al (2015) y García et al (2019). Para esta enfermedad se reconoce al sexo como un factor predisponente, determinando que las hembras tienen un riesgo más alto a desarrollar esta enfermedad (Greene, 2008; Gaymer, 2014; Petreigne, 2017; García, 2018). La uretra de las hembras es más gruesa y corta que la uretra de los machos, lo que posiblemente hace más fácil que las bacterias asciendan hasta la vejiga, debido a que el ano de las hembras está más cerca del orificio uretral, existiendo una mayor probabilidad de contaminación fecal e inoculación de microrganismos; en ese sentido, los machos pueden tener un mecanismo protector adicional debido a las secreciones prostáticas con propiedades antimicrobianas (Elliott & Grauer, 2007).Algunos animales pueden tener infección, tanto de la parte superior e inferior del tracto urinario, especialmente si existe insuficiencia renal (Bartges, 2004). Del mismo modo, los pacientes con insuficiencia renal crónica poseen una incidencia de un 20% en infecciones bacterianas del tracto urinario (Bartges, 2007). Esto explicaría por qué el 8.57% de los pacientes con ITU, también fueron diagnosticados con una enfermedad renal (aguda y/o crónica).

En relación con la edad, se encontró que afecta más a aquellos caninos mayores a 8 años, teniendo

© 2021 Global Journals

como promedio la edad de 8 años. La edad de presentación de las infecciones urinarias en perros varía desde 0,3 hasta 16 años, con una mediana de 7 años (Chew et al., 2011). Esto está asociado a que los animales de 8 años en adelante, por lo general presentan otras enfermedades concurrentes que alteran alguno de los mecanismos de defensa del tracto urinario (Mendoza, 2015; Elliot y Grauer, 2007).

En base a la raza, se han establecido algunas razas predisponentes a esta patología, encontrándose al pastor alemán, caniche miniatura y toy, labrador Retriever, Dachshund, doberman, pinsher y schnauzer miniatura con una mayor incidencia de ITU (Chew et al 2011; Petreigne 2017; Gaymer, 2014). En este caso, encontramos con mayor presentación a los caninos sin raza definida, seguido de poodle y Schnauzer. Estos datos son similares a los obtenidos por García et al (2019), en donde se presentó con mayor frecuencia en caninos mestizos, seguido de Schnauzer y cocker spaniel. Con respecto a los perros mestizos, no existen datos comparativos debido a que la mayoría incluye animales de raza (García et al, 2019).

La segunda patología con mayor frecuencia presentada fue la urolitiasis. Esta constituye la causa de aproximadamente el 18% de las consultas en las veterinarias, de caninos con afección del tracto urinario inferior (Rosas, 2021). En este caso, la incidencia de presentación de la enfermedad fue del 16.90% de los pacientes caninos que acudieron a consulta con sintomatología de estranguria, hematuria; siendo similares los resultados obtenidos por López-Villa et al (2014) de un 17.75%.

La orina canina es una solución compleja en la que las sales pueden permanecer en solución en condiciones de sobresaturación; sin embargo, esta puede precipitarlas o formar sólidos, dando como resultado cristales, los cuales si no son expulsados se pueden unir y formar urolitos. Estos dañan el uroepitelio y provocan la inflamación del aparato urinario, predisponiendo al animal a una infección del aparato urinario (Nelson & Couto, 2010; Mendoza, 2015).Los urolitos pueden formarse en cualquier lugar de las vías urinarias, aunque, en los perros, la gran mayoría aparece en la vejiga y pueden moverse a uretra (Baciero, 2013); solo un 5% se localiza en riñones o en los uréteres.

Con respecto al sexo, la urolitiasis vesical, se presentó con mayor frecuencia en machos respecto a las hembras, siendo los resultados del presente estudio, similares a los obtenidos por Muralles (2021) y Del Ángel Caraza (2009). Esto se debe principalmente, a que los machos poseen una uretra más larga, estrecha y con un hueso en el pene, lo que puede impedir la salida de la orina y la precipitación de sólidos. Por lo contrario, las hembras tienen una uretra corta y amplia, lo que permite la salida de sedimento evitando la formación de urolitos o en su defecto, permite la salida de estos. (Osborne et al., 2000). Sin embargo, esto puede variar de acuerdo con el material del urolito, siendo predominante los cálculos de oxalato de calcio en el macho y los de estruvita en la hembra, que se asocian principalmente a infecciones del tracto urinario (Bermúdez, 2017).

En cuanto a la edad, se observó que afecta principalmente a los caninos mayores a 8 años. En el estudio realizado por Muralles (2021), hace referencia que el rango de edad para esta afección se encuentra entre los 5 a 12 años principalmente. Esto puede deberse a los cambios morfológicos y funcionales que ocurren en los animales con el paso del tiempo, o bien por diferentes medicamentos que predisponen a esta patología (Lekcharoensuk et al., 2002; Osborne et al., 2000 y Del Ángel Caraza, 2009).

Con relación a la raza, se encontró que los caninos de raza pequeña (62.5%, schnauzer, chihuahua, maltes, yorshire, pomerania, poodle, entre otros) son más susceptibles en comparación a las razas de talla grande (37.5%, golden retriever, viejo pastor inglés, husky, otros). Esto se debe principalmente, a la proporción en el consumo de agua, menor volumen de orina, menor número de micciones y, por tanto, mayor concentración de minerales. (Stevenson, 2002; Rosas, 2021).

La enfermedad renal fue la tercera causa más frecuente de enfermedad del tracto urinario. Esta se clasificó en lesión renal aguda (9.15%), enfermedad renal crónica estadio I (0.70%), enfermedad renal crónica estadio II (2.82%), enfermedad renal crónica estadio III (0.70%) y enfermedad renal crónica sin estadificar (14.79%). En clínica de pequeños animales, la casuística ante pacientes renales señala que la Enfermedad Renal Crónica (ERC) es la patología renal más frecuente; ocurre cuando los mecanismos de compensación renal no son capaces de mantener las funciones propias del riñón: regulación de electrolitos, del equilibrio hídrico y ácido base y síntesis de hormonas (Chew, 2011); con prevalencias mundiales entre el 0.5 % - 1.5 % en caninos (Brown, 2007; González, 2018 y Miguel, Gimenez, Meder, 2021).

Del total de caninos diagnosticados con enfermedad renal crónica, solo el 22.22% fue clasificada en los diferentes estadíos: el grado I fue diagnosticado 0.7% en caninos de 3-5 años; grado II, en 4 caninos mayores a 8 años (2.82%) y en grado III, 0.7% en mayores de 8 años. Los pacientes que no fue posible estadificar por falta de pruebas de laboratorio y seguimiento se presentaron en el rango etario a partir de los 6 años en adelante (14.79%). La International Renal Interest Society, IRIS, sugiere la clasificaciónde los enfermos renales crónicos en base a sus niveles de creatinina plasmática en cuatro niveles, que a su vez se pueden sub clasificar en función de la proteinuria y de la presión arterial. Este tipo de clasificación permite

© 2021 Global Journals

unificar criterios para el diagnóstico, pronóstico y tratamiento de estos pacientes.

Con respecto al sexo, no se encontró ninguna diferencia entre hembras y machos respecto a la enfermedad renal. Según Adams (2004), no existe una predilección sexual en la presentación de IRC en perros ni gatos. Estos resultados son similares al estudio de Häfelin, (2008), Chandler, (2007), en todos estos estudios la proporción de machos y de hembras era muy cercana a 1:1.

