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Characterization of Ascitis

Epileptic Sudanese Children

Highlights

Diagnosis and Management

Neurosurgical and Radiologic

Discovering Thoughts, Inventing Future

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Contents of the Volume

i. Copyright Notice
ii. Editorial Board Members
iii. Chief Author and Dean
iv. Table of Contents
v. From the Chief Editor's Desk
vi. Research and Review Papers

1. Characterization of Ascitis using Echo Texture . *1-8*
2. Height Difference Between Right and Left Hemi Diaphragm in Normal Sudanese Adults using Postero -Anterior Computed Chest Radiography. *9-15*
3. Study of Weekly Paclitaxel with Concurrent Radiotherapy V/S Weekly Cisplatin with Concurrent Radiotherapy in Advanced Cervix Carcinoma. *17-22*
4. Perforated Duodenal Diverticulum: Diagnosis and Management. *23 -25*
5. Characterization of Hippocampus in Epileptic Sudanese Children using MRI. *27 -35*
6. Right Internal Carotid Agenesis: A Rare Case Anatomical, Neurosurgical and Radiological Perspective. *37 -39*

vii. Auxiliary Memberships
viii. Process of Submission of Research Paper
ix. Preferred Author Guidelines
x. Index

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Characterization of Ascitis using Echo Texture

By Mohammed Saeed AlNumeiri, Caroline Edward Ayad,
Boushra Hussein Ahmed & Elsafi Ahmed Abdulla
Sudan University of Science and Technology, Sudan

Abstract- *Objectives:* The Purpose of this study is to characterize the asites fluid using echo texture and to compare the findings with laboratory results in order to predict the asctis type by imaging methods for ascitic patients.

Methods: 53 Patients who underwent Sonography for ascitis between February 2012 and January 2013 were included in the study.The study was implemented in Wad- Medani Military Hospital, Alia Specialist Hospital- Wad-Madani. Wad-medani Teaching Hospital, National Cancer Institute- Wad-Madani and Omdurman Military Hospital .Gray scale Sonography of the abdomen was performed using Aloka SSD- 500 and Honda SSD-500 with frequency (3.5 MHz) convex probe. The scanning was done on longitudinal and transverse scan for abdomen and pelvis.

Keywords: *ascitis, ultrasound, laboratory tests.*

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Characterization of Ascitis using Echo Texture

Mohammed Saeed AlNumeiri [α], Caroline Edward Ayad [σ], Boushra Hussein Ahmed [ρ] & Elsafi Ahmed Abdulla [ω]

Abstract- Objectives: The Purpose of this study is to characterize the asites fluid using echo texture and to compare the findings with laboratory results in order to predict the asctis type by imaging methods for ascitic patients.

Methods: 53 Patients who underwent Sonography for ascitis between February 2012 and January 2013 were included in the study.The study was implemented in Wad-Medani Military Hospital, Alia Specialist Hospital- Wad-Madani. Wad-medani Teaching Hospital, National Cancer Institute-Wad-Madani and Omdurman Military Hospital .Gray scale Sonography of the abdomen was performed using Aloka SSD-500 and Honda SSD-500 with frequency (3.5 MHz) convex probe. The scanning was done on longitudinal and transverse scan for abdomen and pelvis. The patients ascitis echo texture had been evaluated and the findings were correlated with Ascitis Paracentesis results, including total protein values, total albumin, Serum Ascitis Albumin Gradient (SAAG),ascitis type , liver and spleen texture as well as the Ultrasound findings.

Results: During this period, 53 patients (31males, 22females) underwent Sonography for ascitis,5(9.4%)had abdomen tuberculosis,1(1.9%)acute renal failure,2(3.8%)Ca breast,1(1.9%)Ca prostate,1(1.9%) Ca colon, 2(3.8%) Ca ovaries, 3(5.7%) Congestive heart disease, 6(11.3%) Chronic renal failure,1(1.9%)Cystadenocarcinoma, 2(3.8%) hepato cellular carcinoma,1(1.9%)Hepatitis, 23(43.4%) Liver Cirrhosis,1(1.9%) lymphoma,1(1.9%)portal hypertension, 2(3.8%)Pelvis inflammatory diseases ,1(1.9%) Urinary bladder Schistosomasis. The correlation between the Ascitis Echo Texture with total protein values, total albumin, SAAG, ascitis type, ultrasound findings were found to be significant at *p* value 0.05.liver echo texture has significant relation with Ascitis Echo Texture and laboratory results, but no impact of the spleen texture in the ascites character was noted.

Conclusion: Ultrasound is valuable in the investigation of ascetic patients. It is recommended to replace other methods of laboratory investigation as it can predict the ascitis type from its echo texture, as well as ruling the underlying causes.

Keywords: ascitis, ultrasound, laboratory tests.

I. Introduction

Ascites is defined as the accumulation of fluids in the peritoneal cavity .[1]Two important factors that control the balance exchange of fluids in the body, these including the plasma colloid osmotic pressure and the portal venous pressure and its disturbance may cause Ascites. [2, 3,4]

The most common cause of Ascites from Western Europe and North America is Cirrhosis, which records about 80% of the cases. The other common causes are Malignancy (10%), Cardiac Failure (5%) and Tuberculosis and other causes. [5, 6]

The differentiation between Ascitis causes is important for diagnostic and therapeutic purposes [7] Diagnostic abdominal paracentesis is considered as an essential investigation for differential diagnoses in all patients with clinically noticed Ascites. [8]

Clinically; Ascites is detected by the presence of flank dullness to percussion, [2].In recent years Ultrasound has been proven an accurate and reliable method of detecting abdominal fluid, determining its site [9] but questions have been raised about its capability to differentiate the Ascitis of transudates concept from inflammatory or malignant exudates. Assessment of the Ascites is necessary in monitoring the progress of the disease and in selecting appropriate methods of treatment. [10]

Radiologic evaluation of the abdomen was helpful in confirming the presence of fluid, Computed Axial Tomography are considered quite sensitive in the detection of ascitic fluid .Physical examination findings are consistent with the diagnosis of an intra-abdominal fluid accumulation; but its sensitivity yields varying results.[2]

To evaluate the reflection of Ascitis Echo Texture related to the fluid composition; we have correlated the Ultrasound findings, with patient history, clinical findings of proven Ascites cases and laboratory findings including Total Protein, Total Albumin and the Serum Ascites Albumin Gradient (SAAG) .

II. Materials and Methods

This study was implemented in Wad-Medani Military Hospital, Alia Specialist Hospital- Wad-Madani. Wad-Medani Teaching Hospital, National Cancer Institute- Wad-Madani and Omdurman Military Hospital during the period from 2012 to 2013.

Population and samples size: (53) patients in both genders who were clinically diagnosed proved to have abdominal ascites.

Author α: Diagnostic Radiology, Omdurman Military Hospital, Khartoum-Sudan. e-mail: mahmmednumeeri@yahoo.com
Author σ ω: Associate Professor ,PhD Diagnostic Radiology, College of Medical Radiological Science, Sudan University Of Science and Technology. e-mail: carolineayad@yahoo.com, dr.elsafi@gmail.com
Author ρ: Professor, PhD Diagnostic Medical Ultrasound, AlRabat University. e-mail: Bushrahuseen@yahoo.com

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Instrumentation:

Aloka SSD-500 with frequency (3.5 MHz) convex probe, and Honda SSD-500with frequency (3.5 MHz) convex probe and the facility of printing and computerized reporting system are used.

Data were collected, executed by direct ultrasound examination, the collected data were analyzed using statistical method, ANOVA independent values, mean and standard deviation, for ethical Issue: permission of department and patients arise at the area of the study were taken.

Techniques for doing examination:

Scanning technique of abdominal and pelvic ultrasound.

For ultrasound examination, each patient was scanned, in international scanning guidelines and protocols and Ascites was determined by Ultrasound Brightness Mode (B-Mode).

The scanning protocol for Sonography of the peritoneal cavity varies, depending on the patient's clinical symptoms, and the differential clinical diagnosis, No patients preparation was done.Patients were scanned in supine position in right lateral decubitus and in left lateral decubitus.

Transverse section: Transducer was positioned directly under the Xiphisternum and angled cephalic, Transducer beam was swept through the liver, and then was moved distally to umbilicus, applying graded compression, observing lesser sac (around the pancreas) and transverse mesocolon. The transducer was positioned directly below the right costal margin and the scan was repeated, observing all peritoneal spaces. Transducer was placed directly below the left costal margin; transducer was moved in the transverse plane, throughout the remainder of the abdomen to cover the entire abdomen.

Longitudinal section: Transducer was placed below the Xiphisternum, tipped cephalic: Swept across the abdomen from left to right, moved along right costal margin, angling towards the right lateral border of the liver repeated process to the lateral border of the spleen. Longitudinal scans were performed throughout the remaining abdomen, observing all spaces.

Grading of the findings:

Ultrasound Findings:

The Liver and spleen echo texture had been evaluated as Fine texture when smooth homogeneous contour of the parenchyma is present ,and it was given grade 0 which stands for normal. Coarse texture when irregular contour of the parenchyma and was given grade 1. Diffuse disease is irregular heterogeneous contour with fibrotic changes of parenchyma and was given grade 2.

Sonographic appearance and classification of the ascites was done by giving grades to classify the Ascitis Echo Texture as Clear Ascites and was given grade 0 and Turbid Ascites grade 1

Laboratory investigation after Paracenteses :

Normal Total protein range (6-8)g/dl ,Normal serum albumin range (3.5-6.5) g/dl,The Ascites Serum Ascites Albumin Gradient (SAAG) the Serum Albumin Concentration minus the ascitic fluid albumin concentration.Transudate (low in total protein concentration) < 30g/dl, Excaudate (high in total protein concentration)>30g/dl

III. Results

The sample include 53 patients31 (58.5%) were male and22 (41.5%) were females with ascitis arises from different causes , Clinically 32(60.4%) of the sample have a history of liver disease, 8(15.1%) have history of renal diseases 8 (15.1%) chest pain, 3(5.7%) are with hypertension and the residue acts 2 (3.8%) they came with different signs and symptoms including Nausea3(5.7%), Anorexia7(13.2%), Lower limb edema13 (35.8%), shortness of breathing 22 (41.5%). All were significantly related to Ultrasound findings at *p -value 0.05.*

Table 1 : Ultrasound Findings/Diagnosis in patients with ascitis

Ultrasound Findings /Diagnose	Frequency	Percentages
Abdomen Tuberculosis	5	9.4%
Acute Renal Failure	1	1.9%
Breast Cancer	2	3.8%
Prostate Cancer	1	1.9%
Colon Cancer	1	1.9%
Ovarian cancer	2	3.8%
Congestive Heart Diseases(CHD)	2	3.8%
Congestive Heart Diseases+ Chronic Renal Failure	1	1.9%
Chronic Renal Failure	6	11.3%

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Cystoadenocarcinoma	1	1.9%
Hepato Cellular Carcinoma(HCC)	2	3.8%
Hepatitis	1	1.9%
Liver Cirrhosis	23	43.4%
Lymphoma	1	1.9%
Portal Hyper Tension(PHTN)	1	1.9%
Pelvic Inflammatory Diseases(PID)	2	3.8%
Urinary Bladder Schistosomasis	1	1.9%
Total	53	100.0%

Table 2 : Association between ultrasound findings /diagnosis** /classifications& (SAAG Classes *(P-Value = 0.000*)*

Diagnose**	SAAG Classes			Total
	High gradient	Normal	Low gradient	
Inflammatory	7.0(46.7%)	6.0(50.0%)	3.0(11.5%)	16.0(30.2%)
Tumors	6.0(40.0%)	4.0(33.3%)	0.0(0.0%)	10.0(18.9%)
Cardiac & PHT	1.0(6.7%)	1.0(8.3%)	2.0(7.7%)	4.0(7.5%)
Liver cirrhosis	1.0(6.7%)	1.0(8.3%)	21.0(80.8%)	23.0(43.4%)
Total	15.0(100.0%)	12.0(100.0%)	26.0(100.0%)	53.0(100.0%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.** The ultrasound findings /diagnosis were classified into inflammatory , tumors, cardiac diseases and portal Hyper tension (PHT) and liver cirrhosis

Table 3 : ultrasound findings/Diagnosis classifications, Total protein and Albumin values

Diagnose	Total protein	Albumin
Inflammatory	8.2 ± 0.9	2.8 ± 0.7
Tumors	8.5 ± 0.7	3.2 ± 0.7
Cardiac & PHT	7.1 ± 1.3	2.7 ± 1.0
Liver cirrhosis	6.3 ± 0.9	2.0 ± 0.4
P-value	0.000*	0.000*

*Values are expressed as Mean ± SD; * Significant at P-value < 0.05.*

Table 4 : Association between (ultrasound findings /diagnosis classifications) & (ascitis echo texture) *(P-Value = 0.000*)*

Diagnose	*Ascitis Echo Texture*		Total
	Clear	Turbid	
Inflammatory	10.0(25.0%)	6.0(46.2%)	16.0(30.2%)
Tumors	3.0(7.5%)	7.0(53.8%)	10.0(18.9%)
Cardiac & PHT	4.0(10.0%)	0.0(0.0%)	4.0(7.5%)
Liver cirrhosis	23.0(57.5%)	0.0(0.0%)	23.0(43.4%)
Total	40.0(100.0%)	13.0(100.0%)	53.0(100.0%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.

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Table 5 : Association between (Ascites type) & (Sonographic Appearance) *(P-Value = 0.000*)*

Sonographic Appearance	Ascites type		Total
	Transudate	Excaudate	
Clear	34.0(85.0%)	6.015.0%)	40.0(100.0%)
Turbid	1.0(7.7%)	12.0(92.3%)	13.0(100.0%)
Total	35.0(66.0%)	18.0(34.0%)	53.0(100.0%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.

