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Evaluation of the Efficacy, Feasibility and Flexibility of a New Rehab-Protocol as a Fundamental Part of Conservative Treatments for Ankle Traumas

By F. Manfreda, P. Ceccarini, G. Colleluori, J. Teodori, R. Petruccelli, G. Rinonapoli & A. Caraffa

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Abstract- *Introduction:* Ankle traumatic injuries represent a predisposing condition for functional deficits, such as stiffness, residual pain and abnormal functionality, which may reduce return of patients to the activity-levels before the trauma. Several types of treatment have been proposed, and lots of studies and reviews of the last years have emphasized the importance of proper rehabilitation and re-educational programs in order to permit a safe and complete recovery.

Objective: The aim of this study is to assess the efficacy and feasibility of an original program of "Functional" physiotherapy and active exercises after an acute treatment for the most common ankle injuries

Materials and Methods: Our study was conducted on 40 patients who reported two different types of trauma: both lateral ankle sprain, 2nd and 3rd degree of injury, or not displaced ankle fracture. All the patients attended at the same "Functional" rehab- protocol.

Keywords: *ankle trauma; conservative treatment; ankle rehab.*

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Evaluation of the Efficacy, Feasibility and Flexibility of a New Rehab-Protocol as a Fundamental Part of Conservative Treatments for Ankle Traumas

F. Manfreda [α], P. Ceccarini [σ], G. Colleluori [ρ], J. Teodori [ω], R. Petruccelli [¥], G. Rinonapoli [§] & A. Caraffa [χ]

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AOFAS score and TEGNER scale submitted to patients in order to assess the clinical conditions at time zero (T0) and current ones at time t (T1), after 4 months (15-18 weeks).

Results: In the group of patients with sprain, AOFAS at T0 reported an average score of 41,70. After the treatment (T1), the score of AOFAS for this group was 93,86. In the other group, results of AOFAS at T0 have shown an average score of 41,76. After the treatment (T1) value of score was 89,6. Regarding Tegner Activity Scale, we observed that all patients who have reported ankle sprain have returned to the same level of activity they held before the trauma. No recurrences of the pathology happened.

Conclusions: Our "functional" rehab-protocol, despite the limits of the study, has been proven to be flexible and efficient. Finally, results of the studies show how the protocol could be feasible in different types of ankle pathologies.

Keywords: ankle trauma; conservative treatment; ankle rehab.

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I. Introduction

Ankle sprains, especially lateral sprain, and ankle fractures are some of the most common musculoskeletal injuries in sport activity [1].

Although ankle sprain with ruptures of the ankle ligaments are very common, treatment selection remains controversial.

After a proper diagnosis, it is generally agreed that non-operative treatment with early functional rehabilitation is the gold standard among treatments. [2;3].

Surgical treatment has been shown to be associated with increased risk of complications, and higher costs too [4].

Ankle fracture represents probably the most common fracture of lower limbs [5].

Depending on the severity, choice for fracture can vary among surgical or conservative treatments. Despite the selective treatment, fractures lead to several mid-term and long-term complications or residual deficits [6].

Mid-term and long-term complications might be potential problems in all the ankle traumas, including the immediate impact on mobility and risks associated with prolonged immobilisation such as muscle atrophy, deep vein thrombosis and joint stiffness. Long-term consequences might include prolonged gait abnormalities, muscle weakness, altered range of motion and an inability to return to previous activity levels [7]. Then, it is well known that any biomechanical abnormality of the foot-ankle complex is potentially able to influence a sport-man functionality, predisposing him to a lesser or greater extent to injuries. So this kind of long-term complication could lead to a compromising quality of life [8].

Generally, after the acute treatment for an ankle injury, the re-educational treatment plays an important role in order to get a proper functional recovery. The common target of rehabilitation is to improve muscle strength, range of motion (ROM) and sensorimotor control [9].

Several rehabilitation approaches are currently used to manage the effects of an ankle sprain or fracture [10]. Lots of RCT and reviews have been written about the effectiveness of different forms of interventions in acute ankle sprains [11]; a large number of discussions have been also presented in literature about the effectiveness of the different types of treatments for ankle fractures (malleolar/bimalleolar/trimalleolar) [12]. Though, recent reviews and meta-analyses seem to agree about the importance of "functional" treatment, as probably the most effective approach [3;13;14].

Despite all the proposed options, it is not commonly approved which treatment could be the most appropriate. Every type of injury seems to be correlated to different principles of treatment, rehabilitation and re-education protocols. Absolutely few RCT have discussed about the possibility of founding rehab guidelines that could be common to the different ankle traumatic pathologies.

II. Aim of the Study

The objective of this study was to assess the efficacy of an original program of "Functional" physiotherapy and active exercises after an acute treatment for the most common ankle injuries. Then, feasibility of the protocol for different types of trauma is evaluated, in order to propose a standardization of the rehab-program for a functional recovery for every kind of trauma, grade of trauma and type of treatment (conservative or surgical). Variability in types of injury, severity of injury and type of patients create the variability in timing and duration of the several phases that we propose.

III. Materials and Methods

a) Subjects of the study

Our study was conducted on 40 patients who reported two different types of trauma: both lateral ankle sprain, 2nd and 3rd degree of injury [15], and not displaced ankle fracture (malleolar; bimalleolar). All these patients have been treated with a conservative treatment. Exclusion criteria included bilateral injuries, inflammatory diseases, neurologic previous disorders, excessive obesity, displaced fracture, non-unions of fractures. Both two groups have been homogenous for age and BMI (Table 1.).

Exclusion criteria	Selective criteria
• BILATERAL INJURIES • INFLAMMATORY DISEASES, • NEUROLOGIC DISORDERS • EXCESSIVE OBESITY • DISPLACED FRACTURE • NON-UNIONS OF FRACTURES • COMPLICATIONS OF FRACTURES • 1ST AND 2ND DEGREE OF ANKLE SPRAIN • SURGICAL TREATMENT	• 18< AGE<55 • 20< BMI<28 • COMPLIANT PATIENTS • ANKLE SPRAIN OF 2nd AND 3RD DEGREE • MALLEOLAR/BI-MALLEOLAR FRACTURES

Fig. 1: Selective criteria.

Basing on the exclusion criteria, a careful and precise selection was made, which resulted in a total of 40 patients who fully complied with the criteria. 20 of 40 patients fell in the first group, with second and third degree of ankle sprain (A); the other 20 patients, who reported ankle fracture treated in a conservative manner, fell in the second group (B).