En base a la edad, se observó con mayor frecuencia en pacientes mayores de 8 años. En el estudio realizado por González (2018), reporta que se observa principalmente en caninos mayores a 10 años (45%). Esto se debe principalmente por la persistencia de alguna enfermedad renal que no fue diagnosticada a temprana edad y que, con el paso del tiempo, se presentan las alteraciones en las nefronas del canino. En un adulto o geriátrico, existe una limitante ante la capacidad del organismo de producir nefronas y compensar las dañadas, lo que hace que el problema sea persistente en el tiempo y de curso progresivo (Valdés, 2002; González, 2018). Por lo general, las edades avanzadas son las más afectadas, se presentan en un 10% en pacientes geriátricos; sin embargo, esta patología se puede presentar en animales de cualquier edad (Brown, 2007; González, 2018; Cortadellas, 2010). En el caso de los caninos que presentaron la enfermedad a una edad temprana, se debe al diagnóstico temprano y a la metodología utilizada (Watson et al., 2003). Se encontró que el 0.70% de los caninos menores a un año, diagnosticados con enfermedad crónica. Se ha reportado que en animales jóvenes está relacionado con problemas congénitos y/o familiares debido a la presencia y persistencia de glomérulos fetales o inmaduros, engrosamiento de la membrana basal glomerular o un rasgo presente en un grupo de perros emparentados; mientras que la adquirida, ocurre en mayor frecuencia en animales seniles (Cavalera, et al, 2021; Polzin, 2011; Chandler et al., 2007; Gough & Thomas, 2004; Birchard & Sherding, 1996).

Con relación a la raza, se encontró que afectó principalmente a caninos de raza definida (80%), los cuales incluye al Poodle, Golden Retriever, Cocker Spaniel, Schnauzer. La ERC está descritaen muchas razas caninas y puede ocurrir en algunos mestizos, cursando a edad temprana (menor a 5 años), y en razas como Alaskan Malamute, Beagle, Boxer, Montañés de Berna, Bull Terrier, Chow Chow, Cocker spaniel, Golden Retriever, Lhasa Apso, Poodle estándar, Shih tzu, Schnauzer miniatura, Rottweiler, Samoyedo y Shar pei. (DiBartola, 2002; Chandler et al., 2007; González, 2015; Häfelin, 2008).

La lesión renal aguda es un síndrome potencialmente reversible que se produce como consecuencia de una rápida alteración de la función renal por una enfermedad que cursa en horas a días. (Nelson & Couto, 2010). Dicha alteración da lugar a un aumento rápido y progresivo de los metabolitos tóxicos en sangre (azotemia) junto con desbalances hidro-electrolíticos y acido-base, que se reflejan en una falla para concentrar la orina y oliguria en la mayoría de los casos (Daza et al., 2008)

Con respecto al sexo, el 69.23% de los caninos fue diagnosticado con lesión renal aguda, fueron machos. Similares datos, se obtuvieron en los estudios realizados por Häfelin (2008); Vaden (1995) y Behrend (1996). Lo cual podría estar relacionado a la presentación de origen renal. Ya que como se observó anteriormente, la presentación de urolitiasis en machos fue de 79.17%, siendo esta una de las causas más comunes de la lesión renal aguda post renal (Cowgill y Elliott, 2002; Häfelin, 2008).

En relación con la edad, se presentó principalmente en animales mayores de 8 años, datos parecidos al estudio de Häfelin (2008); Behrend (1996). Según Cowgill (2004), esta enfermedad puede ocurrir a cualquier edad, sin embargo, existe mayor predisposición en animales seniles debido a procesos morfológicos y funcionales.

Con respecto a la raza, se encontró que afectó principalmente a animales de raza pura siendo estos Golden retriever 30.77% y Husky Siberiano 15.38%.Sin embargo, para esta patología no existe una predilección racial, cualquier canino puede verse afectado por diversos factores (Cowgill, 2004; Vaden, 1995). En el estudio realizado por Häfelin (2008), hubo una predominancia de esta patología en raza poodle y cocker spaniel, sin embargo, aclaran que esto puede deberse a una mayor presencia de estas razas en la casuística global del hospital.

Con respecto a felinos, las patologías urinarias diagnosticadas fueron: Enfermedad del tracto urinario inferior (FLUTD por sus siglas en inglés) y enfermedad renal. El FLUTD incluye las siguientes etiologías: cistitis idiopática, infección urinaria, neoplasia vesical, obstrucción uretral y urolitiasis. Estos hallazgos son similares a los reportados por otros autores como Forrester y Roudebush (2007), Suárez, Bertolani, Avellaneda y Tabar (2013), Osborne et al (1996), con la diferencia que reportan urolitiasis y tapones uretrales como la segunda causa de FLUTD, en un rango de 10 a 21% de presentación.

La enfermedad del tracto urinario inferior (FLUTD), es una alteración de la vejiga urinaria y/o uretra de los gatos, afectando a todas las edades, siendo cada vez más visible en felinos que viven en interiores (Hostutler et al., 2005). Del total de pacientes felinos atendidos en el Hospital Veterinario (104), el 14.42% fue diagnosticado con FLUTD. Sin embargo, se reporta que la incidencia anual correspondiente a esta patología es de un 1% (Suárez, et al 2013; Cely, 2016). Este aumento, puede deberse a diferentes factores

© 2021 Global Journals

ambientales, de comportamiento y alimentación a los que son sometidos los felinos (Westropp, 2008; Suárez, Bertolani, Avellaneda, Tabar 2013).Según Drobatz y Costello (2012), Sævik, Trangerud, Ottesen, Sørum y Eggertsdóttir (2011), García y Barcena (2014) y Westropp (2008) la principal causa de FLUTD, es la cistitis idiopática, afectando a dos tercios de los gatos. Como se pudo observar en el presente estudio.El diagnóstico de FLUD se realiza por exclusión (Harvey y Tasker, 2014; Cortadellas, 2010; Forrester y Roudebush, 2007, Kim et al 2017; Forrester, 2015, Chew, 2011). No se conoce la patogénesis de este diagnóstico, sin embargo, está asociado a estrés y al comportamiento que tienen los felinos a lo largo de su vida; siendo las principales, la baja ingesta de agua y el alto consumo de comida solida (concentrado), lo que originan una disminución de los niveles de glucosaminoglicanos, y como consecuencia una reducción del efecto protector del epitelio urinario, lo que ocasiona que la orina penetre y origine una inflamación en la vejiga urinaria (Baciero, 2011; Westropp, 2008; Houston & Elliott, 2010). En el caso de estos felinos, el 73.33% tienen una dieta basada en concentrado y solo el 26.67% de ellos, adicionalmente, se les proporciona comida húmeda razón por la cual, podría presentarse con mayor frecuencia esta enfermedad.

Suárez, et al (2013), refieren que los felinos más susceptibles son aquellos con sobrepeso, poca actividad física, limitado acceso al exterior, alimentados con dieta seca y que conviven con más gatos. Sin embargo, Cely (2016), hace la observación, que no en todos los casos se aplican estos factores de riesgo y se deben de tener siempre en cuenta la anamnesis del paciente.

Con respecto a las infecciones urinarias, menos del 2% de los felinos con FLUTD, tienen como causa esta patología (Nelson & Couto, 2010). Normalmente, el tracto urinario del gato es un ambiente hostil para el crecimiento bacteriano y estas suelen presentarse cuando los animales pierden los mecanismos de defensa. Por lo general se dan, cuando hay una migración ascendente de las bacterias por la uretra a la vejiga (Bartges, 2004; Litster et al., 2009). Según Chew et al., (2011) entre un 0,1 a 1 % de los gatos presenta ITU durante su vida.

Con respecto al sexo, se presentó con mayor frecuencia en machos (66.67%) en comparación con hembras (33.33%). Estos datos son similares a los obtenidos en los estudios realizados por Urbina y Mosquera (2009), Astuty, Tjahajati y Nugroho (2020) en donde la mayor presentación de enfermedades del tracto urinario bajo corresponde a machos (61.1% y 69.9% respectivamente).Esta diferencia con respecto al género es significativa en el caso de FLUTD (Dorsch, et al 2014), ya que se debe especialmente a una diferencia anatómica en el largo de la uretra; siendo los machos los más afectados ya que esta, es bastante larga y presenta dos zonas de estrechamiento (Saevik et al, 2011) en comparación con las hembras (Bengoa, 1995 & Cely, 2016); además, existe un factor de riesgo, al realizarles una castración, se disminuye el crecimiento de la uretra, originando esta enfermedad (Buffington et al., 2006; Cortadellas, 2010; Suárez, Bertolani Avellaneda & Tabar 2013).