Table 6 : Ascites type, Total Protien, Albumin value, Ascitis Serum albumin gradient (SAAG), Sonographic Appearance

Ascites type	Total Protein	Albumin value	SAAG Value	Sonographic Appearance
Transudation	6.7 ± 1.1	2.3 ± 0.7	1.7 ± 0.6	0.02 ± 0.2
Exudates	8.5 ± 0.9	2.9 ± 0.8	0.3 ± 0.6	0.7 ± 0.5
P-value	0.000*	0.009*	0.000*	0.000*

Values are expressed as Mean ± SD; * Significant at P-value < 0.05.

Table 7 : Association between ultrasound findings /Diagnosis classifications & Asites type *(P-Value =0.000*)*

Diagnose		Asites type		Total
		Transudate	Excaudate	
Inflammatory	Count	7.0(20.0%)	9.0(50.0%)	16.0(30.2%)
Tumors	Count	1.0(2.9%)	9.0(50.0%)	10.0(18.9%)
Cardiac & PHT	Count	4.0(11.4%)	0.0(0.0%	4.0(7.5%)
Liver cirrhosis	Count	23.0(65.7%)	0.0(0.0%)	23.0(43.4%)
Total	Count	35.0(100.0%)	18.0(100.0%)	53.0(100.0%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.

Table 8 : Association between Liver texture & Ascitis Echo Texture *(P-Value = 0.005*)*

Liver texture	Ascitis Echo Texture		Total
	Clear	Turbid	
Fine	13(32.5%)	11(84.6%)	24(45.3%)
Coarse	10(25.0%)	1(7.7%)	11(20.8%)
Diffuse	17(42.5%)	1(7.7%)	18(34.0%)
Total	40(100.0%)	13(100.0%)	53(100.0%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.

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Table 9 : Association between Liver texture &SAAG Class *(P-Value = 0.000*)*

Liver texture	SAAG Class			Total
	High gradient	Normal	Low gradient	
Fine	10(66.7%)	11(91.7%)	3(11.5%)	24(45.3%)
Coarse	2(13.3%)	0(0.0%)	9(34.6%)	11(20.8%)
Diffuse	3(20.0%)	1(8.3%)	14(53.8%)	18(34.0%)
Total	15(100.0%)	12(100%)	26(100%)	53(100.%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.

Table 10 : Association between Liver texture & Asites type *(P-Value = 0.003*)*

Liver texture	Asitestype		Total
	Transudate	Excaudate	
Fine	10(28.6%)	14(77.8%)	24(45.3%)
Coarse	9(25.7%)	2(11.1%)	11(20.8%)
Diffuse	16(45.7%)	2(11.1%)	18(34.0%)
Total	35(100.0%)	18(100.0%)	53(100.0%)

*Normal p-value is < 0.05; therefore the statistical difference is highly significant.

Table 11 : Association between Spleen texture & Ascitis Echo texture (P-Value = 0.326)

Spleen texture	Ascitis Echo texture		Total
	Clear	Turbid	
Fine	29(72.5%)	12(92.3%)	41(77.4%)
Coarse	10(25.0%)	1(7.7%)	11(20.8%)
Diffuse	1(2.5%)	0(0.0%)	1(1.9%)
Total	40(100.0%)	13(100.0%)	53(100.0%)

Table 12 : Association between Spleen texture & SAAG Class *(P-Value = 0.336)*

Spleen texture	SAAG Class			Total
	High gradient	Normal	Low gradient	
Fine	13(86.7%)	11(91.7%)	17(65.4%)	41(77.4%)
Coarse	21(3.3%)	1(8.3%)	8(30.8%)	11(20.8%)
Diffuse	0(0.0%)	0(0.0%)	1(3.8%)	1(1.9%)
Total	15(100.0%)	12(100.0%)	26(100.0%)	53(100.0%)

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Table 13 : Association between Spleen texture& Asitestype *(P-Value = 0.101)*

Spleen texture	Asites type		Total
	Transudate	Excaudate	
Fine	2468.6%	1794.4%	4177.4%
Coarse	1028.6%	15.6%	1120.8%
Diffuse	12.9%	00.0%	11.9%
Total	35100.0%	18100.0%	53100.0%

Table 14 : Liver texture with Total Protein & total albumin

Liver Texture	Total Protein	*Total Albumin*
Fine	8.2 ± 0.8	3.0 ± 0.7
Coarse	7.0 ± 1.1	2.4 ± 0.5
Diffuse	6.3 ± 1.2	2.0 ± 0.5
P-value	0.000*	0.000*

Values are expressed as Mean ± SD; * Significant at P-value < 0.05.

Table 15 : Spleen texture with Total Protein & total albumin

Spleen Texture	Total Protein	Total Albumin
Fine	7.6 ± 1.3	2.7 ± 0.8
Coarse	6.4 ± 1.2	1.9 ± 0.3
Diffuse	6.8 ± 0.0	2.1 ± 0.0
P-value	0.028	0.005

Values are expressed as Mean ± SD; * Significant at P-value < 0.05.

IV. Discussion

The evaluation of Ascites is one of the earliest uses of abdominal ultrasound, since this method is suitable for fluids characterization [11] the ultrasound findings and diagnosis as frequency and percentage were presented in table [1].

The clinical signs and symptoms, causes hint that may be due to pressure on the internal organs, veins, diaphragm and sodium and water retention [12] . Association between ultrasound findings/diagnosis and clinical findings were found to be significant at *P-Value* (0.001) .These clinical history associated with the ascitis criteria may narrow the line for diagnoses and may predict the underlying cause of the diseases.The knowledge about the patients' previous history of diseases is important to be correlated with ultrasound findings as it was mentioned in the guidelines on the ascites management. [6]

Ultrasound has great value in diagnosing asitis causes. The study showed that the causes are either from presence of malignancies, inflammatory, or cardiac in origin where the highest score of the ascitis causes was found in patients affected by liver cirrhosis 23(43.4%) table[1] another studies had mentioned similar causes of ascites. [5,6]

For studying the character of ascites; SAAG, Total Albumin, Total Protein values have been evaluated and correlated with ultrasound findings .The study showed a significant relation with the variables at P-Value (0.000)table. [2,3]

15 out of 53(28.3%) were of high Serum Ascitis Albumen Gradient (SAAG), 12(22.6%) were normal and 26(49.1%) were of low Serum Ascitis Albumen Gradient (SAAG).The study showed that the cases of congestive heart diseases and portal hypertension as well as liver cirrhosis have low SAAG values table [2],In Mauer and Mazione,[13] assessment of ascitis show that SAAG best reflected elevated hydrostatic pressure, contributing significantly to the development of portal hypertensive ascites, even in patients with a low serum albumin concentration as well as SAAG have value in distinguishing congestive heart failure and malignant ascites .

The Total Protein and Total Albumin, were found to be significantly correlated with the ultrasound findings at *P*-Value (0.000) .The high value was found in patients

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with tumors and low values in patients with congestive heart failure, portal hypertension, and liver cirrhosis table [3].Similarly in the study of Rector and Reynolds [14] patients with chronic heart failure and cirrhosis ascites had lower fluid total protien concentrations.

After ultrasound scanning, the ascities echo texture has been evaluated table [4] and were classified into 2 main appearances: 40out of 53(75.5%) were clear and 13 out of 53(24.5%) were turbid. The cause of changing the echo texture of the ascitis fluid collections may be either due to debris appears as multiple fine echoes in the cases of inflammation, or the course network of echoes generated from the fibrous strings. The clear appearance of most ascitic fluids reflects the etiology as cirrhosis.[15] similarly in our study the cases of cirrhosis acts 23(43.4%) with clear ascitis and no turbid ascitis is noted, but in the inflammatory cases which acts 16(30.2%) patients; 10 cases were found to be clear and 6cases were turbid. Turbidity, may be due to presence of neutrophils or malignancy due to triglyceride seen in the fluid.[16]as our study include5 cases of abdominal TB (9.4%) ,1case of Hepatitis (1.9%),2 cases of pelvis inflammatory diseases(3.8%) and many cases of malignancies in the breast, prostate, colon, bladder, ovaries, hepatocelluler carcinoma (HCC), and lymphoma .A number of different proteins have been present in the malignant cases and should be evaluated for their usefulness in diagnosing malignancy-related ascites in combination with other parameters such as SAAG, that may change the character of the ascitis. [17,18]

The importance of differentiation between ascitis type; is that malignant ascitis is of critical predictive significance with survival. [19]

The clear sonographic texture of ascitis were found to be transudate in origin 34.0(85.0%) and exudates 6.0(15.0%) where turbid texture were found to be transudate 1.0(7.7%) and exudates in12.0 (92.3%) table. [5]

The ascitis type had also been evaluated and was found to be related significantly at P-value < 0.05. With total protein values, Total Albumin value, Ascitis Serum albumin gradient (SAAG)and sonographic ascitis texture as turbid and clear table. [6]

The causes of ascites formation as transudate or exudate do not always follow the expected pattern [20] it was therefore proposed that the transudate or exudate concept for the classification of ascites should be terminated. [21] Additional tests and methods should be considered.

The Ascitis Total Protein (TP) attempting to reflect the different processes of fluid formation, studies supported that SAAG act as a marker of portal hypertension this approach has been adopted in the British and the American Guidelines.[6]

The demonstration of ascites has been aided by Ultrasound, as it can scan through many anatomic planes and it can detect as little as 10 ml of free fluid [22,23]therefore, uses of Ultrasound was found to be useful as it can characterize the ascitis and find out the causes.

The clinical findings do not reflect the changes in the echo texture in both the liver and spleen. We consider that ultrasound is valuable in the investigation of patients who are difficult to examine clinically, abdominal ultrasound scan should be done in order to evaluate the appearance of the liver, pancreas, and lymph nodes as well as the presence of splenomegaly, which may be a sign of portal hypertension. [6]

Association between liver Echo Texture with Total Protein, Total Albumin, SAAG, ascitis type ,ascitis echo texture was found to be significant at p-value < 0.05 table [8,9,10,14] but the spleen echo texture have significant relations only with Total Protein and Total Albumin values but no relationship was noted signify-cantly with the other examined parameters, as seen in table. [11,12,13]

We believe that Ultrasound should take place in the investigation of abdomen and pelvis for ascitis, it is also valuable in the investigation of ascetic patients with large or small ascitis amount of fluids and patients who are difficult to be examined clinically. It is recommended to replace other methods of laboratory investigation as it can predict the ascitis type from its echo texture, as well as ruling the underlying causes.

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Height Difference between right and left hemi Diaphragm in Normal Sudanese Adults using Postero-Anterior Computed Chest Radiography

By Hassan Ali Abdelrahman Salih, Caroline Edward Ayad, Elsafi Ahmed Abdalla, Ikhlas Abdelaziz Hassan & Abdelmoneim Saeed Ahmed

Sudan University of Science and Technology, Sudan

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The study was done to determine the distance between right and left hemi diaphragm in normal Sudanese adults using digital radiography.

The study sample was 100 subjects, 50(50%) were males and 50(50%) were females, with different ages ranged from 18 – 82 years old; all subjects were with normal abdominal ultrasound and normal chest radiographs. The study was done in Fedail hospital in the period from January up to March 2013. The measurements were done on ideal postero anterior (PA) chest radiograph by measuring the difference between the distance from the highest point of right hemi diaphragm and highest point of the left hemi diaphragm. The result showed that the right hemi diaphragm was higher than the left in 98% of total sample and the left was higher in 1% and they were in the same height in 1%.

Keywords: chest x-ray, hemi diaphragm, thoracic, digital radiography.

GJMR-D Classification : NLMC Code: WN 180, WF 800



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Height Difference between right and left hemi Diaphragm in Normal Sudanese Adults using Postero-Anterior Computed Chest Radiography

Hassan Ali Abdelrahman Salih [α], Caroline Edward Ayad [σ], Elsafi Ahmed Abdalla [ρ]
Ikhlas Abdelaziz Hassan [ω] & Abdelmoneim Saeed Ahmed [¥]

Abstract- Diaphragm position and shape on chest radiographs are routinely used as indicators for diseases. Previous population studies were done for normal diaphragm position and shape.

The study was done to determine the distance between right and left hemi diaphragm in normal Sudanese adults using digital radiography.

The study sample was 100 subjects, 50(50%) were males and 50(50%) were females, with different ages ranged from 18 – 82 years old; all subjects were with normal abdominal ultrasound and normal chest radiographs. The study was done in Fedail hospital in the period from January up to March 2013. The measurements were done on ideal postero anterior (PA) chest radiograph by measuring the difference between the distance from the highest point of right hemi diaphragm and highest point of the left hemi diaphragm. The result showed that the right hemi diaphragm was higher than the left in 98% of total sample and the left was higher in 1% and they were in the same height in 1%.

The right was higher in range of 1cm to 2.5cm in 79% and the Male diaphragm height difference ranged between0.6-2.8 and Female ranged from-0.5-2.9cm.The study found that there are linear relation between distance difference of right and left hemi diaphragm with subjects' age, body mass index (BMI), height and weight.

Computed radiography was useful in measurements of diaphragm height difference for Sudanese as it is accurate and easy.

Keywords: chest x-ray, hemi diaphragm, thoracic, digital radiography.

I. Introduction

The diaphragm is a curved muscle fibrous sheet that separates the thoracic from abdominal cavity, the position of the domes or cupola of the diaphragm are extremely variable as they differ on body built. [1-3]

Authors α σ ω: MSc Diagnostic Radiology, Sudan University of Science and Technology, College of Medical Radiological Science.
e-mails: HassanAli@yahoo.com, carolineayad@yahoo.com, dralsaffi@gmail.com
Author ρ: PhD Diagnostic Medical Ultrasound, Sudan University of Science and Technology, College of Med-ical Radiological Science.
e-mail: Eklassabdelazizz@yahoo.com
Author ¥: Diagnostic Radiology, National College of Medical and Technical Studies. e-mail: abdelmoneiimsaeed@yahoo.com

Although the use of computerized Tomography has greatly increased over the past decades, chest radiography remains the most frequently performed imaging examination [4].A good understanding of normal anatomy and variations is essential for the interpretation of postero anterior (PA) chest radiographs include fissure lines [5, 6, 7, 8, 9], and vascular structures [10], aortic nipple [11, 12, 13] is important.