In the first group (A) there were 13 male and 7 female patients, with a current average age of 35.5 years (40.6 for females and 32.8 for males).

In group B there were 10 males and 10 females, with an average of years 38,5 (41,8 for females and 35,2 for males).

Two evaluation charts of "clinical score" type were submitted to patients in order to assess the clinical conditions at time zero (T0) and current ones at time t (T1), after 4 months (15-18 weeks). . The AOFAS score and TEGNER scale were used.

To correspond to the end of acute phase of the treatment and proper Rehab phases of protocol are assessed.

Patients with sprain (Group A) started a progressive load-walking about 10-20 days after the trauma in case of 2nd degree-sprain and 15-30 days in case of 3rd degree-sprain.

Patients with fracture have been treated with a cast and no walking for 5 weeks. After the removal of cast a progressive load-walking with the use of a bivalve brace for other 15 days has been recommended. The first assessment at T0 was carried out after the removal of the appliance cast.

b) Evaluation Tools

American Orthopedic Foot and Ankle Society (AOFAS) scale: items are distributed into three major categories of pain, function and alignment. Each item included was based on both subjective and objective assessment and is scored from clinical observation and finding. The maximum score is 100 points [16].

The TEGNER is a scale graded activity based on work and sports activities. It is important in order to measure both function and activity level [17].

c) *Protocol of Rehab/Re-Educational treatment*

The protocol used both for patients with sprain and for those with fractures has been assessed by our Orthopaedic institute of University of Perugia; the objective of this protocol is a complete "functional recovery". All the patients attended to the same protocol.

It consists in 5 phases. The first one is the treatment for acute pathology. The other phases are the proper rehabilitative and re-educational phases. Passages from a step to the sequent one vary in timing. This variability derives from different morphotypes, compliance and athletic conditions before the trauma of the patients. The passage into the next phase should be granted only when the patient is able to conduct the previous one without pain and in proper way.

All exercises in the treatments should be practiced 3-4 times/day, 20-30 minutes for each one.

Table 2: First step of the protocol.

Step 1: Acute phase
Timing: From the trauma
Duration:
• Grade 2 Sprain: 10-20 days. • Grade 3 Sprain: 15-30 days. • Akle fracture: 5 weeks.
Treatments:
1. Load Prohibition (Canadian crutches) 2. Ice 3. Elevation 4. Venous pump Exercises 5. Optional: Zinc oxide cream 6. Optional: ankle brace (es. Aircast) 7. Optional: NSAIDs 8. Cast (for fracture)

Table 3: Step n°2 of the protocol.

Step 2: subacute phase (Fig 1)
Timing: The transition from phase 1 to phase 2 is established on the basis of an orthopedic control visit: if the patient is able to walk with a bearable pain, it passes in this stage, otherwise it prolongs the phase for 1 to 5 days.
Duration: 7-10 days
Treatment
1. Progressive load as a function of pain, always with ankle brace. 2. physiotherapy techniques to reduce pain and swelling 3. Ice or contrast baths. 4. Transverse massage (caution). 5. Tecartherapy: 5-8 sessions. 6. Full-weight bearing 7. Therapeutic exercises: • Active ROM exercises. • Dorsiflexion. • Supination. • Circles foot. • Plantar flexion • Pronation. • Draw letters with the foot. • Strengthening exercises. • Isometrics in painless range. • Flex and extend fingers with a towel (put a weight on the towel to increase resistance). • Grasp objects with fingers (fabrics, marbles). • Proprioceptive tablets.

- Stretching.
- ROM passive - only dorsal and plantar flexion in painless range, not supination or pronation.
- Achilles tendon stretching (cautious).
- Joint mobilization (in grade 1 and 2 in dorsal and plantar flexion).

Fig. 1: Some of the exercises of Step 2: active movements; grasping; stretching.

Table 4: Step n° 3 of the protocol.

Step 3: Rehabilitation phase (Fig. 2)

Duration: 10-15 days

Treatment:

1. Full load with or without brace (according to clinical conditions)
2. Therapeutic exercises

- Stretching
- Gastrocnemius and soleus strengthening with increasing intensity.
- joint mobilization (grade 1, 2 and 3 for dorsiflexion, plantar and pronation; limit supination).
- Reinforcement.
- Load exercises.
- Heel raise.
- Toe lift.
- Single foot on step.
- 30° squats.
- Eccentric / concentric isotonic (Theraband and anklets with weights).
- Supination.
- Pronation.
- Plantar flexion.
- Dorsal flexion.
- Peroneal reinforcement.
- Isokinetic movements.
- Proprioceptive re-education (progression from no-bearing stage to controlled load-bearing and full load-bearing):

1. Standing on proprioceptive tablet.
2. Standing on oscillating tablet.
3. Single stance exercises (stable or unstable surfaces, with or without distraction)
4. Continue with the techniques as needed, especially after exercise, to prevent the recurrence of pain and swelling

Fig. 2: Some of the exercises of the third phase: eccentric and concentric exercises; strength exercises with elastic-bands; proprioceptive exercises.

Table 5: Step n° 4 of the protocol.

Step 4: Functional re-education
Duration: variable
Treatments:
1. Continue with the progression of the ROM and strengthening exercises. 2. Muscular strenghtening and sport-specific workout. 3. Running progression 4. Alternate light jog - walk - jogging on flat and straight surfaces. 5. Alternate sprint - light running - sprinting on flat and straight surfaces. 6. Running with eight-shape movements. 7. Zig-zag running with sudden changing direction. 8. Agility exercises. 9. Backward pedaling. 10. Side Steps. 11. Carioca. 12. Sport-specific plyometric exercises. 13. balance exercises in progressive loading and multi-motor activities

Fig. 3: Some of the exercise of the forth step (Functional Re-education): Zig-zag and Circle running.

Table 6: Step n° 5 of the protocol.

Step 5: preventive phase
Aims: Preventing injuries.
Functional exercises:
• Activities multidirectional balance tablets. • Preventive reinforcement (insisting on the peroneal pronation).
Back to competition for Sport-people
• The athlete can return to training when all the exercises are performed at maximum speed. • Can resume the competition when all training is tolerated.
Optional: Dynamic bandage.
For No sports / elderly
• Correct gait pattern • Proprioceptive Rehabilitation

IV. Results

We scored the clinical evaluations by AOFAS score for Ankle both at T0 and at T1.

We present in the table below (Table 7) the results for AOFAS score, both at T0 and T1, for patients with ankle sprain.

Values associated to the items correspond to percentages of patients.