En cuanto a la edad, la frecuencia de presentación fue muy amplia, 1-8 años, afectando a temprana edad principalmente a los machos y luego a las hembras. Según Urbina & Campos, 2009, la mayor frecuencia de presentación de patologías urinarias se encuentra en felinos mayores a 8 años (33.1%), luego de 2 a 5 años (24.8%), y por último de 5 a 8 años (20.9%). Sin embargo, las patologías del tracto urinario pueden presentarse a cualquier edad, siendo las causas idiopáticas más frecuentes en animales jóvenes; mientras que, en los animales seniles son aquellas patologías relacionadas con la disminución de las defensas (García & Barcena, 2014; Astuty, Tjahajati y Nugroho, 2020)

En relación con la raza, el 100% de los felinos con enfermedad del tracto urinario, no tenía una raza definida. Urbina & Campos (2009), mencionan que se presenta en 56.1% en felinos sin raza definida, y el 43.9% corresponde a felinos de raza, dentro de los que se encuentra: siamés, persa, angora. Los resultados obtenidos, pueden deberse, al mayor porcentaje de felinos mestizos que asisten a consulta en comparación con felinos de razas puras.

Referencias Bibliográficas

1. Adams L. Chronic renal failure. In: Tilley, L.P.; Smith, F.W. The 5 Minutes Veterinary Consult. 3ª edición. Baltimore, Estados Unidos: Lippincott, Williams & Wilkins; 2004. p.1124–1125
2. Astuty ATJE, Tjahajati I, Nugroho WS. Detection of feline idiopathic cystitis as the cause of feline lower urinary tract disease in Sleman Regency, Indonesia. Vet World. 2020 Jun; 13(6):1108-1112. https://doi.org/10.14202/vetworld.2020.1108-1112
3. Baciero G. Enfermedades del tracto urinario inferior en el gato. AMVAC. 2011 [agosto 2021] No. 32 Comunicación científica Royal Canin Ibérica, S.A. Madrid: España Disponible en: http://axonveterinaria.net/web_axoncomunicacion/auxiliarveterinario/32/AV_32_Revista_completa.pdf
4. Baciero G. Urolitiasis caninas. AMVAC. 2013 [agosto 2021] No. 43 Disponible en: http://axonveterinaria.net/web_axoncomunicacion/auxiliarveterinario/43/AV_43_Revista_completa.pdf
5. Bartges J. Diagnosis of urinary tract infection. Vet Clin N Am Small Anim Pract. 2004; 34(4): 923-933.

© 2021 Global Journals

6. Bartges J. Bacterial urinary tract infection. In: The North American Veterinary Conference. United States, Tennessee. University of Tennessee. 2007. p. 671- 673.
7. Behrend E, Grauer G, Mani I, Groman R, Salman M. Hospital-acquired acute renal failure in dogs: 29 cases (1983-1992). J Am Vet Med Assoc. 1996. 208(4): 537-541.
8. Bengoa A. Cristaluria felina. Cuantificación de glicoproteínas urinarias bajo diferentes condiciones de alimentación. [Tesis doctoral]. Madrid, España: Universidad Complutense de Madrid: 1995. Recuperado de https://proxy.europeana.eu/9200101/BibliographicResource_1000126624580?view=http%3A%2F%2Fwww.ucm.es%2FBUCM%2Ftesis%2F19911996%2FD%2F2%2FAD2010501.pdf&disposition=inline&api_url=https%3A%2F%2Fapi.europeana.eu%2Fapi
9. Bermudez M. Urolitiasis canina. [Tesis de pregrado]. Caldas, Antioquia: Corporación Universitaria Lasallista Facultad de Ciencias Administrativas y Agropecuarias Medicina Veterinaria; 2017. Recuperado de http://repository.lasallista.edu.co/dspace/bitstream/10567/2145/1/Urolitiasis_canina.pdf
10. Birchard SJ, Sherding RG. Manual Clínico de Pequeñas Especies. México: McGraw Hill; 1996
11. Blair C, Taylor R. Bioestadística. México: Pearson Prentice Hall. 2008. 556 p.
12. Brown SA. Management of chronic kidney disease. In Elliott J, Grauer G. Manual of Canine and Feline Nephrology and Urology. Gloucester, Inglaterra: British Small Animal Veterinary Association; 2007. 223-230
13. Buffington T, Westropp JL, Chew DJ, Bolus RR. Risk factors associated with clinical signs of lower urinary tract disease in indoor-housed cats. Rev. JAVMA. 2006; 228 (5), 722-725.
14. 14. Cavalera MA, Gernone F, Uva A, D'Ippolito P, Roura X, Zatelli A. Clinical and Histopathological Features of Renal Maldevelopment in Boxer Dogs: A Retrospective Case Series (1999–2018). *Animals. 2021*, 11, 810. https://www.mdpi.com/2076-2615/11/3/810/htm
15. Chandler M, Elwood C, Murphy K, Gajnayake I, Syme H. Juvenile nephropathy in 37 boxer dogs. J Small Anim Pract. 2007; 48: 690-694. https://onlinelibrary.wiley.com/doi/10.1111/j.1748-5827.2007.00401.x
16. Chew D. Manual de nefrología y urología en los pequeños animales. Barcelona, España: Editorial Salvat S.A; 2003 p. 358
17. Chew D, Dibartola S, Schenck P. Cystitis and Urethritis: Urinary Tract Infection. In: Canine and Feline Nephrology and Urology. 2ª ed. Missouri, United States: Elsevier Saunders. 2011. p. 240-268; p306-340.
18. Cely Niño DM. Reporte de caso clínico: enfermedad del trato urinario inferior felino (FLUTD). [Tesis de pregrado]. Bogotá, Colombia: Universidad de Ciencias Aplicadas y Ambientales; 2016. Recuperado de: https://repository.udca.edu.co/bitstream/handle/11158/585/articulo%20repor;jsessionid=8E9115221E458B49703CDFA4750E7CE8?sequence=1
19. Cortadellas O. Estadificación y manejo de la enfermedad renal crónica. Manual de nefrología y urología canina y felina. España: Ed. Servet; 2010. p.161.
20. Cowgill L, Elliott D. Falla renal aguda. In: Ettinger, S. y Feldman, E. Tratado de Medicina Interna Veterinaria. 5ta ed. Buenos Aires, Argentina: Intermédica.; 2002. 1798−1819 p.
21. Cowgill L. Acute renal failure. In: Tilley, L.P.; Smith, F.W. The 5 Minutes Veterinary Consult. 3ª ed. Baltimore, Estados Unidos: Lippincott, Williams & Wilkins; 2004. 1122–1123 p.
22. Daza González MA, García Pérez E, Fragio Arnold C. Manejo de urgencias en la insuficiencia renal aguda. AMVAC. 2008; No. 26, 12-21. Disponible en: http://axonveterinaria.net/web_axon-comuni-cacion/centroveterinario/26/cv_26_Insuficiencia_renal.pdf
23. Del Ángel Caraza J. Estudio epidemiológico de la urolitiasis canina en México [Tesis de pregrado]. México: Universidad de León; 2009. Recuperado de: https://dialnet.unirioja.es/servlet/tesis?codigo=108071
24. Dibartola, S. Enfermedad renal familiar en caninos y felinos. In: Ettinger, S. y Feldman, E. Tratado de Medicina Interna Veterinaria. 5ta ed. Buenos Aires, Argentina: Intermédica; 2002. 1891-1896 p.
25. Dorsch R, Hartmann K, Sauter-Louis C. Feline lower urinary track disease in a German cat population: A retrospective analysis of demographic data. Causes and clinical signs. Tierarztl. Prax. Ausg. K. Kleintiere Heimtiere; 2014 42(4): 231-239.
26. Drobatz KJ, Costello MF. Emergencias en medicina felina. Buenos aires, Argentina: Intermedica; 2012.
27. Elliott J, Grauer G. Manual of canine and feline nephrology and urology. 2ª ed. Dorset, Inglaterra: British Small Animal Veterinary Association (BSAVA); 2007. 298 p
28. Forrester S, Roudebush P. Evidence-Based Management of Feline Lower Urinary Tract Disease. Vet Clin Small Anim. 2007; 37: 533-558 p.
29. Forrester SD, Towell TL. Feline idiopathic cystitis. Vet. Clin. North Am. Small Anim. Pract. 2015; 45(5): 783-806 p.
30. Flores Cuellar HR. Las características del servicio al cliente que generan lealtad hacia las tiendas de mascotas [Tesis de pregrado]. Guatemala:

© 2021 Global Journals

Universidad Rafael Landívar Facultad De Ciencias Económicas y Empresariales; 2002. Recuperado de: http://biblio3.url.edu.gt/Tesis/lote01/Flores-Hector.pdf

31. García, L.M.; Barcena, M. Hospital Veterinario Molins: Principales patologías del tracto urinario inferior felino. [internet]. [Consultado agosto 2021]. Disponible en: https://www.portalveterinaria.com/articoli/articulos/24655/principales-patologias-del-tracto-urinario-inferior-felino.html
32. García SM. Estudio retrospectivo de los aislados bacterianos y su sensibilidad antimicrobiana en caninos con diagnóstico de infección del tracto urinario atendidos en la Clínica de Animales Menores de la FMV-UNMSM entre los años 2012-2017 [Tesis de pregrado] Lima: Perú: Universidad del Perú; 2018. Recuperado de https://cybertesis.unmsm.edu.pe/handle/20.500.12672/10090
33. García M Milagros, Díaz C Diego, Huerta M Carlos, Olazábal L Juan, Barrios-Arpi Manuel, Chipayo G Ysaac. Análisis retrospectivo de agentes bacterianos y patrones de susceptibilidad antibiótica en casos de infecciones del tracto urinario en caninos domésticos (2012-2017). Rev. investig. vet. Perú: 2019; No. 30(4): 1837-1844 p. Disponible en: http://www.scielo.org.pe/ scielo.php?script=sci_arttext&pid=S1609-91172019000400049&lng=es. http://dx.doi.org/10.15381/rivep.v30i4.17263.
34. Gaymer EC. Descripción de registros clínicos de perros y gatos con infecciones del tracto urinario (ITU) [Tesis de pregrado]. Santiago, Chile: Universidad de Chile Facultad de Ciencias Veterinarias y Pecuarias Escuela de Ciencias Veterinarias; 2014. Recuperado de: http://repositorio.uchile.cl/bitstream/handle/2250/131689/Descripci%c3%b3n-de-registros-cl%c3%adnicos-de-perros-y-gatos-con-infecciones-del-tracto-urinario-%28ITU%29.pdf?sequence=1 &isAllowed=y
35. González JF. Relación de las patologías caninas más frecuentes que se presentan en la clínica de pequeños animales en la zona noroeste de la Comunidad de Madrid, con las variables edad, raza, sexo y tamaño. [Tesis doctoral]. Madrid, España: Universidad Complutense de Madrid; 2015. Recuperado de: https://eprints.ucm.es/id/eprint/33266/
36. González-Castillo LF, Sanmiguel-Plazas RA. Acercamiento a la enfermedad renal crónica en caninos y felinos geriátricos. Ciencia y Agricultura. 2018; 15(2): 71-81. Disponible en: https://repositorio.uptc.edu.co/bitstream/001/2294/1/PPS_938_Acercamiento_enfermedad_renal_canina.pdf
37. Gough A, Thomas A. Breed predispositions to disease in dogs and cats. Oxford, UK: Blackwell Publishing Ltd.; 2004 225 p.
38. Greene C. Enfermedades infecciosas del perro y el gato. 3° ed. Buenos Aires, Argentina: Intermedica; 2008 Cap 91 p.1027-1046
39. Häfelin R. Estudio descriptivo de registros clínicos de pacientes caninos y felinos con diagnóstico de insuficiencia renal. [Tesis de pregrado] Santiago de Chile: Universidad de chile Facultad de Ciencias Veterinarias y Pecuarias Escuela de Ciencias Veterinarias; 2008. Recuperado de: http://repositorio.uchile.cl/bitstream/handle/2250/133639/Estudio-descriptivo-de-registros-cl%C3%ADnicos-de-pacientes-o-descriptivo-de-registros-cl%C3%ADnicos-de-pacientes-%20renal.pdf?sequence=1
40. Harvey A, Tasker S. Manual de medicina felina. Barcelona, España: Ediciones S; 2014
41. Hostutler RA, Chew DJ, DiBartola SP. Recent Concepts in Feline Lower Urinary Tract Disease. Rev. Vet Clin Small Anim. 2005; No. 35: 147–170 p.
42. Houston DM, Elliott DA. Tratamiento nutricional de las patologías del tracto urinario inferior en el gato. En: Pibot P, Biourge V, Elliott D, Flatin JC. Enciclopedia de la nutrición clínica felina. París: Royal Canin; 2010. p 284-321.
43. IRIS, International renal interest society (2019). Disponible en: http://www.iris-kidney.com/
44. Kim Y, Kim H, Pfeiffer D, Brodbelt D. Epidemiological study of feline idiopathic cystitis in Seoul, South Korea. J. Feline Med. Surg. 2017; 20(10): 913-921p.
45. Lekcharoensuk C, Osborne CA, Lulich J P, Pusoonthornthum R, Kirk CA, Ulrich LK, Koehler LA, Carpenter KA, Swanson LL. Associations between dietary factors in canned food and formation of calcium oxalate uroliths in dogs. *Am J Vet Res*. 2002; 63(2): 163-169. Disponible en: https://doi.org/10.2460/ajvr.2002.63.163.
46. Litster A, Thompson M, Moss S, Trott D. Feline bacterial urinary tract infections: An update on an evolving clinical problem. Vet J. 2009; 187(1): 18– 22.
47. López-Villa J, Mendoza López C, Del Ángel Caraza J, Quijano Hernández IA, Barbosa Mireles MA. Patologías que afectan al tracto urinario caudal de los perros y gatos. Hospital Veterinario para Pequeñas Especies FMVZ-UAEMex. Toluca, México: 2014. [Consultado agosto 2021] Disponible en: http://ri.uaemex.mx/bitstream/handle/20.500.11799/58002/5%c2%ba%20Simposio_HILLS_2015.1-12.pdf?sequence=3&isAllowed=y
48. Mendoza CI. Enfermedades del tracto urinario caudal de los perros. [Tesis de pregrado]. México: Universidad Autónoma del Estado de México; 2015. Recuperado de: http://ri.uaemex.mx/handle/20.500.11799/58760
49. Miguel M, Gimenez M, Meder A. Neutrophil gelatinase-associated lipocalin (NGAL): Biomarker of acute kidney injury in dogs. Brazilian Journal of