When interpreting chest radiographs, the position and shape of the diaphragm are routinely used to evaluate whether the lungs are underinflated, as with inadequate inspiration effort or restrictive lung disease, or overinflated, as in emphysema or other obstructive lung diseases. Conventional teaching that the normal position of the right hemi diaphragm projects at about the anterior sixth rib [14, 15] appears to originate from a single study.[16]

A more precise characterization of the normal variation in diaphragm position and shape, based on easily recognized anatomic landmarks, and analysis of factors that might contribute to this variation, such as age and weight, may provide a more consistent origin for this review.[17]

There have been few reports describing the normal radiographic anatomy and variations of the thoracic structures in different population [13]. Most of the data regarding these normal structures have been provided from the Europe and USA. [5–12]

Therefore we reviewed normal PA chest radiographs and analyzed the radiographic anatomy among Sudanese. To our knowledge no information is available in the open literature about Sudanese population. Therefore, we conducted this study in order to measure the height difference between right and left hemi diaphragm on PA chest Digital radiographs obtained from Sudanese subjects with normal chest and abdomen, and to identify the relationship of diaphragm position to Sudanese demographic data including age gender, weight, height and BMI.

II. Materials and Methods

a) Patients

The sample was 100 Sudanese Subjects (50 males and 50 female) with age range from 18-82 years.

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The chest radiographs were obtained as a part of routine work-up or follow-up study for non-chest diseases, all patients were diagnosed as normal chest x-ray and the abdominal ultrasound was diagnosed as normal; Subjects with plural effusion, lung diseases, scoliosis, sarcoidosis, collagen vascular disease, pulmonary hypertension, large cardio thoracic ratio or, large volume of the abdominal contents, ascites, liver cirrhosis, liver or spleen enlargement disease were excluded.

The x-ray machine: major x-ray machines, Shimadzu were used.-Manufacturer: Shimadzu, Japan. Manufacturing date: Jan 2011. Focal spot: Small (0.6) mm / Large (1.2) mm. Maximum kV: 150 kVp. Maximum mA: 500mA. Year of Installation: 2011.

Processing machine: Images processed by using computed radiography, Fuji film (FCR CAPSULLA) model XL II.

Imaging technique: Firstly the procedure was explained to the patients (pts). Then the pts were asked to change his/her clothes with the hospital gown. The patients were centered in the erect position in the stand bucky as for ideal postero-anterior chest radiograph and asked to take a deep breath and hold it.

Postero-anterior chest radiograph technique: A 35.43cm or 35.35cm cassette is selected, depending on the size of the patient. The patient is positioned facing the cassette, with chin extended and centered to the middle of the top of the cassette. The feet are placed slightly apart so that the patient is able to remain steady. The median sagittal plane is adjusted at right angles to the middle of the cassette. The shoulders are rotated forward and pressed downward in contact with cassette. This is achieved by placing the dorsal aspect of the hands behind and below the hips, with the elbows brought forward, or by allowing the arms to encircle the cassette.The horizontal central beam is directed at right angles to the cassette at the level of thoracic vertebra which is consigned with lung midpoint. The surface marking of T7 spinous process can be assessed by using the inferior angle of the scapula. Exposure is made in full normal arrested inspiration.[18]

The exposure made at inspiration. Images were processed using Fuji computed radiography system (FCR). Images were manipulated, adjusted, and then stored in the computer.

b) Method of measurement

The subjects were asked for their ages and the weight had been registered using weights measuring device, the heights were measured by a meter.
After ideal chest radiograph acquisition and processing then measurements were done. A straight line was drawn at the maximum height of each hemi diaphragm. The lines are parallel to each other. Then the distance between the both lines was measured.

III. Results

The following figures and tables presented the data obtained from 100 normal subjects after measuring the distance between the right and left hemi diaphragm, the variables taken were age, height (m), weight (Kg), Body Mass Index (BMI).Correlations were taken by presenting trend line and resultant equations in the graphs, this was done for males who act 50% of the sample and the females who act 50% of the sample as well as the Total sample (100%).

Table 1 : mean and standard deviation of the variables (age, Hemi diaphragm distance, weight, height, BMI for male, Female and total sample

Variables	Male (mean± STDV)	Female (mean± STDV)	Total Sample (mean± STDV)
Ages (years)	39.98 ±16.8	44.04±16.6	42.01±16.7
Hemi Diaphragms Distance	1.6±0.6	1.42±0.7	1.5±0.6

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Weight (Kg)	74.5±13.2	69.92±13.2	72.2±13.3
Height (M)	1.7±0.1	1.64±0.1	1.7±0.1
(BMI)	24.3±4.0	25.65±4.8	24.9±4.5

Table 2 : Hemi Diaphragms distance Classes for the Total Sample, Male and Female, Frequency and Percentages

Hemi Diaphragms distance (Total sample)	Frequency And Percentage%	Diaphragm distance (Males)	Frequency And Percentage%	Diaphragm distance (Females)	Frequency And Percentage%
-0.5—0.5	5(5%)	0.6-1.0	11(22%)	-0.5-0.5	5(10%)
0.6-1.1	23(23%)	1.4-1.8	21(42%)	0.6-1.1	10(20%)
1.2-1.7	38(38%)	1.9-2.3	11(22%)	1.2-1.7	22(44%)
1.8-2.2	22(22%)	2.4-2.8	6(12%)	1.8-2.3	9(18%)
2.3-2.8	11(11%)	>2.8	1(2%)	2.4-2.9	4(8%)
>2.8	1(1%)	-	-	-	-

Table 3 : Height Classes in Meters (M) For the Total Sample, Male and Female, Frequency and Percentages

Total sample Height(M)	Frequency And Percentage%	Males Height (M)	Frequency And Percentage%	Females Height (M)	Frequency And Percentage%
1.37-1.47	1(1%)	1.37-1.47	1(2%)	1.55-1.59	11(22%)
1.48-1.58	8(8%)	1.48-1.58	1(2%)	1.60-1.64	15(30%)
1.59-1.69	38(38%)	1.59-1.69	7(14%)	1.65-1.69	12(24%)
1.70-1.80	42(42%)	1.70-1.80	30(60%)	1.70-1.74	11(22%)
1.81-1.91	10(10%)	1.81-1.90	10(20%)	1.75-1.79	1(2%)
>1.91	1(1%)	>1.90	1(2%)	-	-

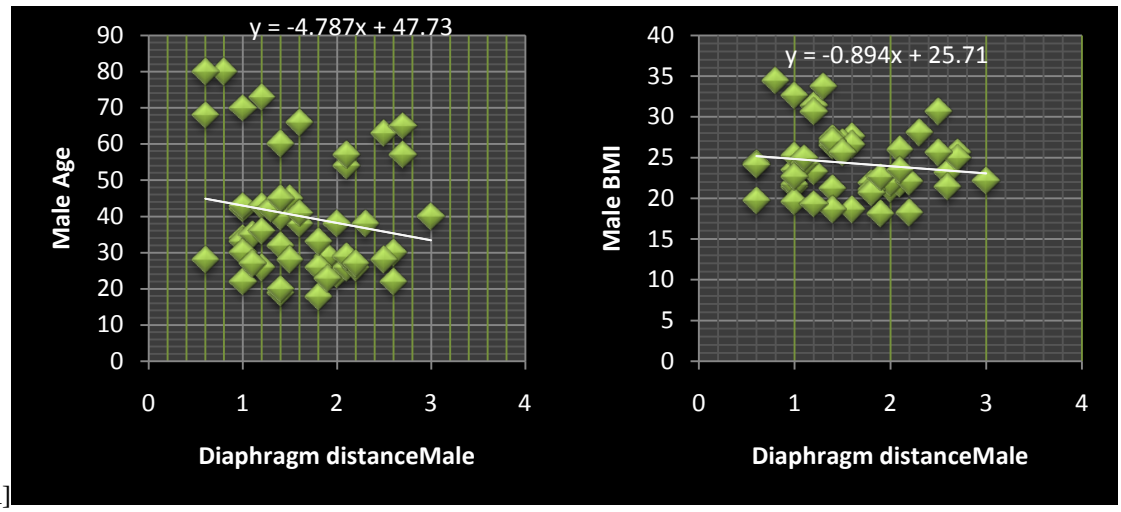
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Table 4 : Weight Classes in kilograms (kg) For the Total Sample, Male and Female, Frequency and Percentages

Total sample Weight(Kg)	Frequency and Percentage%	Males Weight (Kg)	Frequency and Percentage%	Females Weight (Kg)	Frequency and Percentage%
44-54	6(6%)	44-54	2(4%)	48-58	9(18%)
55-65	26(26%)	55-65	12(24%)	59-69	18(36%)
66-76	36(36%)	66-76	15(30%)	70-80	16(32%)
77-87	19(19%)	77-87	12(24%)	81-91	3(6%)
88-98	10(10%)	88-98	8(16%)	92-102	2(4%)
>98	3(3%)	99-109	1(2%)	>102	2(4%)

Table 5 : Body /Mass Index (BMI) Classes for the Total Sample, Male and Female, Frequency and Percentages

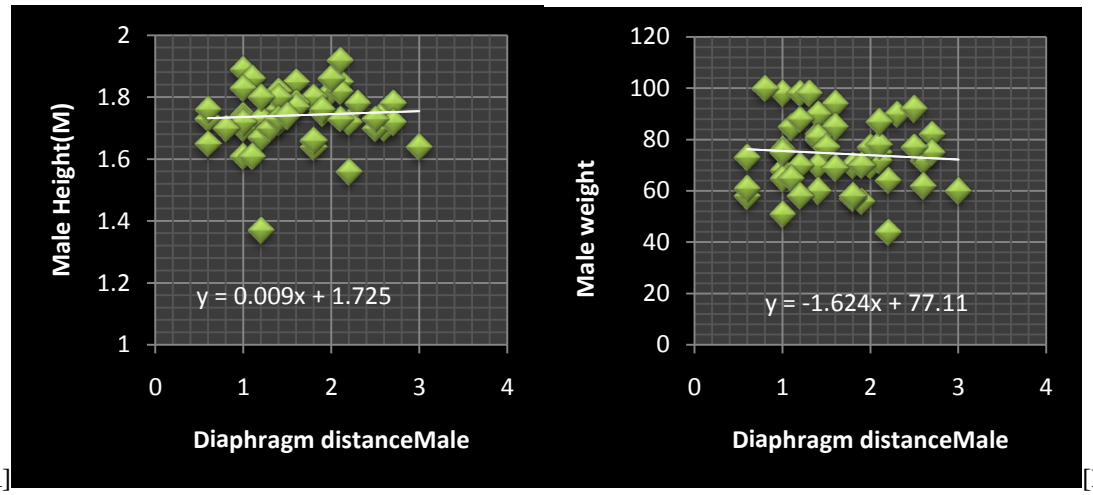
Total sample (BMI)	Frequency and Percentage%	Male (BMI)	Frequency and Percentage%	Female (BMI)	Frequency and Percentage%
18.1-19.6	9(9%)	18.1-21.1	9(18%)	18.5--23.1	19(38%)
20.6-22.2	24(24%)	22.1-25.1	22(44%)	24.1-28.8	22(44%)
23.2-24.8	22(22%)	26.1-29.1	13(26%)	29.8-34.5	7(14%)
25.8-26.3	12(12%)	30.1-33.1	5(10%)	35.5-40.2	1(2%)
27.3-28.8	18(18%)	34.1-37.1	1(2%)	>40	1(2%)
>28.8	15(15%)	-	-	-	-



[A] [B]

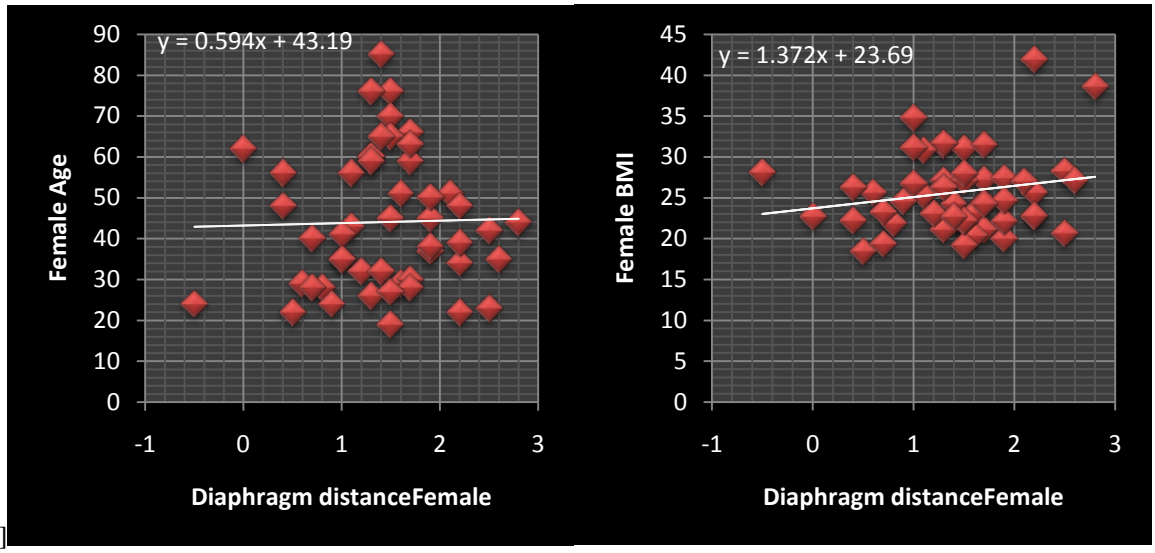
Figure 1 : [A] Scatter Plot Diagramme shows linear relationship between the diaphragm heights in males with age; the relation shows that the height decreased by 4.8 as the age increased starting from 47.7. [B]shows linear relationship between the diaphragm heights in males with BMI; the relation shows that the BMI decreased by 0.9