In group A, results for patients at T0 have shown an average score of 41,70

After the treatment (T1), the score of AOFAS for this group was 93,86 (Fig. 4).

Table 7: AOFAS score for patients with sprain.

AOFAS SCORE for ANKLE. Group A	T0	T1
Pain (40 points)		
None	21	79
Mild/Occasional	29	21
Moderate/Daily	36	0
Severe, almost always present	14	0
Function (50 Points). Activity limitatios, supports.		
No limitations, no supports	13	86
No limitations of daily activities, limits of recreation.	29	7
Limited daily and recreational activities	29	7
Severe limitation of daily and recreational activities, cruches, brace	29	0
Maximum walking distance , blocks (200 metres)		
Greater than 6	0	86
4-6	0	12
1-3	29	2
Less than 1	71	0
Walking surfaces		
No difficulty on any surface	0	79
Some difficulty on difficult surfaces	43	21
Severe difficulty on difficult surfaces	57	0
Gait abnormality		
None, slight	1	86
Obvious	30	14
Marked	69	0
Sagittal motion		
Normal or mild restriction (30° or more)	36	86
Moderate restriction (15°-29°)	43	14
Severe restriction (less than 150°)	21	0
Hindfoot motion (inversion plus eversion)		
Normal or mild restriction (75%-100% normal)	0	92
Moderate restriction (25%-74% normal)	20	8
Marked restriction (Less than 25% normal)	80	0
Ankle-hindfoot stability (anteroposterior, varus-valgus)		

Stable	57	100
Unstable	43	0
Alignment (10 points)		
Good, plantigrade foot, midfoot well aligned	43	71
Fair, plantigrade foot, some degree of malalignment.	43	29
Poor, nonplantigrade foot, severe malalignment	14	0

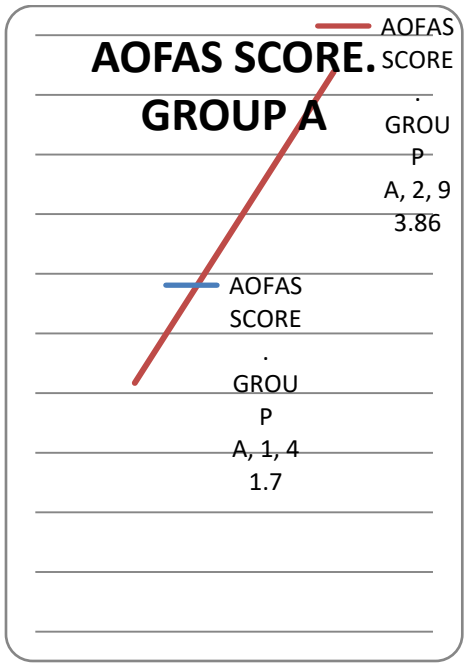

Fig. 4: Improvement of AOFAS score for Group A.

As we can see in the graphs, almost all the patients have reported at T1 a good improvement in all the items. Function-items seem the best, while alignment and pain, in some cases, are still evident at T1 (Fig 5; Fig. 6).

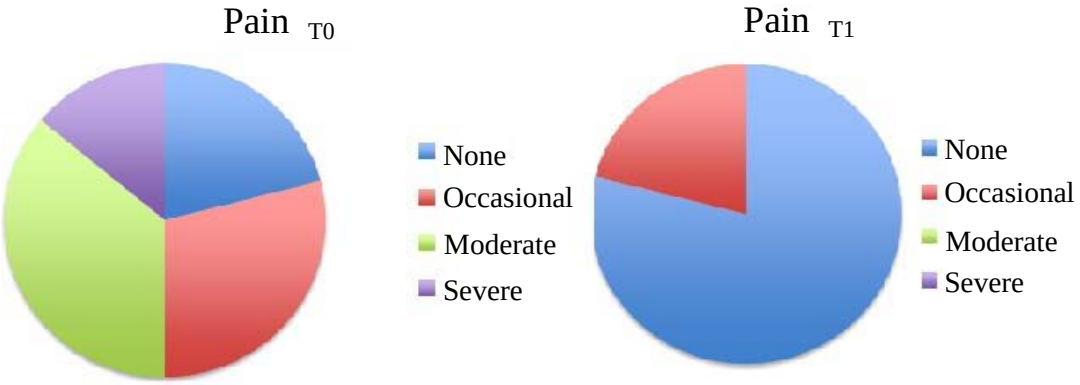

Fig. 5: Pain at T0 and T1 In group A

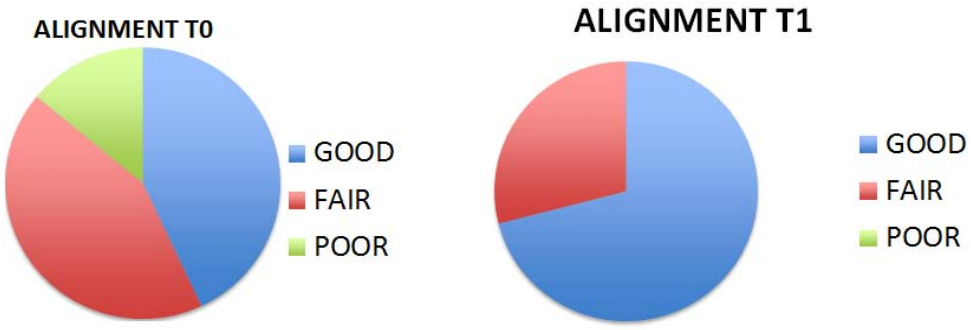

Fig. 6: Alignment at T0 and T1 in group A

In the table below (Table 8) the results for AOFAS score, both at T0 and T1, for patients with fractures (Group B) are reported.

Values associated to the items indicate the percentages of patients.

Table 8: AOFAS score for patients with fracture.