© 2021 Global Journals

Animal and Environmental Research. 2021; No.4. 2490-2503 p. Disponible en: https://www.brazilianjournals.com/index.php/BJAER/article/view/31236
50. Muralles RA. Caracterización clínica y epidemiológica de pacientes caninos con urolitiasis en el Hospital Veterinario de la Facultad de Medicina Veterinaria y Zootecnia en el periodo de febrero 2015-noviembre 2017 [Tesis de pregrado]. Guatemala: Universidad de San Carlos de Guatemala; 2021 Recuperado de: http://www.repositorio.usac.edu.gt/15899/1/Tesis%20Med.%20Vet.%20Rogelio%20Augusto%20Muralles%20Oscal%20actualizacion.pdf
51. Nelson RW, Couto CG. Small Animal Internal Medicine. España: ELSEVIER; 2010
52. Osborne CA, Kruger JM, Lulich JP. Fe line lower urinary tract disorders; definition of term and concept. Vet. Clin. North Am. Small Anim. Pract. 1996; 26(2): 169-179 p.
53. Osborne CA, Bartges JW, Lulich JP, Polzin DJ, Allen TA. Urolitiasis canina. En: Hand MS, Thatcher CD, Remillard RL, Roudebush P, editores. Nutrición clínica en pequeños animales. 4th ed. Bogotá: Panamericana; 2000. p. 711-733.
54. Petreigne C. Diagnóstico de infección urinaria en canino macho. [Tesis de pregrado]. Tandil, Argentina: Universidad Nacional del Centro de La Provincia de Buenos Aires; 2017. Recuperado de https://www.ridaa.unicen.edu.ar/xmlui/bitstream/handle/123456789/1322/Petreigne%2C%20Celia.pdf?sequence=1&isAllowed=y
55. Polzin DJ. Chronic kidney disease. Nephrology and urology of small animals. Blackwell publishing. 2011; 433-471.
56. Rosas Martínez A. Reporte de urolitiasis vesical en un canino en la Clínica Veterinaria UNIPAZ. Rev *CITECSA*. 2021; *12*(19), 33-43. Recuperado de: https://revistas.unipaz.edu.co/index.php/revcitecsa/article/view/223
57. Saevik BK, Trangerud C, Ottesen N, Sorum H, Eggertsdottir AV. Causes of lower urinary tract disease in Norwegian cats. J. Feline Med. Surg. 2011; 13(6): 410-417 p.
58. Senior D. Management of urinary tract infections. In: BSAVA Manual of Canine and Feline Nephrology and Urology. 2ª ed. London, U.K.: British Small Animal Veterinary Association (BSAVA); 2007. pp. 282-288.
59. Stevenson AE. The incidence of urolithiasis in cats and dogs and the influence of diet in formation and prevention of recurrence. [Tesis doctoral]. Londres: University College London; 2002. Recuperado de: http://www.ivis.org/advances/rc_es/A4309.0608.ES.pdf?LA=2.
60. Suárez M, Bertolani C, Avellana A, Tabar M. Las vías urinarias "Tan sencillas como complejas": Cistitis intersticial "esas locas vejigas". Formación continuada, asociación de veterinarios españoles especialistas en pequeños animales (AVEPA). 2013. P. 31-37 Disponible en: https://avepa.org/pdf/proceedings/URINARIO_PROCEEDING2013.pdf
61. Urbina Bohórquez EM, Campos Mosquera C. Estudio retrospectivo de la prevalencia de enfermedades del sistema urinario en una población de caninos y felinos en un lapso de 15 años (1993 - 2008) en la ciudad de Bogotá, Colombia. [Tesis de pregrado]. Bogotá, Colombia: Universidad de la Salle; 2009. Recuperado de: https://ciencia.lasalle.edu.co/medicina_veterinaria/291
62. Vaden S, Levine J, Correa M, Jameson P, Williams L, Stumpf N, Breitschwerdt E. Retrospective analysis of 106 dogs with acute renal failure. J Vet Intern Med. 1995; 9:209.
63. Valdés A. Actualización en el manejo de la insuficiencia renal crónica. En: VI Curso Internacional de Medicina y Cirugía en Pequeños Animales. Quintero, Chile. 2002; 125-133.
64. Watson D, Lefebvre H, German A, Font A. Diagnóstico Precoz de la Insuficiencia Renal Crónica. Aniwa Publishing. París, Francia. 2003; 19–24 pp.
65. Westropp, J. Feline Idiopathic Cystitis: Pathophysiology and Management. World Small Animal Veterinary Association World Congress Proceedings. Estados Unidos: University of California. 2008. Disponible en: https://www.vin.com/apputil/content/defaultadv1.aspx?id=3866633&pid=11268&
66. Westropp J. Diagnosis and Management of Bacterial Urinary Tract Infections in Dogs and Cats. In: 4th International Baytril® Symposium. Florence, Italy. 18-19 June 2009. Bayer HealthCare, Animal Health. p. 16-23.
67. Windahl U. Bacterial infections in dogs with special reference to urinary tract infections, surgical site infections and Methicillin-resistant Staphylococcus pseudintermedius. 2015; 90p. Disponible en: https://pub.epsilon.slu.se/12200/1/windahl_u_150508.pdf
68. Wong C, Epstein S, Westropp J. Antimicrobial susceptibility patterns in urinary tract infections in dogs (2010–2013). J Vet Intern Med. 2015; (29): 1045-1052.

© 2021 Global Journals

This page is intentionally left blank

© 2021 Global Journals

Global Journal of Medical Research: G
Veterinary Science and Veterinary Medicine
Volume 21 Issue 2 Version 1.0 Year 2021
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Recurrence of Dental Malocclusion in a Fuzzy Lop Rabbit: A Case Report

By Larissa Lemos Sobral
Universidade Cruzeiro do Sul

Abstract- Domestic rabbits (Oryctolagus cuniculus) had their ancestors from western Europe and northeastern Africa. Even today more than 50 breeds of rabbits and countless mixtures persist. Depending on race, size and age, the prevalence of some diseases is higher, such as dental malocclusion, dacryocystitis, pododermatitis, cardiomyopathy and dermatopathy. Their gastrointestinal system is complex and requires adequate environmental and nutritional management. Rabbits and rodents have constant tooth growth, the adequate fiber content in the diet and the way the food is offered provide healthy tooth wear, without causing changes in dental occlusion (Cubas et al., 2014). The deficiency in the feeding of lagomorphs consists of inadequate nutrition with abrasive sheets, lack of long fibers such as hay, thus leading to hyper tooth growth and, consequently, malocclusion. Affected rabbits routinely stop feeding and may present various local and systemic clinical signs. Feeding management and monitoring with the veterinarian periodically are extremely important to prevent dental and other diseases that may affect this species.

Keywords: *rabbits; dental malocclusion; veterinary medicine; relapse.*

GJMR-G Classification: *NLMC Code: WA 360*

RECURRENCEOFDENTALMALOCCLUSIONINAFUZZYLOPRABBITACASEREPORT

Strictly as per the compliance and regulations of:

Open Association of Research Society, USA
Research | Diversity | Ethics

© 2021. Larissa Lemos Sobral. This research/review article is distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0). You must give appropriate credit to authors and reference this article if parts of the article are reproduced in any manner. Applicable licensing terms are at https://creativecommons.org/licenses/by-nc-nd/4.0/.

Recurrence of Dental Malocclusion in a Fuzzy Lop Rabbit: A Case Report

Recidiva De Má Oclusão Dentária Em Coelho Da Raça Fuzzy Lop: Relato De Caso

Larissa Lemos Sobral

Resumo- Os coelhos domésticos (Oryctolagus cuniculus) tiveram seus ancestrais provenientes do oeste da Europa e nordeste da África. Ainda hoje persiste mais de 50 raças de coelhos e incontáveis misturas. Conforme a raça, o tamanho e a idade, a prevalência de algumas enfermidades é maior, como má oclusão dentaria, dacriocistite, pododermatite, cardiomiopatia e dermatopatia. O sistema gastrintestinal deles é complexo e requer um manejo ambiental e nutricional adequados. Coelhos e roedores apresentam crescimento constante dos dentes, o teor adequado de fibras na dieta e a forma como o alimento é ofertado, proporcionam desgaste saudável dos dentes, sem acarretar alterações na oclusão dentária (Cubas et al., 2014). A deficiência na alimentação de lagomorfos, consiste numa nutrição inadequada com folhas abrasivas, falta de fibras longas como o feno, levando assim ao um hiper crescimento dentário e consequentemente a má oclusão. Coelhos acometidos corriqueiramente param de se alimentar e podem vir a apresentar diversos sinais clínicos locais e sistêmicos. O manejo alimentar e o acompanhamento com o médico veterinário periodicamente são de extrema importância para prevenção dentaria e de outras doenças que podem vir a acometer esta espécie.

Palavra-chave: coelhos; má oclusão dentaria; medicina veterinária; recidiva.