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[A] [B]

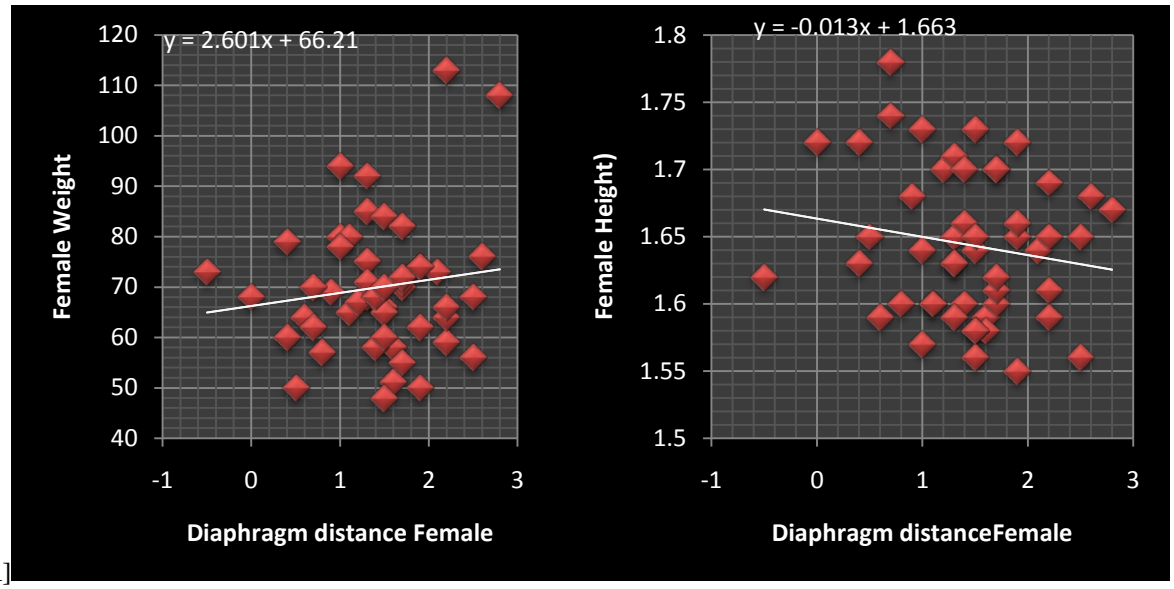
Figure 2 : [A] Scatter Plot Diagramme shows linear relationship between the diaphragm heights in males with Height; the relation shows that the height increased by 0.009 as the diaphragm distance increased starting from 1.72.[B]shows linear relationship between the diaphragm heights in males with Weight; the relation shows that the diaphragm height decreased as the weight increased.



[A] [B]

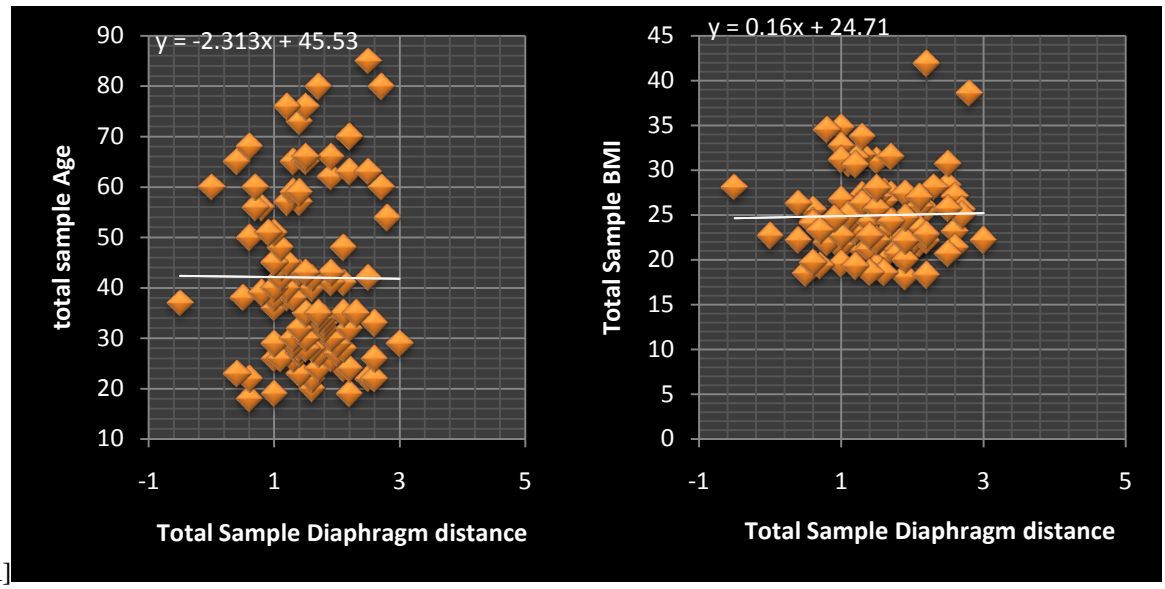
Figure 3 : [A] Scatter Plot Diagramme shows linear relationship between the diaphragm heights in Females with age; the relation shows that the height increased by 0.6 as the age increased starting from 43.2.[B] shows linear relationship between the diaphragm heights in Females with BMI; the relation shows that the height increased by 1.4 as the BMI increased starting from 23.7

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[A] [B]

Figure 4 : Scatter Plot Diagramme shows linear relationship between the diaphragm heights in Females with Weight; the relation shows that the height increased by 2.6 as the Weight increased starting from 66.2.[B] shows linear relationship between the diaphragm heights in Females with Height; the relation shows that the Diaphragm height decreased by 0.01 as the Female Height increased starting from 1.7 meter.



[A] [B]

Figure 5 : Scatter Plot Diagram shows linear relationship between the diaphragm heights in Total Sample with age; the relation shows that the height decreased by 2.3 as the age increased starting from 45.5.[B] shows linear relationship between the diaphragm height and BMI, The diaphragm height increase as the BMI increased.

IV. Discussion

Measurements were performed on ideal PA chest radiograph, measurement points was clearly identified. Table 1 shows the total sample means and standard deviations of the variables, the total sample age mean was 42.01 and ±16.73, the total sample weight mean was 72.2 ±13.34, the total sample height mean was 1.6926 ±0.09, the total sample body mass index (BMI) was 24.957 ±4.45 and the total sample diaphragm distance mean was 1.522 ±0.64.

The mean age for male was 39.98 it was lower than mean age for females which was 44.04. The mean of male weight was 74.48 and for female was 69.92, the height of males was greater by 0.1m, the BMI mean for male was 24.26 and for female 25.65, the BMI of female was greater than male because male height was greater. The total sample age range was from 18 to 85, for male the range was from 18 to 82, while for female the range was from 19 to 85. Age classes for total sample, frequency and percentage were studied.

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For the total sample the right hemi diaphragm was higher than the left hemi diaphragm in 98 sample which was act 98% of the total sample, the left hemi diaphragm was higher in 1 sample which was 1% of the total sample and they was in the same height in also 1 sample which was 1% of the total sample.

In males samples the right was higher in 50 sample (100%), while in females the right was higher in 48 samples (96%), the left was higher in 1 sample (2%) and they was in the same height In 1 sample (2%).For the total sample 79(79%) of the right hemi diaphragm was higher in range of 1.0 to 2.5 cm, 7(7%) were in range of 2.5 to 3.0 cm, 12 were in range of 0.1 to 0.9, 1 (1%) the right and the left were in the same height and in 1 sample the left was higher. Of 1 person with a high diaphragm was overweight; It is possible that he took an improperly deep inspiration. There were two instances where the diaphragm in addition to being low was also flat, but there were no cardiovascular or lung disease this is similar to what had been mentioned previously. [19]

For the males the distance between right and left hemi diaphragm is decreased as the age, BMI and weight increased subsequently , while it increased as the height increased For the females the distance between right and left hemi diaphragm increased as the age, BMI and weight increased as ,while it decreased as the height increased For the total, the distance between right and left hemi diaphragm decreased as the age increased while the distance increased as the BMI, weight and height increased .

Simile study showed that the averages the diaphragm was slightly higher in females, in heavy persons and after the age of 40 years. [19]

V. Conclusion

The study found that the right hemi diaphragm is higher than the left in 98% of sample, the left hemi diaphragm may be higher than the right but it consider significant and can be at the same height.

There is a correlation between hemi diaphragms distance and sample age, BMI, weight and height; the distance decrease with increase of age, the distance increase as increase of BMI, the distance increase as increase of weight and the distance increase as increase of height.

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Study of Weekly Paclitaxel with Concurrent Radiotherapy V/S Weekly Cisplatin with Concurrent Radiotherapy in Advanced Cervix Carcinoma

By Dr. Prashant Rajendra Kumbhaj, Dr. Rameshwaram Sharma, Dr. Aseem Rai Bhatnagar & Dr. Peeyush Kumar Saini

Department of Radiotherapy & Oncology SMS Medical College & Attached hospitals, India

Abstract- *Purpose:* To evaluate the Response and Efficacy of weekly paclitaxel with concurrent radiotherapy in comparison to weekly cislatin with concurrent radiotherapy in advanced cervical cancer patients.

Methods: Patients coming to the department of radiotherapy S.M.S Hospital were included in the study.50 patients of advanced squamous cell carcinoma of cervix FIGO stage III &IV were selected. In the study and control group , patients were given 5 weeks of external beam radiotherapy followed by brachytherapy. External beam irradiation each of 200cGy/fr, on linear acceleretor by parallel opposed – anterior and posterior fields was given. External beam irradiation was followed by Intracavitary brachytherapy 700cGy/week for 3 weeks each with High Dose Rate Iridium 192 source. Patients received 50 Gy by External beam irradiation (200cGy/fr, total 25 Fr) and 21 Gy by Intracavitary brachytherapy (7Gy/fr, 3fr) .In control group, patients were treated by concurrent weekly cisplatin with external beam radiotherapy.In study group patients were treated by concurrent weekly paclitaxel with external beam radiotherapy.

GJMR-D Classification : *NLMC Code: WP 470, WR 660*



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Results: At end of the completion of treatment 76% in the study group and 72% in the control group were found to have complete response to the treatment, 16% and 20% were found to have partial response in the study and control group respectively.statistical analysis was done by chi Square test. After 6 months of completing the treatment the result were equivalent in both the groups, 84% had complete response and 8% had partial response. Though the difference in tumour response was not statistically significant(χ^2 = .13, p = 0..94)., the rate of reduction in tumor size was found faster in study group at the end of the treatment, complete response was little more in the study group. The vomiting during the treatment is statistically significantly more in the control group(χ^2=23.548,p=<0.0001).Total leukocyte count was significantly decreased more in study group compared to control group.(χ^2=9.8,p=0.0106).

Conclusions: The overall response with the use of paclitaxel, which is the study arm, are equal to those with cisplatin. Though not significant, but tumor response was more in paclitaxel arm compared to cisplatin arm.

Authors α ρ ω: Department of Radiotherapy & Oncology SMS Medical College& Attached hospitals, Jaipur, Rajasthan India.
e-mails: drprashantkumbhaj@yahoo.com, piyushasini622@gmail.com, aseemrai123@gmail.com
Author σ: Department of pathology, Government medical college, Surat, Gujarat India. e-mail: cancertherapy@yahoo.co.in

I. Introduction

Cancer is the third biggest killer in India. India recorded 9.8 lakh new cases of cancer in the year 2010, an increase of about 80,000 new cases as compared to 2009. *I*n India, four lakhs die of cancer every year. There is data that shows 25 lakh cancer patients in the country at any point in time. By 2015, the number of new cases in India is expected to cross 15 lakhs(1). Among Indian males, lung, head and neck cancer is the most common and among women, breast and cervical cancer is the most frequent. Carcinoma of the Uterine Cervix is the most common malignancy to affect females of developing countries. It ranks second in incidence among females, after Cancer Breast. Worldwide, approximately 5 lakh new cases are identified each year and about 2.33 lakh patients die of the disease (2). In developing countries, it accounts for about 3.4 lakh new cases & 1.6 lakh deaths every year (3).In India about 1.82 lakh new cases & 80,000 deaths every year from this disease (4).An estimated 1,82,027 new cases and 77,096 deaths due to cervical cancer occurred in India in 2010, contributing to 29% and 30% of the global burden of cervical cancer incidence and mortality(5).

Patients with Cervical Cancer usually present with locally advanced disease that is clinically confined to the pelvis (FIGO stage IIB, III & IV) in which surgery has higher morbidity. Radiotherapy plays a major role in management of these patients. The limitation of radiotherapy in controlling pelvic diseases for locally advanced cervical cancers is that radiation doses required to treat large tumours in the setting of poor tumour oxygenation exceeds the limit of toxicity in normal tissue. This was the main reason for treatment failure supporting by the fact that about 70% of relapses have pelvic failure as the first sites (6). Many strategies have been made trying to improve outcomes in locally advanced diseases such as uses of hypoxic cell sensitizers, hyperbaric oxygen, neutron therapy, and hyper-fractionation. However, results of those mentioned were found limited or unsuccessful (7). After a 1999

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National Cancer Institute (NCI) Clinical alert was issued, chemoradiotherapy has become widely used in treating women with cervical cancer . Cisplatin is considered the most active cytotoxic agent and the drug of choice for concurrent chemoradiation. Meta-analysis studies have also demonstrated improved local control rates and survival with cisplatin-based chemotherapy concurrent to radiation therapy (RT). Although many prospective studies had shown that CTRT with cisplatin-based chemotherapy clearly improve the outcome of patients with carcinoma of the cervix, many patients treated on these protocols continue to fail in the pelvis and at distant sites [8]. In addition, one intergroup study using weekly concurrent cisplatin with radiotherapy for patients with carcinoma of the cervix could not demonstrate a beneficial effect of CTRT over standard RT alone [9]. This non-superiority finding was attributed to many factors like possible enrollment of patients with paraaortic lymph nodes, and an imbalance among randomization groups for known prognostic factors such as anemia [10]. These facts have lead many groups to investigate other drugs for CTRT like paclitaxel in an attempt to improve on what can be achieved by concurrent cisplatin [11].Paclitaxel is a taxane chemotherapy drug that was found to have significant activity in solid tumors especially epithelial ovarian cancer, lung, and breast cancer . Preclinical studies have shown a radiosensitizing effect of paclitaxel in human cervical cancer cell lines.(12)

At Our Centre, the treatment for locally advanced cervical cancer is concurrent chemoradiotherapy; the protocol is cisplatin 50 mg/m2 once a week for 5 weeks concurrent with pelvic radiation . Radiation is administered with cobalt-60 and HDR Brachytherapy. Paclitaxel is also radiosensitizing agent ,We conducted study to investigate the efficacy and response of Paclitaxel with concurrent radiotherapy versus Cisplatin with concurrent radiotherapy.