AOFAS SCORE for ANKLE. Group B	T0	T1
Pain (40 points)		
None	12	67
Mild/Occasional	29	33
Moderate/Daily	46	0
Severe, almost always present	13	0
Function (50 Points). Activity limitatios, supports.		
No limitations, no supports	3	76
No limitations of daily activities, limits of recreation.	39	17
Limited daily and recreational activities	25	7
Severe limitation of daily and recreational activities, cruches, brace	34	0
Maximum walking distance, blocks (200 metres)		
Greater than 6	0	65
4-6	0	15
1-3	18	4
Less than 1	82	16
Walking surfaces		
No difficulty on any surface	0	65
Some difficulty on difficult surfaces	48	26
Severe difficulty on difficult surfaces	52	9
Gait abnormality		
None, slight	0	65
Obvious	15	35
Marked	85	0
Sagittal motion		
Normal or mild restriction (30° or more)	16	78
Moderate restriction (15°-29°)	55	22
Severe restriction (less than 150°)	29	0
Hindfoot motion (inversion plus eversion)		
Normal or mild restriction (75%-100% normal)	0	85
Moderate restriction (25%-74% normal)	20	15
Marked restriction (Less than 25% normal)	80	0
Ankle-hindfoot stability (anteroposterior, varus-valgus)		
Stable	73	100
Unstable	27	0
Alignment (10 points)		
Good, plantigrade foot, midfoot well aligned	35	66
Fair, plantigrade foot, some degree of malalignment.	40	34
Poor, nonplantigrade foot, severe malalignment	25	0

Results for Group B show a good improvement in all the items. As we can see, items such as pain, maximum walking distance and alignment have shown poorer results respect group A (Fig. 6).

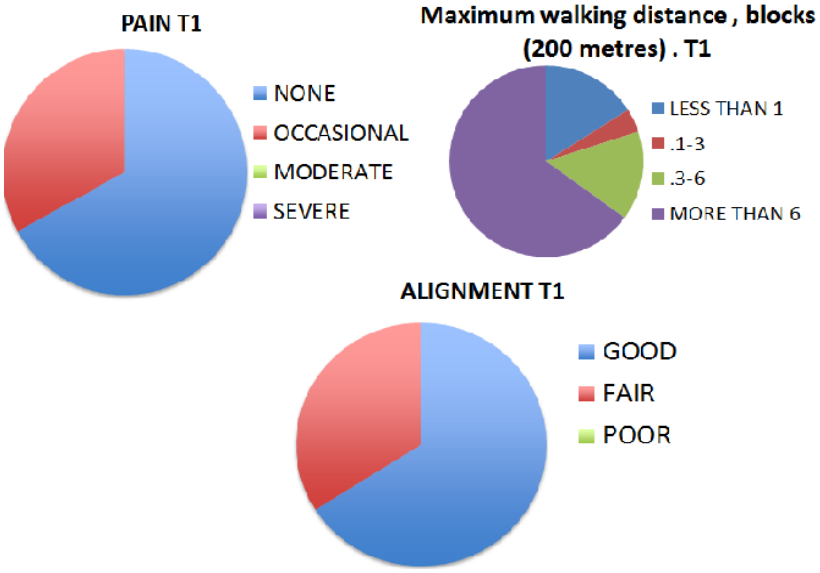

Fig. 6: Pain, walking distance and alignment for Group B at T1.

Global results for AOFAS score in the group B are shown in figure 7. Results for patients at T0 for this group have shown an average score of 41,76. After the treatment (T1) value of score was 89,6 (Fig. 7).

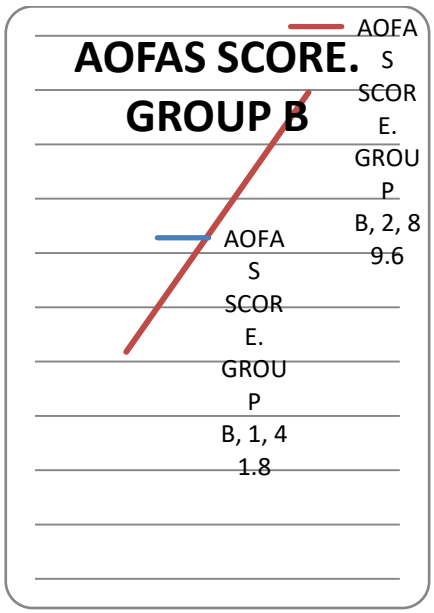

Fig. 7: Improvement of AOFAS score for Group B.

Regarding Tegner Activity Scale, in the group A, while 71% of Patients were sport-people (level 7/8), the other 29% of people had a sedentary lifestyle (level 1-2) before the trauma.

In group B, 52% of patients were sport-people (level 6-8); 32% of them were assessed in level 3-4; the remaining 16% of the patients were used to observe a sedentary lifestyle (level 1-2).

At the final stage, after the complete rehab-protocol, we observed that all patients who have reported ankle sprain, have returned to the same level of activity they held before the trauma.

In Group B (ankle fracture) 15/20 patients are back at the previous levels before the trauma, 4 are back at a lower level, from high levels to level 3; only one patient has gone down to a Level 1 from level 4.

Anyway, in both the groups evaluated, at follow-up of 12 months, no recurrences of the pathology happened.

V. Discussion

In the era of evidence-based medicine (EBM), for maximum results, guidelines arising from the analysis of the international literature are indispensable. These should be also mediated by the experience of the individual professionals involved and by periodical checking of quality of their work. A proper protocol of rehabilitation and re-education should vary in qualitative and subjective criteria; anyway these criteria should proceed with quantitative parameters (measurements, biomechanical testing, objective evaluation boards and validated at the international level) [2;12].

Several protocols have been developed for rehabilitation after both acute severe ankle sprains, and ankle fractures [8;18;19]. Their principal target is the management of pain, swelling, range of motion, strength training, and proprioceptive training. Every rehabilitation protocol has the target of a fast and safe return to the preinjury activity level [20]. Anyway standardized protocols for a complete re-education of the ankle after the different types of ankle trauma are missing. No guidelines exist.

The rehabilitation program should be divided into several stages, with goals set for each stage. Parameters for every stage must be reached before moving on to the next phase: rehabilitation must proceed with periodic comparisons between rehabilitation therapist, physiatrist and orthopaedic. It is important that these professionals have specific experience in the treated disease.

Few RCT and reviews report protocols divided in stages. While this type of programs is common for other district, such as knee [21], for ankle few precise flow-charts of phases for rehabilitation exist. Recently, Brison et al. have proposed a protocol in 4 phases with good results. In this study they also analysed the effectiveness of an early supervised physiotherapy reporting no significant differences respect the classical ways [22].

In our protocol 5 stages have been created with proper methods, treatments, and targets. Obviously, timing and duration of every stage cannot be rigid and fixed. It should vary according to the type of patient and compliance.

Then, the concept of functional recovery has grew-up in the last years. The most recent meta-analyses, such as the Cochrane works have shown how the complete rehab-programs whose target is the functional represent the best approach [3;13;14].

In our program we emphasize the stages of active and assisted-active exercise for functionality. The target of our protocol is not limited neither to the recovery of mobility alone nor of neuro-muscular activities Coordination between them are expressed in the 4th phase, which represents the phase of "functional recovery".