Abstract- Domestic rabbits (Oryctolagus cuniculus) had their ancestors from western Europe and northeastern Africa. Even today more than 50 breeds of rabbits and countless mixtures persist. Depending on race, size and age, the prevalence of some diseases is higher, such as dental malocclusion, dacryocystitis, pododermatitis, cardiomyopathy and dermatopathy. Their gastrointestinal system is complex and requires adequate environmental and nutritional management. Rabbits and rodents have constant tooth growth, the adequate fiber content in the diet and the way the food is offered provide healthy tooth wear, without causing changes in dental occlusion (Cubas et al., 2014). The deficiency in the feeding of lagomorphs consists of inadequate nutrition with abrasive sheets, lack of long fibers such as hay, thus leading to hyper tooth growth and, consequently, malocclusion. Affected rabbits routinely stop feeding and may present various local and systemic clinical signs. Feeding management and monitoring with the veterinarian periodically are extremely important to prevent dental and other diseases that may affect this species.

Author: Aluna de graduação, faculdade de Medicina Veterinária, Universidade Cruzeiro do Sul, Ceunsp. Endereço: Estrada da serrinha 321, bairro cambara, São Roque-SP.
e-mail: larissalemossobral@gmail.com

Keywords: rabbits; dental malocclusion; veterinary medicine; relapse.

I. Introdução

Foi realizado um estudo amplo sobre as más oclusões dentarias em coelhos domésticos, sendo uma disfunção muito corriqueira da espécie. O presente trabalho apresenta uma recidiva de má oclusão em um coelho doméstico de aproximadamente 3 anos, castrado e da raça fuzzy lop.

O animal apresentado neste trabalho manifestou sinais clínicos, como inapetência, diarreia, prostração e epifora. Há muitos relatos em clínicas de silvestres sobre esta condição, podendo ser de origem etiopatogenia variada, como afecção congênita, lesões traumáticas, prognatismos mandibulares ou braquignatismos maxilares, afecções secundárias a maloclusão dos dentes superiores e doenças osteometabólicas. Contudo uma dos principais sinais clínicos associados a má oclusão dentaria é a inapetência e epifora, pela ocorrência das raízes dos dentes serem bem próximas aos canais lagrimas do animal, sendo assim prejudicando e gerando um trauma nesses canais, assim agindo fazendo com que os canais não possam exercer suas funções corretamente. A inapetência vem de decorrente a dor e a dificuldade do animal para mastigar os alimentos.

Para diagnosticar a má oclusão dentária pode se usar métodos como o raio x, exames físico e clínicos. O tratamento sempre é de escolha cirúrgica, pois o veterinário responsável terá que ter uma visibilidade melhor dos dentes do animal e submeter ao desgaste dentário.

II. Caso Clínico

No dia 10 de julho de 2018 foi atendido na clínica veterinária espaço veterinário um coelho da raça fuzzy lop de aproximadamente 1 ano de idade apresentando epífora (lacrimejamento), inapetência (falta de apetite) e diarreia. Foi então submetido ao exame físico e a suspeita inicial foi de má oclusão dentária, a partir da anamnese e do exame clínico, foram solicitados exames de imagem e de laboratório. No hemograma o animal não demonstrou nenhuma

© 2021 Global Journals

anormalidade, tudo dentro dos parâmetros normais. O diagnóstico se baseou no exame da cavidade oral e no exame radiográfico. Exame da cavidade oral: Com o coelho contido com uma toalha, pode-se examinar uma parte da cavidade bucal com auxílio de um especulo nasal ou, na falta deste, de um otoscópio. Investiga-se a presença de pontas de dentes visíveis ou de lesões na mucosa oral. Essa técnica não permite visualizar cerca de 25% das lesões. O exame minucioso da cavidade oral requer anestesia geral e utilização de um abridor de boca específico.

Na radiografia o animal apresentou, comprometimento do canal nasolagrimal ocasionado por um crescimento anormal das raízes dentarias que foi apresentada juntamente no exame.



Imagem 1: Raízes dentarias em crescimento exagerado.



Imagem 2: Crescimento dentário exagerado (Clínica Espaço Veterinário).

Podemos encontrar em exames radiográficos realizados nos casos de má oclusão dentária que demonstram, com grande frequência, a desmineralização dos ossos cranianos. As alterações da forma, posição e estrutura dos dentes tem possivelmente uma ligação com à osteopenia, decorrente de um desequilíbrio no metabolismo do cálcio.

O animal foi então submetido ao desgaste dentário e a correção cirúrgica no dia 02 de agosto de 2018. Na cirurgia foi possível observar pontas nos dentes pré-molares que possibilitavam a formação de pontas lacerantes em direção à mucosa oral do animal. Os dentes inferiores, que cresceram em direção ao interior da cavidade, lesionaram a língua, enquanto os dentes superiores, que cresceram em direção ao exterior, lesionaram as bochechas. A pós o desgaste dentário, o animal passou bem e voltou a comer, não apresentou novos sinais de dor, inapetência e epifora.



Imagem 3: Dentes com pontas, antes do desgaste.



Imagem 4: Dentes após o desgaste dentário, (Clínica Espaço Veterinário).

Um dos fatores que pode estar relacionado ao problema de má oclusão dentária é o fator mecânico pela falta de desgaste das coroas dentárias. Os molares e pré-molares, quando não utilizados

© 2021 Global Journals

corretamente, continuam a crescer e ficam em contato com seu homólogo do maxilar correspondente quando em repouso, ocasionando fechamento inadequado da boca. Quando a boca não se fecha adequadamente, não há contato e desgaste normal dos incisivos. Causando assim uma má oclusão secundária dos incisivos. O crescimento das coroas dentárias, umas contra as outras, não podendo continuar indefinidamente, pois os músculos e os ligamentos da boca se opõem a isso. Portanto se temos uma pressão anormal das coroas, umas sobre as outras, o que induz sua curvatura anormal, impedido então a direção das coroas, o crescimento dentário continua, apesar de tudo, e induz um crescimento anormal das raízes (Quinton, 2005). Os incisivos superiores se curvam em direção ao interior da cavidade bucal, enquanto os inferiores crescem para frente, a preensão dos alimentos torna-se difícil. O crescimento os incisivos para o interior da boca podem causar lesões doloridas que se infeccionam facilmente. Nos Molares e pré-molares os sintomas são discretos. As pontas lacerantes dos dentes provocam pequenas ulcerações da mucosa oral, que ocasionam desconforto temporário e, por fim, cicatrizam (Quinton, 2005). O coelho acaba diminuindo o consumo de alimentos durante alguns dias e depois volta a se alimentar normalmente quando a lesão cicatriza. À medida que essas pontas de dentes continuam a crescer, o desconforto persiste (Quinton, 2005). A desmineralização da maxila ocasiona perda de consistência do osso alveolar, que contém as raízes dentárias. Estas não encontram mais resistência ao seu crescimento e se desenvolvem anormalmente. Consequências do crescimento anormal das raízes podem causar um grande crescimento em direção ao maxilar, podendo assim ocasionar outros problemas como, protrusão das raízes nos canais lacrimais (ocasionando dacriocistite), nos espaços suborbitárias (induzindo a abscessos em caso de infecção, responsáveis pela exoftalmia), na cortical ventral do osso mandibular (formando bolsas detectáveis à palpação). A dor durante a mastigação, a raiz dentária é forçada de forma dolorida contra o periósteo do osso maxilar e entra em contato com terminações nervosas do ápice dentário, isso resulta em dor quando o coelho mastiga um alimento duro, recusando o consumo de feno e, portanto, agravando a doença dentária. Podendo ter uma ocorrência também de uma infecção como a doença periodontal, frequentemente em coelhos, pode induzir a complicações infecciosas na base das raízes. A perda dos ligamentos periodontais deixa um espaço que pode ser colonizado por patógenos (geralmente bactérias anaeróbicas da microbiota digestiva, como Fusobacterium necrophorutn), causando osteomielite e formação de abscessos. Em função disso, pode se formar grandes tumefações nos maxilares ou provocar exoftalmia (Quinton, 2005). Um ano após a submissão a cirurgia o animal, apresentou uma recidiva, tendo que ser submetido ao mesmo processo cirúrgico de antes. Foi então contatado pela anamnese e os resultados dos exames que por ser tratar de um coelho doméstico ele poderia ter desenvolvido um processo crônico de deficiência de vitamina d, juntamente com problemas já pré-dispostos a raça. Um estudo realizado por Harcourt-Brown e Baker em coelhos de estimação acometidos por distúrbios dentários demonstrou que os animais apresentavam hipocalcemia e concentração sanguínea de paratormônio significativamente maior, em relação aos coelhos de vida livre. A falta de desgaste dentário associada à alimentação pobre em fibras não seria assim, o único fator importante na ocorrência de doença dentária. Os coelhos que vivem em ambiente externo se alimentam de ervas, que os oferecem fonte equilibrada de cálcio e fósforo. Portanto estes animais têm um aproveitamento da luz solar, permitindo a síntese de vitamina D. Embora no coelho a absorção intestinal de cálcio seja possível na ausência de vitamina D, sua presença favorece a absorção do cálcio, em especial quando o teor do mineral na dieta é baixo. Em contrapartida, a vitamina D influencia a mobilização do cálcio intraósseo e o controle da excreção renal de cálcio. A vista disso, a deficiência de vitamina D pode ter papel importante nas instalações de doenças dentárias em coelhos, podendo ser associa a fatores mecânicos, a falta do desgaste dentário, um fator metabólico, a desmineralização dos dentes e dos ossos que os sustentam. As indicações para que o animal possa conviver com este distúrbio e ter uma qualidade de vida, é de eleição de escolher bons alimentos, sempre oferecer uma boa nutrição com verduras e fenos. Foi sugerido ao tutor do animal que vive dentro de casa tomar banhos de sol pela manhã, realizar os desgastes dentários todos os anos, acompanhamento veterinário uma vez ao ano pelo menos e qualquer intercorrência e algum sintoma levar o animal ao veterinário especialista, para que o animal possa vir a ter uma qualidade de vida compatível com a vida.