II. Method and Meterials

Patients coming to the department of radiotherapy & cancer treatment centre, SMS medical college &hospital jaipur were included in the study.After proper evaluation of the Biochemical and Hematopoietic profile, 50 patients were randomly divided into study and control group.

III. Inclusion Criteria

1. Patients with newly diagnosed cases of Squamous Cell Carcinoma Cervix FIGO stage-III &IV were taken for study and control group.
2. Patients with advanced & inoperable cervix cancer.
3. Age between 18 to 70 years.
4. ECOG (eastern cooperetive oncology group) performance status. 0 to 2.

IV. Exclusion Criteria

1. Patients previously treated with radiotherapy ,Surgery, Chemotherapy.
2. Any histology other than squamous cell carcinoma.
3. Poor perfomence status ECOG 3 &4.
4. Any uncontrolled intercurrent illness.
5. Pt who don't give consent for the study.
6. Class III & IV cardiac failure according to NYHA classification.
7. Pregnant & lactating women.

In the study and control group , patients were given 5 weeks of external beam radiotherapy followed by brachytherapy. External beam irradiation each of 200cGy/fr, on linear acceleretor by parallel opposed – anterior and posterior fields was given. External beam irradiation was followed by Intracavitary brachytherapy 700cGy/week for 3 weeks each with High Dose Rate Iridium 192 source. Patients received 50 Gy by External beam irradiation (200cGy/fr, total 25 Fr) and 21 Gy by Intracavitary brachytherapy (7Gy/fr, 3fr) .In control group, patients were treated by concurrent weekly cisplatin with external beam radiotherapy.In study group patients were treated by concurrent weekly paclitaxel with external beam radiotherapy .

Response was assessed as per the RECIST Criteria 1.1(13) .The results of study group were analyzed & compared with control group in terms of various aspects like side effects, tumor response, & local disease status. The data thus collected were analyzed by using Chi-square test for co-relation.

V. Results

Treatment Response at The end of Study

Table a shows treatment response of disease of patients using RECIST version 1.1 criteria while on treatment and subsequent follow up.

After 2nd week of initiating treatment, 9 (36%) patients of study group and 8 (32%) patients of control group had partial response, 16 (64%) patients of study group and 17 (68%) patients of control group had stable disease ($\chi^2 = 0.089$, $p = 0.76$).

After 4th week of initiating treatment, 2(8%)patients of study group and 1(4%) patients of control had complete response, 18 (72%) patients of both study & control group had partial response and 5 (20%) patients of study group and 6 (24%) patients of control group had stable disease ($\chi^2 = .42$, $p = 0.80$).

After 5th week of initiating treatment, 4(16%) of control group and 5(20%) of study group had complete response, 17 (68%) patients of control group and study group had partial response 4(16%) patients of control group and 3 (12%) patients of study group had stable disease ($\chi^2 = .25$, $p = 0.88$).

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At end of treatment,18(72%) of control & 19(76%) of study group had complete response, 5 (20%) patients of control group and 4(16%) patients of study group had partial response 2 (8%) patients of study group and control group had stable disease (χ^2 = .13, p = 0..94).

At 1st month of follow up, 19 (76%) patients of control group and 20 (80%) patients of study group had complete response 4 (16%) patients of control group and 3(12%) patients of study group had partial response and 2 (8%) patients of study group and control group had stable disease (χ^2 = .16, p = 0..91).

At 3rd month of follow up, 21 (84%) patients of study group and control group had complete response, 3 (12%) patients of study group and control group had partial response and 1 (4%) patients of study and control group had stable disease (χ^2 = 0, p = 1).

At 6th month of follow up, 21 (84%) patients of study group and control group had complete response, 4 (16%) patients of study group and control group had partial response and none patients of study group and control group had stable disease (χ^2 = 0.14, p = 0.699).

Table a : Treatment Response Evaluation For Disease Control

TREATMENT RESPONSE	STUDY GROUP					CONTROL GROUP					STATISTICS	
	Complete Response	Partial Response	No Change	Progressive Disease	TOTAL	Complete Hesponse	Partial Response	No Change	Progressive Disease	TOTAL	χ_2	P

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2nd week	0	9	16	0	25	0	8	17	0	25	0.008	0.76
4th week	2	18	5	0	25	1	18	6	0	25	0.042	0.80
5th week	5	17	3	0	25	4	17	4	0	25	0.025	0.88
End of Treatment	19	4	2	0	25	18	5	2	0	25	0.013	0.94
1st month	20	3	2	0	25	19	4	2	0	25	0.016	0.91
3rd month	21	3	1	0	25	21	3	1	0	25	0	1
6th month	21	4	0	0	25	21	4	0	0	25	0.014	0.699

Acute Toxicity During Treatment

The incidence of nausea during treatment in both the groups are summarised in the table b. As per RTOG criteria Table b shows that in the study group 10 (40%) of the patients had Grade 1 Reactions as compared to 6 (24%) in the control group whereas 2(8%) in the study group and 7 (28%) in the control group had Grade 2 Reaction and the incidence of Grade 3 was 2 (8%) and 5 (20%) in the study group and control group respectively(χ^2=5.9, p=0.11).

The vomiting during the treatment is statistically significantly more in the control group. 22(84%) patient in study group had Grade 0-1 vomitting and only 5(20%) had in study group, whereas only 3(12%) had grade 2-3

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vomitting in study group, comparing to 11(44%) had grade 2 and 9(36%) had grade 3 vomitting in control group(χ^2=23.548,p= <0.0001).

The haematological toxicity is represented in the table b in three sub heads- haemoglobin, Total Leucocytes count and Absolute Neutrophil count. 4 (16%) and 5(20%) had grade 1, 21(84%) and 20(80%) had grade 2 heamoglobin level in the study group and the control group(p=1).

Total leucocyte count in the table b shows that study group had more grade 2 and 3 toxicity {6(24%) and4(16%)} comparing to control group having 2(8%) grade 2 toxicity &1(4%) having grade 3 toxicity. 8(32%) in study group and 19(76%) group had grade 0 toxicity, 7(28%) and 3(12%) had grade 1 toxicity in study and control group respectively. This difference is statistically significant, showing more toxicity in the study group compared to control group.(χ^2=9.8,p=0.0106), absolute neutrophil count shows the same pattern of toxicity profile. 10(40%) and 20(80%) had grade 0, 8(32%) and 3(12%) had grade 1, 4(16%) and 1(4%) had grade 2toxicity in the study and control group respectively. 3 (12%) developed grade 3 toxicity in the study group and 1(4%) in control group. This difference was statistically significant more in the study group compared to control group (χ^2=8.4,p=0.03).

There was no nephrotoxicity found in 24(96%) in study group and 19(76%) in the control group, while 1(4%) and 4(16%) were found to have grade 1 toxicity in the study and control group respectively and.1(4%) was found to have grade 2 toxicity in control group(p=.11)
Table b

VI. Discussion

The clinical feasibility of concurrent RT and paclitaxel was tested in phase I trials and a maximum tolerated dose (MTD) of 50 mg/m2 per week concurrently with radiation therapy was established . In addition, the clinical efficacy of paclitaxel has been tested in phase II and III studies for metastatic and recurrent cervical cancer with objective response rates ranging between 36 and 47% In all these studies paclitaxel was used in conjunction with either cisplatin (4/7 studies) or carboplatin (3/7 studies) but was never used alone for CTRT. The majority of these studies was phase I (4/7 studies), with one study being a combined phase I/II study conducted by the GOG [60]. The number of patients enrolled in these studies varied between 8 and 35 patients and the rates of progression free survival ranged between 39 and 88%. The dose limiting toxicity was primarily neutropenia in 4 studies [14,15] or diarrhea (14).

The present study was carried out on 50 histopathologically confirmed newly diagnosed cases of Squamous cell Carcinoma cervix Stage IB to IVA. These cases were registered for treatment in department of Radiotherapy at S.M.S hospital jaipur from December 2011 to June 2012.. In this study there was no statistically significant toxicity between the study group and control group for acute skin reaction, nausea during treatment, acute diarrhea, haemoglobin changes during treatment and nephrotoxicity. The statistically significant neutropenia was found in study group and vomiting in control group.

The tumour response in this study was evaluated in the 2nd, 4th, 5th week and at the end of treatment. After the completion, patients were evaluated every month til 6th month. Reduction in the tumour size was seen comparatively more in the study group and rendering them fit for brachytherapy earlier then the control group. In the 4th week of treatment 8% in the study group and 4% in the control group had complete response and in the 5th week 20% in the study group and 16% in the control group had complete response.

At end of the completion of treatment 76% in the study group and 72% in the control group were found to have complete response to the treatment, 16% and 20% were found to have partial response in the study and control group respectively. After 6 months of completing the treatment the result were equivalent in both the groups, 84% had complete response and 8% had partial response. Though the difference in tumour response was not statistically significant, the rate of reduction in tumour size was found faster in study group at the end of the treatment complete response was little more in the study group. So paclitaxel can be used as a radiosensitizer concurrently with radiotherapy in advanced inoperable patients in whom renal functions are not normal due to (1)hydronehrosis caused by advance disease,(2)Chronic renal disease.

VII. Conclusions

Our study provides a direct comparison between cisplatin and paclitaxel used as weekly concurrent chemotherapy with definitive radiation for advanced carcinoma of the cervix. Our data indicate that the overall response with the use of paclitaxel, which is the study arm, are equal to those with cisplatin. Though not significant, but tumor response was more in paclitaxel arm compared to cisplatin arm .However, the results were encouraging and it shall require larger number of patients and longer follow up in order to arrive at a concrete conclusion as far as disease free survival, cause specific survival, pelvic control rate, and long term sequel or complications are concerned.

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Perforated Duodenal Diverticulum: Diagnosis and Management

By Zhou Yaw LOO & Asiri Arachchi

Abstract- Duodenal diverticula occur in up to 20% of the general population and are generally asymptomatic. Complications such as perforation are exceedingly rare, with only 101 cases reported in the literature.1 Early diagnosis is a challenge and clear guideline for the management of this rare entity is still lacking. We present a case of a 50 year-old man who was admitted to our institution with a perforated duodenal diver-ticulum. The diagnosis was achieved by contrast CT imaging of his abdomen and he was subsequently managed conservatively with nasogastric decom-pression and broad-spectrum antibiotics.

GJMR-D Classification : NLMC Code: WS 141



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Perforated Duodenal Diverticulum: Diagnosis and Management

Zhou Yaw LOO [α] & Asiri Arachchi [σ]

Abstract- Duodenal diverticula occur in up to 20% of the general population and are generally asymptomatic. Complications such as perforation are exceedingly rare, with only 101 cases reported in the literature.[1] Early diagnosis is a challenge and clear guideline for the management of this rare entity is still lacking. We present a case of a 50 year-old man who was admitted to our institution with a perforated duodenal diver-ticulum. The diagnosis was achieved by contrast CT imaging of his abdomen and he was subsequently managed conservatively with nasogastric decom-pression and broad-spectrum antibiotics.

I. Case Report

A 50- year-old man presented to our centre with a 1-day history of sudden-onset epigastric and right upper quadrant pain, associated with nausea and vomiting. There was no fever or any other infective symptoms. His past medical history was significant for Type 2 diabetes, hypertension and hyperch-olestrolaemia. On examination, he was normotensive, tachycardic and aprexial. Localised epigastric tend-erness with associated voluntary guarding was appre-ciated. Rectal examination did not reveal any presence of blood or malaena. Laboratory data showed a haemoglobin of 162 g/L and white cell count of 17.1x10^9/L. CT abdomen with contrast demonstrated a thickened duodenal wall with a 2-centrimetre diverticulum in the region of the duodenal papilla (Figure 1). This was associated with peri-duodenal fat stranding and extraluminal air posterior and lateral to the duodenal wall (Figure 1 & 2). After initial fluid resuscitation, a nasogastric tube was inserted and he was commenced on broad-spectrum antibiotics. Total parental nutrition was initiated and a repeat CT few days later demonstrated significantly smaller para-duodenal collection. He was slowly progressed to soft diet and was discharged 12 days after initial presentation with a plan for gastroscopy in 6 weeks.