Also the evaluation tools of the study (AOFAS and TEGNER) are scores that maybe better than others are able to evaluate functionality. We get good results in this pattern for both the group, but with some small difference among them. As we can see, items such as pain, maximum walking distance and alignment have shown poorer results respect group A, we think because of the different involvement of anatomical structures for the two pathologies. In fact, for fractures, lots of studies report a greater number of mid-term and long-term complications than ankle sprain [6;10]. The ideal situation is definitely that one where you have available parameters acquired prior to the acute event occur; alternatively you can collect data before any surgery or before the beginning, during and at the end of rehabilitation, then in the follow - up controls at a later date after the resumption of activity

There are some limits into our study: for example we have been able to evaluate the protocol for two different type of severe injury, but they are not alone; we have evaluated only patients who have been submitted to a conservative treatment: future direction of the research is towards patients treated with surgery. Finally, we didn't evaluate professional sportive people.

VI. Conclusion

Rehabilitation and re-education play a key role in the treatment of ankle sprain and ankle fracture, especially for their consequence: the joint instability. The main objectives are control of pain and swelling, the recovery of ROM, muscle strengthening, the neuro - muscular control, the return to the same level of sport that was practiced before the trauma. These objectives must be achieved respecting the biological time of healing of anatomical structures that have been damaged. We propose in this study an original re-educational protocol for rehabilitation treatments in some of the most common ankle traumatic pathologies. It has been proven to be flexible and efficient. We think that no contraindications are connected with this kind of approach. The protocol can vary in timing and methods, depending on the type of sprain, possible instability or broken syndesmosis ankle – peroneal, type of treatment and type of patient (age, motivation, type and level of sport activity, environmental situation).

Conflict of Interests

The authors declare no potential conflicts of interest. No institutional or financial support was provided for this report.

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The Effect of Primary Care Physicians on Smoking Habits

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Abstract- Primary care physicians (PCPs) are the first line of healthcare for patients and their knowledge of smoking cessations services and guidelines can affect the prevalence of smoking dramatically. We aimed to analyse the routine of PCPs in regards to patient smoking habits and to evaluate their knowledge of smoking cessation clinics and services.We conducted a cross-sectional descriptive study at the King Abdulaziz Medical City in Riyadh, using a validated questionnaire developed by the National Cancer Institute, USA, and customized to our medical settings. 38% of family physicians, and 21% of internal medicine physicians, are aware of, and have referred patients to, any smoking cessation services. 47% of family physicians and 26% of internal medicine physicians asked almost all of their patients about smoking habits. It is fundamental for PCPs to build a strong rapport with their patients in order to inspire change in patient perceptions about quitting smoking while updating the physicians about services available for their patients to benefit from.

Keywords: family medicine, primary care physicians, smoking, smoking cessation, smoking habits, tobacco, saudi arabia.

GJMR-K Classification: NLMC Code: QZ 55

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The Effect of Primary Care Physicians on Smoking Habits

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Abstract- Primary care physicians (PCPs) are the first line of healthcare for patients and their knowledge of smoking cessations services and guidelines can affect the prevalence of smoking dramatically. We aimed to analyse the routine of PCPs in regards to patient smoking habits and to evaluate their knowledge of smoking cessation clinics and services. We conducted a cross-sectional descriptive study at the King Abdulaziz Medical City in Riyadh, using a validated questionnaire developed by the National Cancer Institute, USA, and customized to our medical settings.38% of family physicians, and 21% of internal medicine physicians, are aware of, and have referred patients to, any smoking cessation services. 47% of family physicians and 26% of internal medicine physicians asked almost all of their patients about smoking habits. It is fundamental for PCPs to build a strong rapport with their patients in order to inspire change in patient perceptions about quitting smoking while updating the physicians about services available for their patients to benefit from.

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I. Introduction

Smoking is one of the leading causes of preventable death and disease among humans. The use of tobacco is associated with lung cancer, which is one of the most fatal cancers worldwide (Alamoudi, 2010; Bartsch *et al*., 2016). In the United States, a total of 212,584 new cases of lunch cancer were diagnosed in 2013, 156,176 of which were fatal (World Health Organization, 2016). According to the latest Saudi National Cancer Registry in Saudi Arabia, the diagnosis of lung cancer reached 397 cases in 2010, accounting for 4% of all cancer cases diagnosed that year (Azuri and Nashef, 2016). Moreover, the elimination of tobacco smoking could prevent 20% of all cancer deaths worldwide (Cruz *et al*., 2011). Non-smoking behaviour is dependent on various factors, including physician advice and intervention. In a recent study done in Turkey, the majority of Primary Care Physicians (PCPs)(87.3%) routinely their patients about smoking habits, and 89.2% of PCPs advised patients to quit smoking (Sonmez et al. 2015). In Saudi Arabia, 2013 health data estimates that 12.1% of the population are smokers, and the average age to start smoking is 18.7 (Institute of Health Metrics and Evaluation, 2017). The Saudi Ministry of Health has been approaching the smoking issues by opening more than 70 smoking cessationclinics and providing adequate training for more than 170 physicians across the country to help smokers quit using the newest evidence-based medicine (Ministry of Health, 2017). Our study aims toanalyse the routine of PCPsin regards to patient smoking habits and to evaluate their knowledge of smoking cessation clinics and services.

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II. Methods

A cross-sectional descriptive study was conducted in King Abdulaziz Medical City (KAMC), Riyadh between January and February of 2017, using the validated lung cancer screening questionnaire developed by the National Cancer Institute (NCI) in collaboration with the Agency for Healthcare Research Quality, and the Centers for Disease Control and Prevention in the United States. The questionnaire was edited and customized by adding and eliminating questions to be compatible with our medical setting.

All 146 PCPs in the KAMC, including Family Medicine and Internal Medicine physicians, were included in the study without sampling. A pilot study on 10 physicians was performed to ensure full comprehension of the questionnaire, which resulted in some changes in vocabulary and format to avoid any confusion. King Abdullah International Medical Research Center (KAIMRC) also reviewed the survey tool. It contains questions related to physicians' attitudes and demographic characteristics.

Data management and statistical analysis were performed using the Statistical Package for Social Sciences (SPSS) software version 20.0. Frequencies and percentages were utilized to present categorical variables.

Permission from the KAIMRC in Riyadh was obtained. The questionnaire cover sheet for the surveyexplained that participation of physicians was voluntary, and therefore was considered as a consent form. All data collected were anonymous and were kept as secure storage media. All of the content was encrypted and only the researchers are able to login to view it.