III. Matérias e Métodos

As informações contidas neste trabalho foram obtidas por meio de revisão do prontuário clínico, registro fotográfico dos exames de imagem aos quais o paciente foi submetido e revisão bibliográfica.

IV. Resultados e Discussão

As más oclusões dentarias em coelhos costuma ser de aspecto comum, variando muito sobre a alimentação e manejos destes animais. No caso relato, o animal apresentou um hiper crescimento acompanhado de uma recidiva das más oclusões, os coelhos de vida livre costumam se alimenta de ervas que oferecem os nutrientes necessários. Sendo assim

© 2021 Global Journals

os coelhos de vida livre costumam ter um aproveitamento da luz solar, sintetizando a vitamina D, em contrapartida os coelhos domésticos não costumam ter um aproveitamento tão constante da luz solar, causando uma disfunção da síntese de vitamina D acompanhada da falta de desgaste alimentar natural, o que pode vir a levar a um problema dentário e então a recidiva de má oclusão dentaria. É sempre indica que o animal doméstico possa vir a ter um aproveitamento melhor da síntese da vitamina D, tomando sol pela manhã, realizar mudanças no abito da alimentação introduzindo alimentos que sejam mais duros como caules de couve e realizar o desgaste dentário com um médico veterinária para que o animal possa vir a ter uma qualidade de vida compatível com a vida.

V. Conclusão

A má oclusão dentária é tem uma ampla ocorrência nos lagomorfos, manifestando diversas etiologias e podendo ocasionar diversas disfunções odontológicas, avançando assim para outros sistemas. A dieta é uma das causas comuns e que deve ser controlada para impedir a evolução severa do quadro clínico do paciente. O prognostico tem sido bom, realizando o procedimento cirúrgico o quanto antes. Na literatura tem-se descrito diversas técnicas, sendo de escolha do médico veterinário de acordo com o exame físico e histórico do animal e urgência, que no caso foi optado pelo procedimento cirúrgico de desgaste dentário em conjunto com mudanças no ambiente do animal como banhos de sol pela manhã e mudança em sua alimentação.

Referência Bibliográficas

1. CUBAS, Z.S; SILVA, J.C. R; CATÃO-DIAS, J.L. Tratado de animais selvagens: medicina veterinária. São Paulo: Roca, 2014.
2. RIBEIRO, M.J. Consequências do manejo nutricional e ambiental inadequados para a saúde dos animais selvagens de estimação. Jaboticabal, 2017.
3. SEREJO, P.P. FLORENCIO, L.G. SANTOS, M.M. Má oclusão dentaria em coelho. 2016.
4. QUINTON, F.J. Novos animais de estimação, pequenos mamíferos. 1 ed. Rio de janeiro: Roca, 2005. 181p.

© 2021 Global Journals

Global Journals Guidelines Handbook 2021

www.GlobalJournals.org

Memberships

Fellows/Associates of Medical Research Council

FMRC/AMRC Memberships



Introduction

FMRC/AMRC is the most prestigious membership of Global Journals accredited by Open Association of Research Society, U.S.A (OARS). The credentials of Fellow and Associate designations signify that the researcher has gained the knowledge of the fundamental and high-level concepts, and is a subject matter expert, proficient in an expertise course covering the professional code of conduct, and follows recognized standards of practice. The credentials are designated only to the researchers, scientists, and professionals that have been selected by a rigorous process by our Editorial Board and Management Board.

Associates of FMRC/AMRC are scientists and researchers from around the world are working on projects/researches that have huge potentials. Members support Global Journals' mission to advance technology for humanity and the profession.

FMRC

Fellow of Medical Research Council

FELLOW OF MEDICAL RESEARCH COUNCIL is the most prestigious membership of Global Journals. It is an award and membership granted to individuals that the Open Association of Research Society judges to have made a 'substantial contribution to the improvement of computer science, technology, and electronics engineering.

The primary objective is to recognize the leaders in research and scientific fields of the current era with a global perspective and to create a channel between them and other researchers for better exposure and knowledge sharing. Members are most eminent scientists, engineers, and technologists from all across the world. Fellows are elected for life through a peer review process on the basis of excellence in the respective domain. There is no limit on the number of new nominations made in any year. Each year, the Open Association of Research Society elect up to 12 new Fellow Members.

To the institution

Get letter of appreciation

Global Journals sends a letter of appreciation of author to the Dean or CEO of the University or Company of which author is a part, signed by editor in chief or chief author.



Exclusive Network

Get access to a closed network

A FMRC member gets access to a closed network of Tier 1 researchers and scientists with direct communication channel through our website. Fellows can reach out to other members or researchers directly. They should also be open to reaching out by other.

Career | Credibility | Exclusive | Reputation



Certificate

Certificate, LoR and Laser-Momento

Fellows receive a printed copy of a certificate signed by our Chief Author that may be used for academic purposes and a personal recommendation letter to the dean of member's university.

Career | Credibility | Exclusive | Reputation



Designation

Get honored title of membership

Fellows can use the honored title of membership. The “FMRC” is an honored title which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., FMRC or William Walldroff, M.S., FMRC.

Career | Credibility | Exclusive | Reputation

Recognition on the Platform

Better visibility and citation

All the Fellow members of FMRC get a badge of "Leading Member of Global Journals" on the Research Community that distinguishes them from others. Additionally, the profile is also partially maintained by our team for better visibility and citation. All fellows get a dedicated page on the website with their biography.

Career | Credibility | Reputation

© Copyright by Global Journals | Guidelines Handbook

Future Work

Get discounts on the future publications

Fellows receive discounts on the future publications with Global Journals up to 60%. Through our recommendation programs, members also receive discounts on publications made with OARS affiliated organizations.

Career | Financial



GJ Internal Account

Unlimited forward of Emails

Fellows get secure and fast GJ work emails with unlimited storage of emails that they may use them as their primary email. For example,
john [AT] globaljournals [DOT] org.