II. Discussion

Duodenum is the second most common location to be affected by diverticula, after the colon.[2,3,5] They are typically pseudo-aneurysm, as not all layers of the bowel wall are affected.[4,5,6] About 75% of them are located in the second part of the duodenum, usually within 2.5cm of the ampulla of Vater. Most of them (88%) are located along the pancreatic or mesenteric border. The incidence of duodenal diverticula has been reported between 1-5% in upper GI studies and up to 22% at autopsies.[1] Duodenal diverticula are mostly asymp-tomatic, however comp-lications such as bleeding, inflammation and perforation can develop in 5% of patients.[5] Perforation represents the rarest but most serious complication, with mortality of up to 13%.[1]

Perforated duodenal diverticulum poses a diagnostic challenge as there is no pathognomonic clinical features. Of all the 101 cases reported in literature, only 13 of the cases achieved accurate pre-operative diagnosis[1]. The symptoms are mostly non-specific and could mimic conditions such as peptic ulcer disease, acute cholecystitis and pancreatitis.[7] Majority of the patients presented with acute-onset epigastric or right upper quadrant pain associated with nausea and vomiting,[3,4,5] while some experienced chronic abdo-minal pain with anorexia and malaise.[3] The diagnosis is by exclusion and requires clinician to possess a high index of suspicion.

Contrast-enhanced CT is a valuable diagnostic modality due to its ability to detect small amount of extraluminal air and delineate the retroperitoneal anatomy.[3] It can even demonstrate the presence of a diverticulum in some cases. Typical radiographic findings include thickened bowel wall, fat stranding and extraluminal air or fluid.[4,5] However, these are not diagnostic as perforated viscus close to an asymptomatic duodenal diverticulum can give a similar appearance.[2,7] Post-bulbar duodenal ulcer for instance, can produce the clinical and radiological presentation of a perforated duodenal diverticulum.[2] Upper gastroin-testinal series may be employed as part of the investigation but previous literature fail to prove its effectiveness.[2,3] This could be explained by cases of diverticulum with tight neck or the presence of a calculus.[3] Forward-viewing endoscopy can be useful in excluding pathologies such as peptic ulcer, but it has been shown to have a low-predictive value of diagn-osing duodenal diveticulum.[5] Side-viewing duode-noscopy may be the tool of choice,[5] with Leinoven et al and Jin et al finding duodenal diver-ticulum in 7.1% and 24.6% of all patients who underwent ERCP, respectively.[8,9] One rationale behind this is that forward-

Author: e-mail: asiriarachchi@gmail.com

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viewing endoscopy may not reliably assess the concavity of the descending duodenum close to the ampulla of Vater, where most of the diverticulum lies.[5]

In cases of perforated duodenal diverticulum, the treatment of choice seems to be transduodenal diverticulectomy with two-layer closure.[1] Bypass procedure such as gastrojejunostomy and tube duodenostomy may be required.[2] Due to the close proximity of distal common bile duct and the ampulla of Vater, the surgeon must proceed with utmost care to avoid iatrogenic injury.[1] Complications associated with repair of perforated diverticulum include duodenal fistula, intra-abdominal abscess, sepsis and pancreatitis, with duodenal fistula being the commonest (20%).[1] In addition, laparoscopic [10] and endoscopic [11] treatment of perforation have also been described. Conservative management of perforation is a feasible option provided that the patient has mild symptoms and has radiographic evidence of a contained leak.[6] Treatment involves nasogastric decompression, broad-spectrum antibiotics with or without percutaneous drainage of subsequent abscess formation.[4] There have been reports in literature of successful outcome with such treatment.[1,4,6] However, should there be clinical deterioration, surgical intervention is obviously warranted.

In conclusion, perforation represents the rarest complication of duodenal diverticulum and early diagnosis is challenging. Optimal treatment of this condition has not been well-established and may be guided by the patient's clinical condition. We present a case of a perforated duodenal diverticulum diagnosed by contrast-enhanced CT and managed successfully with a conservative approach.



Figure 1 : A 2-centimetre diverticulum can be appreciated in the regional of duodenal papilla

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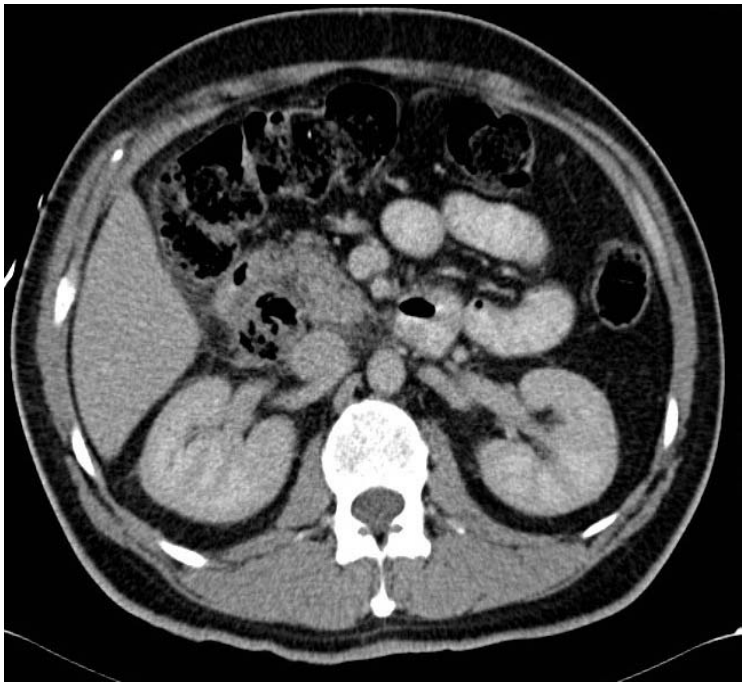


Figure 2 : Axial view showing extraluminal gas and induration of abdominal fat around the duodenum

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Characterization of Hippocampus in Epileptic Sudanese Children using MRI

By Caroline Edward Ayad, Mohammed Abdalla Bashir Abdalla, Mohammed .E.M. Garelnabi & Elsafi Ahmed Abdalla

Sudan University of Science and Technology, Sudan

Abstract- Seizures are the most noticeable clinical manifestations of epilepsy; measurement of the hippocampus on magnetic resonance (MR) images of the brain has been useful for the assessment of patients with seizures. Therefore this study aimed to diagnose subjects who had developed epilepsy by measuring the RT and LT hippocampus area and volume considering epilepsy duration, seizure frequency, EEG results, T2 signal intensity, treatment, and children ages as well as to correlate the MRI findings with EEG findings. This Study was conducted at Gezira University- MRI Diagnostic center –Khartoum –Sudan during the period from 2010up to2011using Siemens 0.5 Tesla MRI machine. A total of 29 Sudanese children of both genders with clinical history of generalized seizures, and 17 normal children who were selected as control group at different ages were involved in this study. Children with head injury or organic lesion found on MR images were excluded.

Keywords: *epilepsy, siezers, hippocampus.*

GJMR-D Classification : *NLMC Code: WS 141, WN 180*



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Characterization of Hippocampus in Epileptic Sudanese Children using MRI

Caroline Edward Ayad [α], Mohammed Abdalla Bashir Abdalla [σ], Mohammed .E.M. Garelnabi [ρ] & Elsafi Ahmed Abdalla [ω]

Abstract- Seizures are the most noticeable clinical manifestations of epilepsy; measurement of the hippocampus on magnetic resonance (MR) images of the brain has been useful for the assessment of patients with seizures. Therefore this study aimed to diagnose subjects who had developed epilepsy by measuring the RT and LT hippocampus area and volume considering epilepsy duration, seizure frequency, EEG results, T2 signal intensity, treatment, and children ages as well as to correlate the MRI findings with EEG findings. This Study was conducted at Gezira University- MRI Diagnostic center –Khartoum –Sudan during the period from 2010up to2011using Siemens 0.5 Tesla MRI machine. A total of 29 Sudanese children of both genders with clinical history of generalized seizures, and 17 normal children who were selected as control group at different ages were involved in this study. Children with head injury or organic lesion found on MR images were excluded.

The hippocampus was characterized in the coronal MR images; the area and volume of the right and Left sides were found to be reduces significantly in the diseased sample comparing with the control group; there was relationship between patient's age and seizure duration and frequency as well as hippocampus area and volume. Significant differences were detected in the hippocampus area and volume in children who have got treatment and none treated children.T2 weighted images showed hyper signal intensity in the hippocampuses of the diseased sample. No significant differences were detected in males and females measurements. EEG failed in diagnoses of 12 (41.4%) cases of the sample, and new formulas were established for prediction of EEG findings regarding the hippocampus area and epilepsy duration.MRI has a great value in characterization hippocampus in epileptic Sudanese children.

Keywords: epilepsy, siezers, hippocampus.

I. Introduction

Epilepsy is a chronic brain disorder that is characterized by repeated spontaneous seizures, and increased risk of mortality.[Wilner AN et al.,2010] Epilepsy is one of the most common neurologic disorders encountered in clinical practice. Epilepsy is more common among the elderly, higher incidence in men than women.

Author α: Sudan University of Science and Technology-College of Medical Radiological Science. e-mail: carolineayad@yahoo.com
Authors σ ρ ω: Gezira University- MRI Diagnostic center, Khartoum – Sudan. e-mails: mohammedbasheer@yahoo.com, mohamedgarelnabi@yahoo.com, dr.elsaffi@gmail.com

[Hesdorffer DC et al., 2011, Banerjee PN et al .,2009], more common among racial or ethnic minorities or among low-income populations. [Banerjee PN et al., 2009].

Seizures are the most obvious clinical manifestations of epilepsy; it refers to the changes in physical findings that occur in relation to abnormal electrical activity within the brain [Fisher RS et al., 2005] The electroencephalogram (EEG), can measures changes in brain electrical activity, and identify brain regions where seizures are most likely to originate. More recently, imaging technologies such as magnetic resonance imaging (MRI), has become indispensable tool in evaluating patients with epilepsy and other seizure disorders, because of it's superior soft tissues contrast, and ability of viewing variety of planes, providing greater sensitivity and accuracy for the identification of underlying lesions in patients with epilepsy .According to guidelines from the American College of Radiology (ACR), MRI is considered appropriate for all epilepsy evaluations, and become the standard for brain imaging in patients with seizures.[www.acr.org 2011].

A systematic approach to the evaluation of seizure disorders is essential to ensure that patients receive appropriate treatment and to rule out the many other medical conditions that may resemble epilepsy [Noe KHet al., 2011].

Common MRI protocols used in the evaluation of epilepsy include volumetric T1-weighted sequencing; proton-density, T2-weighted and fluid-attenuated inversion recovery (FLAIR) sequences in oblique coronal and axial planes; and gradient echo sequences. [Duncan JS. ,2010].

Measuring hippocampus volume with MRI has provided important information about several neuropsychiatric disorders, smaller hippocampus volu-mes have been reported in epilepsy [Geuze et al., 2009].

Measurement of hippocampus volumes has been found to be the most accurate approach to evaluate the hippocampus pathology [Bronen RA.,1991]. This has found its greatest clinical application in the assessment of patients with seizures [Ashtari M et al., 1991, Jack CR.,1990]. Other factors may also help identify hippocampal sclerosis: quantitative evidence of increased T2 values; and visual assessment of the disruption of internal architecture, volume loss, and

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intensity elevation [Jackson GD., 1990, Kuzniecky R., 1987].

This study aimed to diagnose subjects who had developed epilepsy by measuring the RT and LT hippocampus area and volume considering epilepsy duration, seizure frequency, EEG results, T2 signal, treatment, and children ages as well as to correlate the MRI findings with EEG findings.

II. Material and Methods

This Study was conducted at Gezira University-MRI Diagnostic center-Khartoum-Sudan during the period from 2010up to2011.

MRI machine: Siemens 0.5 Tesla

Patients: A total of 29 children in both genders with clinical history of generalized seizures, and 17 were normal as control group at different ages were involved in this study. The ethics and research committee approved the study.

Exclusion criteria: Subjects who were normal, with head injury or organic lesion found on MR images were excluded.

MRI technique and Hippocampus area and volume measurements

MRI Brain was done first axial T1, T2, FLAIR and sagittal images; it is used as screening for presence of mass lesion or other abnormalities. Sagittal image was used as a guide to obtain perpendicular plane to temporal lobe. T1, T2 of coronal 3mm slice thickness, images perpendicular to the long axis of the temporal lobe were taken.

Volume measurement

The whole hippocampal volume was measured. Measurement of hippocampal body and tail included subicular complex, the hippocampus proper, the dentate gyrus, the alveus and hippocampal fimbria. ROI-manually traced with computer mouse, right and left sides were measured individually. The measures were done three times for each ROI and the average was taken. Summation of the average of each slice = the total area of hippocampus for each side.

Volume of the hippocampal complex (cm3)=total area of the hippocampal complex (cm2) X the slice thickness (cm)

III. Results

The 29 subjects studied consist of 11(37.9%) males and 18(62.1%) females. The mean ages of the subjects were 14.79±6.01 years. The mean age of the seizure onset was found to be 12.4±5.7and frequency of 6.6±4.35.