III. Results

Out of 146 PCPs included in this study,we received 74 responses with a total response rate of 50.68%, including Family Medicine (response rate of 51%) and Internal Medicine (response rate of 48.7%).

On average, family physicians spent 81.73% of their time providing medical care, 8.18% on research, 9% on teaching, and 1.09% on 'other' (administration, higher education, etc). While internal medicine physicians spent 80.52% providing medical care, 12.1% on research, and 7.38% on teaching. The mean age groups of patients seen per specialty are shown in figure 1, and the average number of patients seen during a typical week by specialty is shown in figure 2.

Physician practices regarding asking patients about their smoking behaviours are demonstrated in figure 3. Only 38% of family physicians, and 21% of internal medicine physicians, are aware of, and have referred patients to, any smoking cessation services. Of these smoking services, Naqa, Ministry of Health clinics, and the Saudi Charitable Society to Combat Smoking were the most commonly reported. Only 33% of all PCPs are aware of, or have ever referred a patient to, any smoking cessation service.

Out of 55 family medicine physicians, only 47% asked almost all of their patients about smoking habits, and only 27.6% of these physicians are aware, or have referred a patient to, any smoking cessation program or service. On the other hand, out of the 19 internal medicine physician respondents, only 26% asked almost all patients about smoking behaviour, and 60% of them are aware, or have referred a patient to, any smoking cessation program or service.

Patient awareness of the relationship between smoking and lung cancer is reflected by a mean of 2.6 family medicine patients who asked if they could or should be screened for lung cancer. Furthermore, a mean of 3.4 internal medicine patients asked if they could or should be screened for lung cancer.

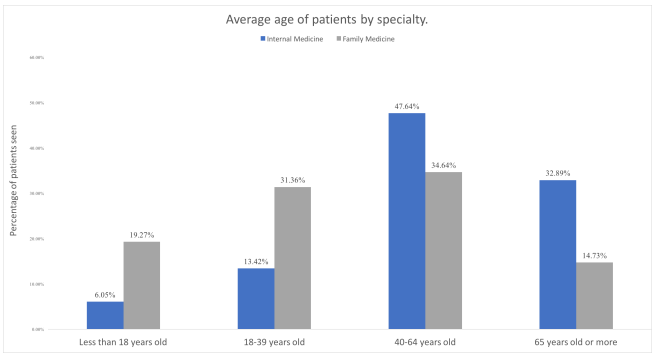

Figure 1: Summary of patient ages by specialty

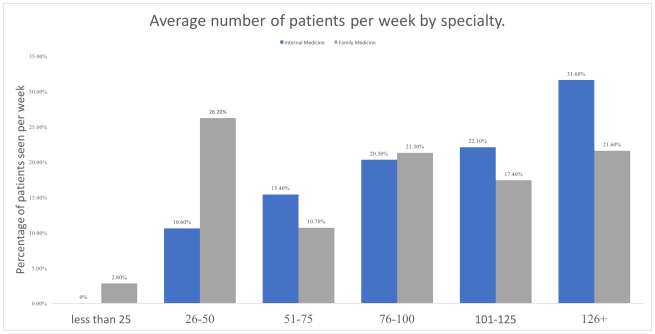

Figure 2: Average number of patients per week by specialty

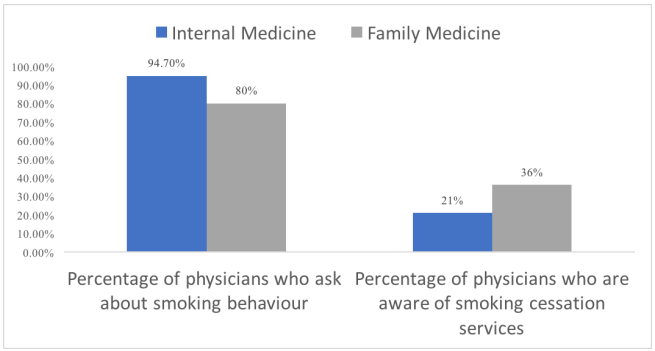

Figure 3: Comparison between specialty physicians asking about smoking habits and their awareness of smoking cessation services

IV. Discussion

Tobacco smoking is one of the most important public health issue worldwide, and primary care physicians play a very crucial role in this matter (AlAteeq *et al.*, 2016). The main means to consider to reduce tobacco smoking include collaboration and cooperation of policy, the public, and health professionals (Armstrong *et al.*, 2017; Bartsch *et al.,* 2016). Of all healthcare specialties, PCPs are considered the backbone of smoking intervention (Alamoudi, 2010). Smoking cessation and smoking habits can affect many clinical outcomes in patients, including overall survival rates, outcomes of surgery, and quality of life. Thus, providing tobacco cessation advice should be part of every PCP's routine clinical practice (Lina *et al.,* 2016).

The present study examined the influence of PCP attitudes and routines in clinical practice on smoking cessation measures. Based on our findings, only 35% of PCPs promote lung cancer screening by initiating a conversation with their patients concerning the advantages and risks of undertaking lung cancer screening. This oversight can be attributed to a lack of familiarity with the clinical practice guidelines for lung cancer detection. These findings are consistent with existing evidence that does not support screening for any asymptomatic patient, regardless of their exposure to smoking (National Cancer Institute, 2016b). Moreover, PCPs may refrain from asking their patients about

smoking behaviour because current guidelines and recommendations can be overwhelming for physicians (National Cancer Institute, 2016a).

The findings of the study indicate that only 38% of family physicians and 21% of internal medicine physician were aware of, and had referred patients to, any smoking cessation program. Previous studies have highlighted that proper training of physicians could help strengthen the appropriate skills, which could assist them in reconsidering their own personal beliefs, and offer solutions of how patients might quit smoking (Nobile, 2014). Research has shown that smoking cessation plays a central role in the prevention of cancer, improvement of cancer treatment, and cancer survival rates, thus making it imperative to be recommended in all clinical guidelines (National Cancer Institute, 2016a).

Despite the high number of family medicine physicians who ask their patients about their smoking status (94.7%), only 21% of them were aware of locations and organizations where they could refer patients to seek tobacco cessation services. Although patient's smoking status is a vital portion of their medical history, the results of this studyindicate that history taking is undertaken as routine, rather than as a starting point for addressing necessary care and support. The disconnect that exists between screening patients for smoking and referring them for tobacco cessation services offers crucial information on the need for strengthening the training of PCPs to appreciate the need for referring patients. There is a need to harmonize the screening of smoking and referring patients to smoking cessation services.