Career | Credibility | Reputation



Premium Tools

Access to all the premium tools

To take future researches to the zenith, fellows receive access to all the premium tools that Global Journals have to offer along with the partnership with some of the best marketing leading tools out there.

Financial

Conferences & Events

Organize seminar/conference

Fellows are authorized to organize symposium/seminar/conference on behalf of Global Journal Incorporation (USA). They can also participate in the same organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent. Additionally, they get free research conferences (and others) alerts.

Career | Credibility | Financial

Early Invitations

Early invitations to all the symposiums, seminars, conferences

All fellows receive the early invitations to all the symposiums, seminars, conferences and webinars hosted by Global Journals in their subject.

Exclusive

© Copyright by Global Journals | Guidelines Handbook



Publishing Articles & Books

Earn 60% of sales proceeds

Fellows can publish articles (limited) without any fees. Also, they can earn up to 70% of sales proceeds from the sale of reference/review books/literature/publishing of research paper. The FMRC member can decide its price and we can help in making the right decision.

Exclusive | Financial

Reviewers

Get a remuneration of 15% of author fees

Fellow members are eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get a remuneration of 15% of author fees, taken from the author of a respective paper.

Financial

Access to Editorial Board

Become a member of the Editorial Board

Fellows and Associates may join as a member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer.

Career | Credibility | Exclusive | Reputation

And Much More

Get access to scientific museums and observatories across the globe

All members get access to 5 selected scientific museums and observatories across the globe. All researches published with Global Journals will be kept under deep archival facilities across regions for future protections and disaster recovery. They get 10 GB free secure cloud access for storing research files.

© Copyright by Global Journals | Guidelines Handbook

ASSOCIATE OF MEDICAL RESEARCH COUNCIL

ASSOCIATE OF MEDICAL RESEARCH COUNCIL is the membership of Global Journals awarded to individuals that the Open Association of Research Society judges to have made a 'substantial contribution to the improvement of computer science, technology, and electronics engineering.

The primary objective is to recognize the leaders in research and scientific fields of the current era with a global perspective and to create a channel between them and other researchers for better exposure and knowledge sharing. Members are most eminent scientists, engineers, and technologists from all across the world. Associate membership can later be promoted to Fellow Membership. Associates are elected for life through a peer review process on the basis of excellence in the respective domain. There is no limit on the number of new nominations made in any year. Each year, the Open Association of Research Society elect up to 12 new Associate Members.

To the institution

Get letter of appreciation

Global Journals sends a letter of appreciation of author to the Dean or CEO of the University or Company of which author is a part, signed by editor in chief or chief author.



Exclusive Network

Get access to a closed network

A AMRC member gets access to a closed network of Tier 2 researchers and scientists with direct communication channel through our website. Associates can reach out to other members or researchers directly. They should also be open to reaching out by other.

Career | Credibility | Exclusive | Reputation



Certificate

Certificate, LoR and Laser-Momento

Associates receive a printed copy of a certificate signed by our Chief Author that may be used for academic purposes and a personal recommendation letter to the dean of member's university.

Career | Credibility | Exclusive | Reputation



Designation

Get honored title of membership

Associates can use the honored title of membership. The “AMRC” is an honored title which is accorded to a person’s name viz. Dr. John E. Hall, Ph.D., AMRC or William Walldroff, M.S., AMRC.

Career | Credibility | Exclusive | Reputation

Recognition on the Platform

Better visibility and citation

All the Associate members of AMRC get a badge of "Leading Member of Global Journals" on the Research Community that distinguishes them from others. Additionally, the profile is also partially maintained by our team for better visibility and citation.

Career | Credibility | Reputation

© Copyright by Global Journals | Guidelines Handbook

Future Work

Get discounts on the future publications

Associates receive discounts on future publications with Global Journals up to 30%. Through our recommendation programs, members also receive discounts on publications made with OARS affiliated organizations.

Career | Financial



GJ Account

Unlimited forward of Emails

Associates get secure and fast GJ work emails with 5GB forward of emails that they may use them as their primary email. For example,
john [AT] globaljournals [DOT] org.

Career | Credibility | Reputation



Premium Tools

Access to all the premium tools

To take future researches to the zenith, fellows receive access to almost all the premium tools that Global Journals have to offer along with the partnership with some of the best marketing leading tools out there.

Financial

Conferences & Events

Organize seminar/conference

Associates are authorized to organize symposium/seminar/conference on behalf of Global Journal Incorporation (USA). They can also participate in the same organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent. Additionally, they get free research conferences (and others) alerts.

Career | Credibility | Financial

Early Invitations

Early invitations to all the symposiums, seminars, conferences

All associates receive the early invitations to all the symposiums, seminars, conferences and webinars hosted by Global Journals in their subject.

Exclusive



Publishing Articles & Books

Earn 60% of sales proceeds

Associates can publish articles (limited) without any fees. Also, they can earn up to 30-40% of sales proceeds from the sale of reference/review books/literature/publishing of research paper

Exclusive | Financial

Reviewers

Get a remuneration of 15% of author fees

Associate members are eligible to join as a paid peer reviewer at Global Journals Incorporation (USA) and can get a remuneration of 15% of author fees, taken from the author of a respective paper.

Financial

And Much More

Get access to scientific museums and observatories across the globe

All members get access to 2 selected scientific museums and observatories across the globe. All researches published with Global Journals will be kept under deep archival facilities across regions for future protections and disaster recovery. They get 5 GB free secure cloud access for storing research files.

© Copyright by Global Journals | Guidelines Handbook

Associate	Fellow	Research Group	Basic
$4800 **lifetime designation**	$6800 **lifetime designation**	$12500.00 **organizational**	APC **per article**
Certificate, LoR and Momento **2** discounted publishing/year **Gradation** of Research **10** research contacts/day **1 GB** Cloud Storage **GJ** Community Access	**Certificate,** LoR and Momento **Unlimited** discounted publishing/year **Gradation** of Research **Unlimited** research contacts/day **5 GB** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**Certificates,** LoRs and Momentos **Unlimited** free publishing/year **Gradation** of Research **Unlimited** research contacts/day **Unlimited** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**GJ** Community Access

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

Before and during Submission

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

Policy on Plagiarism

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
- Lectures

- Printed material
- Graphic representations
- Computer programs
- Electronic material
- Any other original work

Authorship Policies

Global Journals follows the definition of authorship set up by the Open Association of Research Society, USA. According to its guidelines, authorship criteria must be based on:

1. Substantial contributions to the conception and acquisition of data, analysis, and interpretation of findings.
2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

Copyright

During submission of the manuscript, the author is confirming an exclusive license agreement with Global Journals which gives Global Journals the authority to reproduce, reuse, and republish authors' research. We also believe in flexible copyright terms where copyright may remain with authors/employers/institutions as well. Contact your editor after acceptance to choose your copyright policy. You may follow this form for copyright transfers.

Appealing Decisions

Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

Declaration of funding sources

Global Journals is in partnership with various universities, laboratories, and other institutions worldwide in the research domain. Authors are requested to disclose their source of funding during every stage of their research, such as making analysis, performing laboratory operations, computing data, and using institutional resources, from writing an article to its submission. This will also help authors to get reimbursements by requesting an open access publication letter from Global Journals and submitting to the respective funding source.

Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.



© Copyright by Global Journals | Guidelines Handbook

Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Medical Research Paper

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



© Copyright by Global Journals | Guidelines Handbook

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



© Copyright by Global Journals | Guidelines Handbook

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



© Copyright by Global Journals | Guidelines Handbook

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

INDEX

A

Autoimmune · 1

D

Diluent · 9

E

Enumeration · 9, 10, 12, 14

I

Idiopathic · 1

P

Prevalence · 8, 15
Propagating · 8

S

Slaughtering · 8





Global Journal of Medical Research

Visit us on the Web at www.GlobalJournals.org | www.MedicalResearchJournal.org
or email us at helpdesk@globaljournals.org

ISSN 9755896



© Global Journals