Table 1 : The mean and standard deviation of the hippocampus volume and area measurements for epileptic patients

	Area (RT) Cm^2	Volume (RT) cm^3	Area (LT) Cm^2	Volume (LT) cm^3
Mean	2.75	2.47	2.62	2.36
Std. Deviation	±0.23	±0.21	±0.21	±0.19

Table 2 : Shows the frequency of epilepsy duration in the sample

Epilepsy duration (minutes)	Frequency	Percent%
2	7	24.1
3	5	10.3
4	5	13.8
5	5	6.9
8	1	3.4

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9	3	10.3
11	1	3.4
13	2	6.9
Total	29	100.0

Table 3 : Shows the frequency of EEG results

		Frequency	Percent%
EEG	Consigned with MRI (negative epileptic findings)	7	24.1
	Adverse findings with MRI	12	41.4
	Consigned with MRI (positive epileptic findings)	10	34.5
	Total	29	100.0

Table 4 : Shows the frequency of T2 signal classified as (iso signal intensity& hyper signal intensity)

		Frequency	Percent%
Signal intensity	Iso intense	7	24.1
	Hyper intensity	22	75.9
	Total	29	100.0

Table 5 : Shows frequency of not treated & treated patients

		Frequency	Percent%
Treatment	Not treated	23	79.3
	Treated	6	20.7
	Total	29	100.0

Table 6 : Shows correlation between seizure frequency & Treatment

Model	Un-standardized Coefficients		Standardized Coefficients	Sig.
	B	Std. Error	Beta	
(Constant)	-.099	.124		.432
Seizures Frequency	.047	.016	.492	.007

**This table showed that the seizures frequency decreased by .099 according to the treatment*

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Table 7 : Shows correlation among EEG, Epilepsy duration, LT Hippocampus area in both genders

gender	Model	Un-standardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
Male	(Constant)	-3.229	1.924		.105
	Area (LT) Cm^2	1.570	.730	.388	.041
Female	(Constant)	-4.125	1.812		.032
	Area (LT) Cm^2	1.726	.676	.427	.017
	Epilepsy Duration	.101	.043	.397	.025

+here also EEG results can be related to the area (LT) and epilepsy duration as follow:
EEG = [(area (LT) × 1.726) + (epilepsy duration × 0.101)] – 4.13

Table 8 : Shows correlation among EEG, Epilepsy duration, RT Hippocampus area in both genders

gender	Model	Un-standardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
Male	(Constant)	-2.336	1.026		.126
	Area (RT) Cm^2	1.679	.680	.372	.036
Female	(Constant)	-3.236	1.789		.029
	Area (RT) Cm^2	1.624	.457	.496	.028
	Epilepsy Duration	.101	.043	.397	.025

**here also EEG results can be related to the area (RT) and epilepsy duration as follow:*
EEG = [(area (RT) × 1.624) + (epilepsy duration × 0.101)] – 3.24

Table 9 : Shows T-Test Difference between male & female measurement of the area and Volume as mean, Std. Deviation and *P*-value

	gender	N	Mean	Std. Deviation	Sig. (2-tailed)
Area (RT) cm^2	Male	11	2.7182	.21442	.607
	Female	18	2.7650	.24677	.595
Volume (RT) cm^3	Male	11	2.4473	.19267	.616
	Female	18	2.4883	.22150	.604

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Area (LT) cm^2	Male	11	2.6173	.19571	.906
	Female	18	2.6272	.22862	.902
Volume (LT) cm^3	Male	11	2.3564	.17614	.891
	Female	18	2.3667	.20594	.887

Table 10 : Shows the measured area and volume (comparison between none treated & treated measurement in mean &Std. Deviation and *P*-value

	Treatment	N	Mean	Std. Deviation	Sig. (2-tailed)
Area (RT) cm^2	No treated	23	2.7322	.22682	.504
	Treated	6	2.8050	.26569	.558
Volume (RT) cm^3	No treated	23	2.4583	.20252	.473
	Treated	6	2.5283	.24128	.534
Area (LT) cm^2	No treated	23	2.6061	.20701	.400
	Treated	6	2.6900	.24331	.464
Volume (LT) cm^3	No treated	23	2.3474	.18663	.409
	Treated	6	2.4217	.21885	.471

Table 11 : Shows the T2 signal status in normal & abnormal patients as mean Std. Deviation and *P*-val Ue

	T2 Signal	N	Mean	Std. Deviation	Sig. (2-tailed)
Area (RT) Cm2	Normal	7	2.6186	.15291	.093
	Abnormal	22	2.7882	.24073	.043
Volume (RT) cm3	Normal	7	2.3586	.14053	.097
	Abnormal	22	2.5091	.21580	.048
Area (LT) Cm2	Normal	7	2.5200	.14059	.143
	Abnormal	22	2.6564	.22413	.074
Volume (LT) cm3	Normal	7	2.2700	.12490	.145
	Abnormal	22	2.3923	.20225	.073

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Table 12 : Shows mean and standard Deviation of the epileptic subjects and control group for RT and LT area and volume measurement (*p*-value at 0.05)

	Area (sample) (RT) cm^2	Area (control) (RT) cm^2	Volume (sample) (RT) cm^3	Volume (control) (RT) cm^3	Area (sample) (LT) cm^2	Area (control) (LT) cm^2	Volume (sample) (LT) cm^3	Volume (control) (LT) cm^3
Mean	2.7	2.9	2.47	3.01	2.62	2.8	2.4	3.21
STDV	±.23	±.26	±.21	±.21	±.21	±.32	±.19	±.21
p-value	0.0423		0.059		0.0563		0.034	

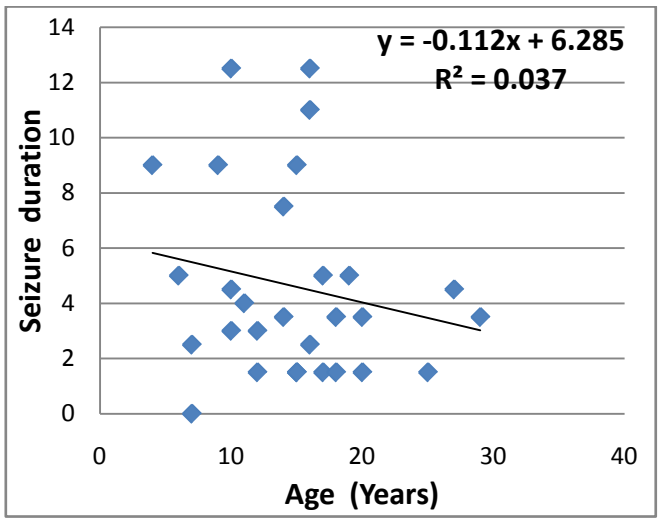


Figure 1 : The relation between the Seizure duration and the age

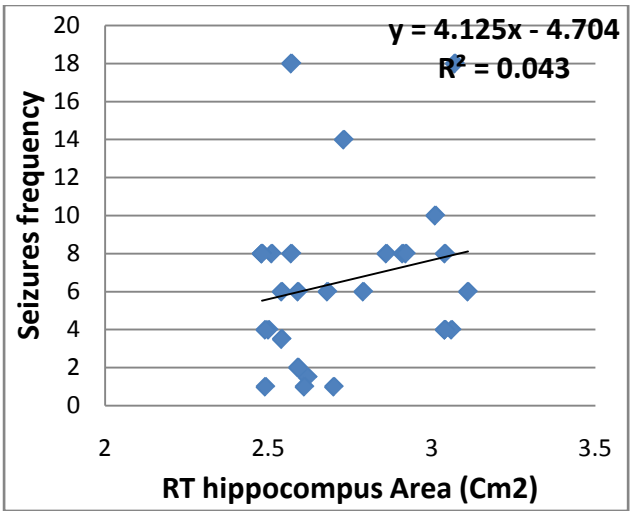


Figure 3 : The relation between the Seizure frequency and the RT hippocampus area

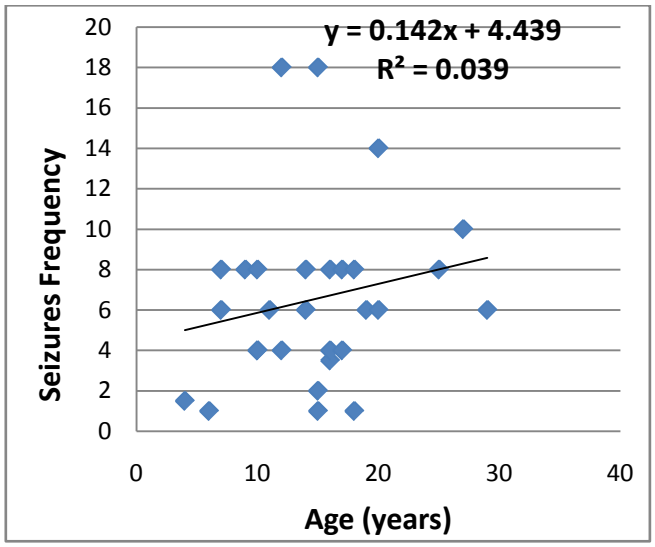


Figure 2 : The relation between the Seizure frequency and the age

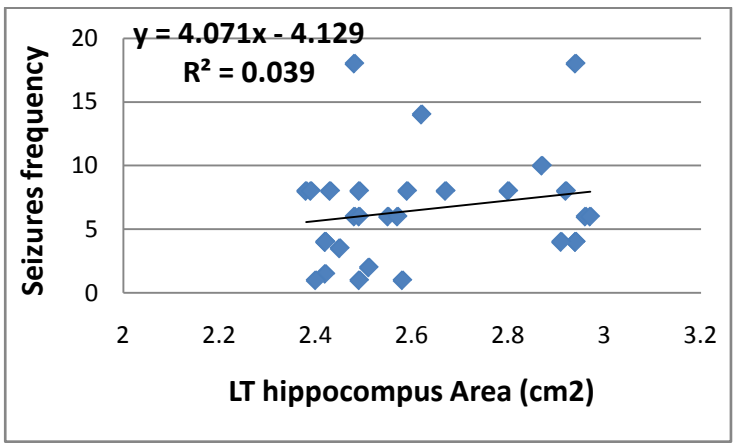


Figure 4 : The relation between the Seizure frequency and the LT hippocampus area

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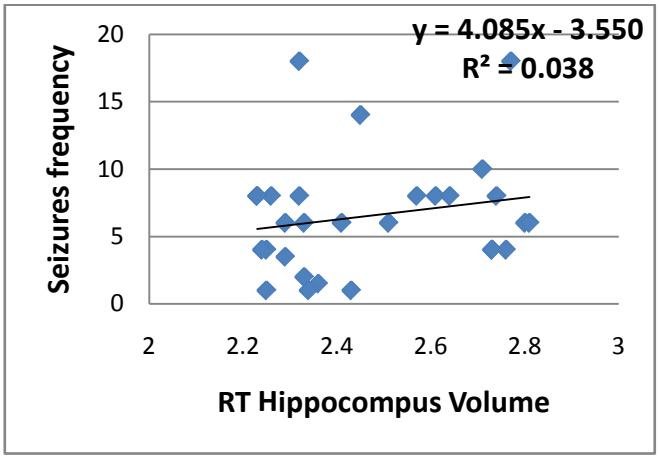


Figure 5 : The relation between the Seizure frequency and the RT hippocampus volume

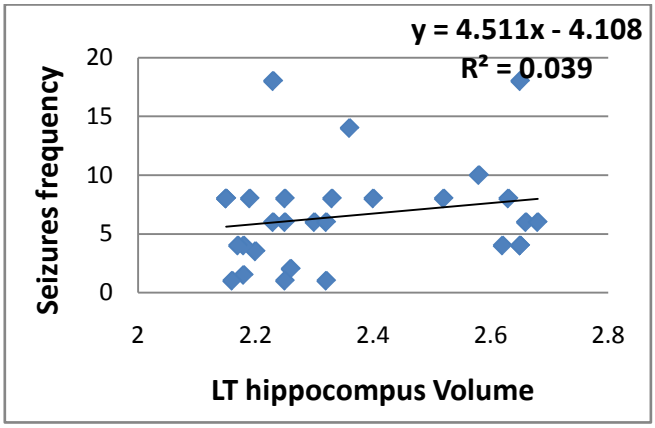


Figure 6 : The relation between the Seizure frequency and the LT hippocampus Volume

IV. Discussion

This study reported the MR findings in a group of patients with documented temporal lobe epilepsy. The diagnosis of temporal lobe epilepsy was based on typical clinical seizure characteristic. In epilepsy researches and in temporal lobe epilepsy in particular, hippocampal volumetry with MRI were mainly used in the determination of hippocampal atrophy and hippocampal sclerosis.The clinical features of this study of 29 epileptic children with temporal lobe epilepsy were in line with four cross sectional previous studies (L.E. Betting et al.,2006; Idil Cavus et al.,2008; Mai Hanamiya et al.,2009; Douglas E et al.,2010).Females were affected more often than males (18 females, 11 males) . This gender results were consistently seen in our studies, supporting the hypothesis that the cause could be a biological phenomenon rather than a research entity.Table1showed the measurements of hippo-campus area and duration and table 2 showed the duration of seizures (minutes)in the sample Abnormalities on MR images were detected in 22 (75.9%), hippocampal sclerosis being the most common lesion. EEG confirmation was present in 10 (34.5%) regarding 7 (24.1%) had normal EEG and 12 cases were reported adverse results from the MRI findings as presented in table(3). Overall agreement between the two observers was fair, indicating that hippocampal sclerosis and other lesion can be detected reliably on MR images. The reported MR features of hippocampal sclerosis included hippocampal atrophy, increased signal intensity on T2, loss of internal architecture of the hippocampus, and loss of singnal intensity on T1 weighted images. In our study only the first two were used as criteria for diagnosis of hippocampal sclerosis.

No lesion was detectable on MR images of 7(24.1%) concordant with 7(24.1%) whom EEG result was normal as the T2 signal intensity was found to be iso intense and patients were diagnosed as normal but the abnormal signal was detected in 22(75.9%) of the sample showing hyper signal intensity and were diagnosed as abnormal this was presented in table (4). The epilepsy was usually mild and responsive to medication this was presented in table (5). 23 out of 29 (79.3%) were on no treatment at the time of study. 6 out of 29 (20.7%) had good seizure control with a single anti-epileptic drug. The seizures frequency decreased by 0.99 according to treatment and the relation is significant between the frequency of seizures and cases administrated with drugs at *p* value 0.007; this was presented in table (6).

EEG results can be related to the left hippocampus area and epilepsy duration as: EEG = [(area (LT) × 1.726) + (epilepsy duration × 0.101)] – 4.13,where EEG results can be related to the right hippocampus area and epilepsy duration as: EEG = [(area (RT) × 1.624) + (epilepsy duration × 0.101)] – 3.24.as presented in tables (7)and(8).

No significant differences were detected between males and females mean measurements for the hippocampus area and volume as presented in table (9).

The hippocampal volume for treated patient were RT 2.53±0.24, LT 2.42±0.22 and for none treated were RT2.46±0.2, LT 2.35±0.19 respectively table (10). The difference at T test (*P*. value = 0.05) was found to be insignificant for both RT&LT as to be for RT (0.47, 0.53).