A recent modeling investigation has estimated that the integration of smoking cessation programs into detection might enhance cost-effectiveness by an average of 20-45% (National Cancer Institute, 2016a; Nobile *et al*., 2014). The majority of PCPs in this study did not place a lot of significance on referring patients to smoking cessation programs, and this evaluation is in opposition to recent evidence that there is need to considering that smoking causes long-term complications (Lina *et al.,* 206). The advantages connected with smoking cessation, such as reduced risk of developing diseases, higher survival rates, and improved quality of life can act as motivating factors (National Cancer Institute, 2016a).

Researchers have also indicated that smoking cessation improves cognition levels, performance, appetite, mood, and also reduces fatigue among smoking patients (Azuri and Nashef, 2016; Sommez *et al.*, 2015). Lack of referral for the appropriate smoking cessation services may provide false reassurance to patients instead of helping them to stop their unhealthy habits (National Cancer Institute, 2016b). Therefore, further strategies should be implemented to ensure long-term smoking cessation among smokers.

The findings of this study illustrate that physicians may lack the confidence or the ability to counsel patients to quit smoking as evidenced by their lack of sufficient engagement in smoking cessation services. This may be due to inadequate training in tobacco cessation. It is notable that among the Family Physicians only 38% referred a patient for smoking cessation services. These findings may also indicate the delivery of health care in health facilities in Riyadh may be more focused on providing curative care as compared to preventative care, which is practiced to the lesser extent (Bartsch et al., 2016; National Cancer Institute, 2016a).

One of limitations of this study is that the survey was based on physician routines and knowledge that were collected through self-reporting and were not verified using any other sources, such as medical claims or reports. Due to the cross-sectional nature of the research design, the establishment of causal links was difficult, and future longitudinal researc his required to provide evidence in regards to the hypothesis proposed by the findings.

To reduce the workload of the respondents, the survey questionnaire on smoking habits and smoking cessation services was comparatively short, and it was not capable of capturing extra details about particular features of the patients whom the PCPs had interacted with, such as the extent and type of smoking exposure. The researcher did not inquire as to what degree a physician might be initiatingthe discussion concerning smoking habits and smoking cessation services with their patients. Moreover, the study relied on the PCPs' routines towards smoking habits and knowledge regarding smoking cessation services that are subject to recall bias. According to Sonmez et al. (2015), passive smoking has been considered by clinicians and researchers to cause many challenges for human health, however in the current study the researchers did not explore whether PCPs made inquiries concerning passive smokingcontact.

V. Conclusions

It is fundamental for PCPs to build a strong rapport with their patients in order to inspire change in patient perceptions about quitting smoking. Smoking cessation support services should be provided ina nonjudgmental manner to avoid discouraging patients from seeking their services. It is important thatall clinicians participate in patient care in order to be adequately prepared to help smokers quit and adopt better lifestyles.

Further research is needed to highlight the importance of a PCP routine that focuses on advising patients to seek tobacco cessation services due to its impact on health outcomes. The members of the public may not have access to sufficient tobacco cessation

services, particularly PCPs in the KAMC primary care do not have adequate information on where to refer patients for the necessary services.

Education opportunities can be utilized to train PCPs about the need for advising all patients that smoke to seek tobacco cessation services. The initiative will be vital in addressing the gaps in PCP knowledge regarding smoking cessation services. Moreover, more research is required to reveal the factors that may be influencing PCP routines and advising patients to seek tobacco cessation services to promote patient involvement and enhance clinical outcomes that correspond with these recommendations.

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Clinical Demographic Characteristics of Arthroplasty Total Knee in a University Hospital

By José Miguel Francisco da Silva Souza, Ricardo dos Santos Ferreira, Alexandre José Pereira de Lima, Airton César Pereira de Sá Filho & Paulo Cezar Vidal Carneiro de Albuquerque

Universidade Federal De Pernambuco

Abstract- *Objective:* To assess socio-demographic characteristics of patients undergoing total knee arthroplasty (TKA) in a public university hospital, evaluating the outcome infection and associated factors.

Method: A retrospective study was carried out with 78 patients undergoing TKA, from 2013 to 2014. The socio-demographic and clinical characteristics of the patients were collected. Comparison between infected and non-infected patients was performed to find out which variables were possibly associated to this complication.

Result: Of 81 arthroplasties performed, patients were older (mean age 64 years), women (79%), with primary osteoarthritis as main etiology (87.6%) and most had comorbidities (82.7%). Infection occurred in 16% of patients, and this outcome associated with age older than 65 years (p=0.023) and the occurrence of deep vein thrombosis (p=0.027).

Keywords: *knee, arthroplasty, epidemiology, infection.*

GJMR-K Classification: *NLMC Code: WE 312*

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Conclusion: Patients undergoing TKA are mostly elderly women with primary osteoarthritis in the knee and comorbidities who developed infection in 16% of cases. More studies need to be conducted aimed at creating specific protocols in order to improve the quality of clinical practice. Level of Evidence III, Retrospective Comparative Study.

Keywords: knee, arthroplasty, epidemiology, infection.

I. Introdução

Since the nineteenth century, the treatment of serious knee joint diseases with joint replacement (arthroplasty) has been recognized and has received deserved attention. In 1860, Verneviul[1] suggested interposing of soft tissue for reconstructing the knee joint. In the twentieth century, total knee arthroplasty (TKA) has greatly evolved, due to the development of inorganic materials suitable for joint interposition and improvement of the surgical technique, driven mainly by the studies of Campbell[2] and McKeever.[3] TKA is used to treat refractory chronic pain mostly due to primary arthrosis.[4,5] TKA is a major surgery and subject to post-operative complications and infection is one of the worst and most feared complication, representing an actual challenge to the orthopedic surgeon, since it is difficult and lengthy to treat.[6] The infections after knee arthroplasty represent an estimated economic impact of US$ 50,000 per patient in the US.[7]

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To succeed the treatment of infection post total knee arthroplasty, early and accurate diagnosis should be immediate. Therefore, it is essential that all patients complaining of pain at the site of a total knee arthroplasty are evaluated for the possible presence of infection.[8] The surgical site infection can be classified as superficial or deep; those involving only skin and subcutaneous tissue are considered superficial and those involving deep tissue incision, such as fascia and muscle are considered deep infections.[9]