Table (4) showed that 7 (24.1%) in the group of patients had normal hippocampus T2 signal, 22 (75.9%) showed high signal intensity on T2. The hippocampal volume of normal T2 signal were RT 2.36±0.14, LT 2.27±0.12 were the volume for high signal intensity RT 2.51±0.21, LT 2.39±0.2 respectively table (11). T- test showed that the difference at (*P-value 0.05)* was to be insignificant for the normal and abnormal T2 signal for hippocampus volume as (0.97, 0.15) for RT and (0.5, 0.73) for LT respectively, but the difference was to be

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significant for the normal T2 signal of the RT hippocampus area when compared with the abnormal T2 signal for the same area.

Previous investigations using volumetry showed that hippocampal atrophy is a reliable marker of hippocampal sclerosis (L.E. Betting et al.,2006; Mai Hanamiya et al.,2009). In an investigation of patients with temporal lobe epilepsy, 22 (75.9%) patients with hippocampal sclerosis pathologically proven had atrophy in the MRI evaluation.

In another volumetric evaluation of patients with idiopathic generalized epilepsy, no hippocampal atrophy had been detected but the hippocampal hyper intense T2 signal was present (Mai Hanamyia et al., 2009).

A significant reduction had been detected in the right and left hippocampus area and volume of the epileptic children when compared with the control group as presented in table (12).

The reduced hippocampus volumes described herein were slightly different from the typical findings of hippocampal sclerosis. Ipsilateral reduction of the fornix is associated with hippocampal atrophy in most of the patients with unilateral hippocampal atrophy. Hippocampal hyperintense T2 signal was present in 22(75.9%) similar findings were mentioned by (L.E. Betting et al., 2006).

The justification is that a disturbance in the blood and oxygen supply during epileptic attacks causes destruction of hippocampal nerve cells and that the sclerosis, or scarring, is the end result of this process Margerison J. H. ,et al2010).The tendency for the damage to occur preferentially in certain parts of the hippocampus, is attributed either to a special sensitivity of these areas to lack of oxygen, or to their exceptional need for oxygen through increased cellular activity at a time when it is liable to be in short supply. This discriminating susceptibility may be due to variations in the chemical make-up of its different parts, (Purpura and Gonzalez-Monteagudo,1960), the researchers suggested that these were the causes of changing the signal intensity in T2 weighted images.

EEG failed in diagnosing of 12 patients where MRI images showed a significant reduction and changing in the T2 signal intensity.

The study also noted that as the children ages increased the seizure duration was also decreased by 0.11 starting from 6.4minutes, but the frequency increased by0.14 as the children ages increased, this was presented in figure(1)and figure(2).

As the RT and LT hippocampus areas increased; the seizures frequency was also increased at R^2 0.04 and 0.039,this was presented in figures (3,4)as well as the RT and LT hippocampus volume ;it increased at R^2 0.038,0.039 respectively and this was presented in the figures5and6.

Regarding the results, the routine electroencephalogram (EEG) is often helpful in diagnosing epilepsy because it can detect the abnormal electrical discharges in the brain that indicate epilepsy. However, the EEG is very often normal in patients with proven epilepsy, so it cannot be used alone to exclude epilepsy. MRI is an excellent imaging modality used to characterize the hippocampus by measuring its area and volume as well as to evaluate the signal intensity as these articles are very important to evaluate patients with neurological disorders.

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Right Internal Carotid Agenesis: A Rare Case Anatomical, Neurosurgical and Radiological Perspective

By Dr. Ashfaq Ul Hassan, Dr. S habinul Hassan, Prof Nisha Kaul & Prof Ghulam

SKIMS Medical College Bemina, India

Abstract- We present a case of 35 year old female with Right Internal carotid artery agenesis . The Axial and coronal T2- weighted MRI demonstrated an absent right internal carotid artery flow void. A subsequent magnetic resonance angiography showed absence of the right internal carotid artery. This finding was confirmed by magnetic resonance angiography of the cervical vessels, and axial computed tomography angiography showed agenesis of the right carotid artery. The literature reports such finding in association with other anomalies such as transsphenoidal encephaloceles and circle of Willis aneurysms. These associations were not observed in the present case. The patient remained asymptomatic.

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Right Internal Carotid Agenesis: A Rare Case Anatomical, Neurosurgical and Radiological Perspective

Dr. Ashfaq Ul Hassan [α] , Dr. Shabinul Hassan [σ] , Prof Nisha Kaul [ρ] & Prof Ghulam [ω]

Abstract- We present a case of 35 year old female with Right Internal carotid artery agenesis. The Axial and coronal T2-weighted MRI demonstrated an absent right internal carotid artery flow void. A subsequent magnetic resonance angiography showed absence of the right internal carotid artery. This finding was confirmed by magnetic resonance angiography of the cervical vessels, and axial computed tomography angiography showed agenesis of the right carotid artery. The literature reports such finding in association with other anomalies such as transsphenoidal encephaloceles and circle of Willis aneurysms. These associations were not observed in the present case. The patient remained asymptomatic.

I. Introduction

In the Medical OPD of SKIMS, 50 patients were worked upon for evaluation. These patients had neurological symptoms like headache , giddiness, weakness in limbs, loss of consciousness, dementia . After subjecting them for further evaluation one patient was found to have Neck Angiography revealing small right common carotid artery and no Internal carotid artery . MR Angiography revealed normal left petrous and Cavernous internal carotid. Right Middle cerebral artery and right anterior cerebral artery are likely supplied by anterior communicating artery and posterior communicating artery. In addition bilateral hyper intensity lesions were seen in heads of Caudate nuclei.

II. Discussion

The Cerebral circulation is divided into Anterior circulation and posterior circulation. The internal carotid arteries form the anterior circulation and the vertebral arteries form the posterior circulation. These two meet at the Circle of Willis and most of the blood supply is derived from the internal carotid system. Embry-ologically the internal carotid is formed by the portion of the third arch artery distal to the bud along with the original dorsal aorta cranial to the attachment of third arch artery.

By inherent nature Agenesis of Carotid arteries is a rarity with not so frequent cases reported worldwide. It is mostly asymptomatic because of the fact of compensation by Blood flow through Circle of Willis. Internal carotid agenesis occurs when one of the blood vessels which supply blood to the brain does not develop (agenesis). It is rare, occurring in less than 0.01% of people.[1] Usually there is a pair of internal carotid arteries, one on the left side and one on the right side; agenesis occurs on the left side three times more frequently than on the right side.[2]

However, if symptoms occur, they may include headache, blurred vision, paralysis of some of the nerves in the head (palsy), epilepsy, or muscle weakness on one side of the body (hemiparesis).[2] The main concern with internal carotid agenesis is the increased risk for enlargement of the other blood vessels (aneurysm), which can occur in up to 67% of people with this condition (compared to 2-4% of individuals without this condition).[3] It usually presents unilaterally and rarely has been reported bilateral[4] Associated defects seen are Aneurysms in the Circle of Willis Especially the Anterior circulation and Encephaloceles, intracranial hemorrhages[5, 6] and Arachnoid cysts.[7,8]

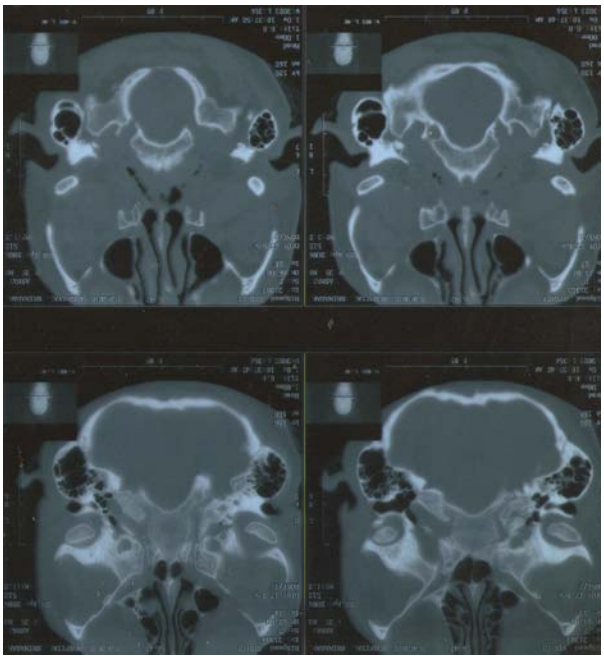
According to Padget [9], the internal carotid artery originates from the dorsal aorta and the third aortic arch at approximately the 3-mm embryonic stage, but complete development does not occur earlier than the 16–18 mm stage (40 days). So far, there is no exact explanation for developmental anomalies of the internal carotid artery, but all variations are thought to occur because of insults to the developing embryo. Keen [10] suggested that mechanical insults to the developing embryo such as excessive folding of the embryo to one side, pressure effects, or restriction by amniotic bands may cause unilateral absence of internal carotid artery.

A 35 year old female who had dementia reported to a medical OPD in SKIMS Soura. All her Lab Parameters were with normal range. A CT/ MRI was asked to be done by a Neurologist which revealed an Absent cavernous carotid artery . Neck Angiography revealing small right common carotid artery and no Internal carotid artery . MR Angiography revealed normal left petrous and Cavernous internal carotid. Right Middle cerebral artery and right anterior cerebral artery

Author α: Lecturer Anatomy SKIMS Medical College Bemina.
e-mail: zahidarasool12@rediffmail.com
Author σ: Dental Surgeon, SKIMS Soura.
Author ρ: Prof Anatomy Santosh Medical College Delhi.
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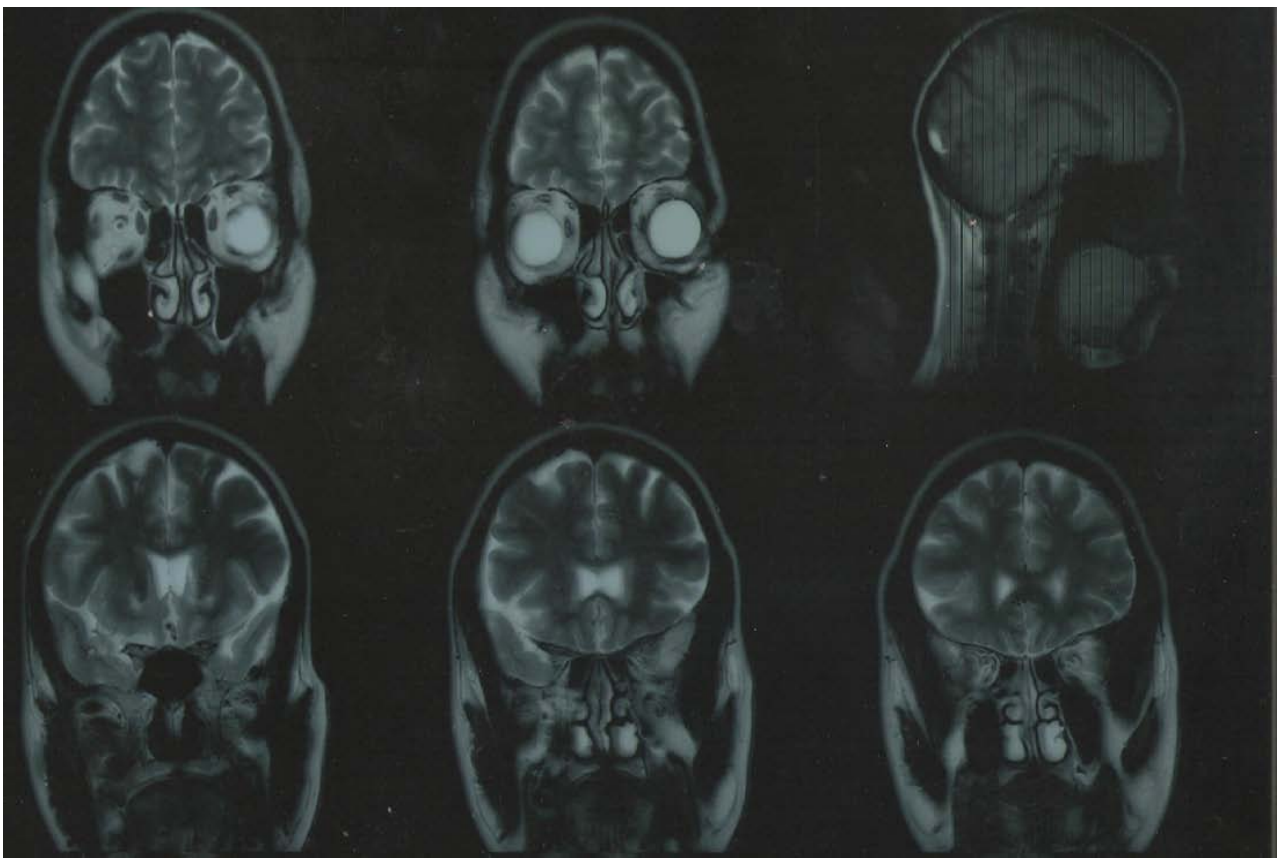
are likely supplied by anterior communicating artery and posterior communicating artery. In addition bilateral hyperintensity lesions were seen in heads of Caudate nuclei.



Magnetic resonance angiography of the cervical vessels showing agenesis of the right carotid artery

III. Conclusion

There are multiple variations in the cerebral vasculature but rarely do patients present with such a rare anomaly. Such cases are usually detected incidentially or in some cases where a clinician would not suspect such a diagnosis in the first instance.



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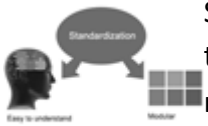


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- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
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- One 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?
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- Submit to work done by specific persons (including you) in past tense.
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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

D

Diaphragm · 7, 10, 12, 15, 17, 19, 20
Duodenum · 28

E

Epilepsy · 32, 34, 36, 39, 40, 42, 44

G

Gastrojejunostomy · 29

L

Lymphoma · 2, 8

O

Omdurman · 2

R

Reynolds · 8, 9

S

Shimadzu · 12

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