In the acute form of infection, constant local pain, heat, swelling, redness and joint effusion are evident and almost always caused by Staphylococcus aureus and gram negative bacilli (Escherichia coli, Proteus sp, Pseudomonas aeruginosa).[10] Some laboratory tests should be requested, such as erythrocyte sedimentation rate and the level of C-reactive protein (CRP) when infection is a suspicion.[11] Carvalho Junior et al.[12] demonstrated the correlation of CRP and erythrocyte sedimentation rate levels, showing that these go back to normal levels 30-80 days after surgery. The correlation of physical examination, laboratory tests and imaging tests are essential for the diagnosis of prosthesis infection.[11,12]

The prevalence of primary TKA infection is between 0.4% and 2% in the US.[13,14] Malinzak et al.[15] reported a 0.51% infection rate in 8,494 hip and knee arthroplasties, moreover, they found as risk factors for infection: obesity, early age and diabetes *mellitus*. In Spain, the prevalence of TKA infection is 3-4%.[16] In Brazil, some authors have shown that the prevalence of superficial infection of TKA is 1.2%.[4]

The study is justified by the need to establish a diagnostic protocol and early treatment to reduce complications to the patient and costs to public health systems.

The aim of this study was to establish the socio-demographic profile of patients undergoing TKA performed in a public hospital, evaluating the outcome infection and associated factors.

II. Materials and Methods

This study was approved by the Research Ethics Committee of Hospital Público Universitário under the protocol number 1007986/CAAE 42681815.4.0000. 5208. All authors signed the Free and Informed Consent Form.

A retrospective cross-sectional study included 78 adult patients undergoing knee arthroplasty operated by orthopedic surgeons of a public university hospital from January 2013 to December 2014.

The diagnosis of TKA infection occurred during hospitalization and outpatient consultation during the follow-up period between six and 30 months.

Exclusion criteria were incomplete medical records, patients unidentified in the hospital database and infections acquired in other hospitals. Data from medical record was collected and stored in a Microsoft Office Excel 2007 spreadsheet. The variables age, gender, etiology, comorbidities, use of prophylactic antibiotics, complications, primary surgery and revision were collected for each patient. The qualitative variables were described as frequencies and percentages. To evaluate the association between two dichotomous qualitative variables the Fisher's exact test was employed with the statistical software Epi Info. P-Values <0.05 were considered statistically significant.

III. Results

Eighty one total arthroplasties were performed, 78 unilateral primary TKA, three bilateral primary in two stages and a review. As to gender, 17 patients (20.9%) were male and 64 (79.1%), female. Regarding etiology, only osteoarthritis affected 71 (87.65%) patients. The age range was between 29-84 years old (mean 64 years). (Figure 1)

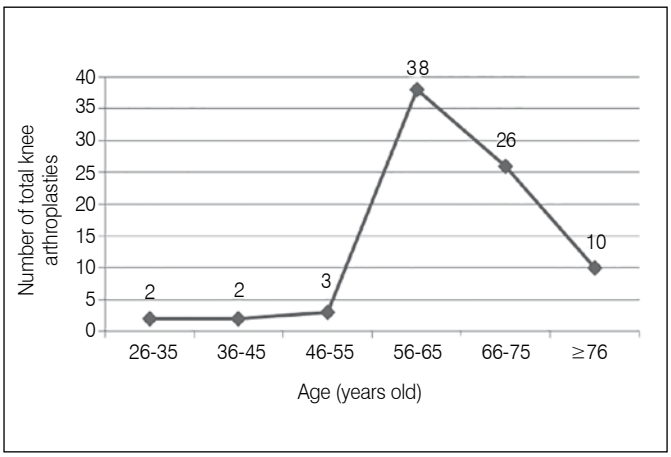

Figure 1: Number of total knee arthroplasties performed by age groups

As complications, we diagnosed 13 (16.04%) infections, eight (9.88%) involving deep tissue and five (6.17%) involving superficial tissues. Among the 81 arthroplasties, five (6.17%) were preceded by deep vein thrombosis (DVT), all cases confirmed by Doppler ultrasound, one case (1.23%) had compartment syndrome and one patient (1.23%) died.

Considering the 13 patients who developed TKA infection, nine (69.23%) were female, 10 (76.92%) were over 65 years of age ($p = 0.023$). Regarding the comorbidities of infected individuals, 12 (92.31%) presented some associated clinical disease. Among these diseases, 10 (76.92%) patients had hypertension and two (15.38%) had DM. Even among those who presented infections, one patient had rheumatoid arthritis (RA) and had gout (15.38%). However, among all surgeries, five (6.17%) had rheumatoid arthritis. Prophylactic antibiotic was administered 30 min before the surgical incision in 12 (92.31%) patients. The recommendation of the Hospital Infection Control Committee was to start antibiotic prophylaxis 30 min before the surgical incision and maintain it for 24h postoperatively. However, some surgeons have chosen to increase it to 48h postoperatively. There was no difference between those treated for 24h and 48h. The antibiotic used in the prophylaxis was 2g cefazolin before the incision and 1g each 8h postoperatively. If cefazolin was not available, 2g cephalothin was administered before incision and 1g every 6h postoperatively. Deep vein thrombosis, considered the second most common complication, preceded three (23.08%) of TKA infections ($p=0.027$). (Table 1)

Table 1: Analysis results showing the association of the main variable infected total knee arthroplasty with other variables analyzed, and *p*-values.

Variables	Infected total knee arthroplasty n (%)	*p* value
Gender		
Female	9 (69.23)	0.23
Male	4 (30.77)	-
Age (years old)		
> 65	10 (76.92)	0.023
65	3 (23.08)	-
Comorbidities		
Systemic hypertension	10 (76.92)	0.6
Diabetes *mellitus*	2 (15.38)	0.5
Rheumatic disease	2 (15.38)	0.31
Prophylactic antibiotic therapy		
Yes	12 (92.31)	0.62
No	1 (7.69)	-
Infection		
Deep	8 (61.54)	-
Superficial	5 (38.46)	-
Deep vein thrombosis	3 (23.08)	0.027
Compartment Syndrome	1 (7.69)	-
Death	1 (7.69)	-

IV. Discussion

The mean age of patients undergoing TKA reported by other researchers varied between 65 and 71 years old[4,17] somehow above the mean age in the present study of 64 years old. The preferential involvement of the elderly is related to cumulative exposure to various risk factors and biological changes that occur with aging, such as thinning of the cartilage, decreased muscle strength and oxidative stress.[18] This study showed that women preferably developed osteoarthritis, which is consistent with the international literature.[18] This fact is probably related to menopause, which interferes with the female hormone levels. Regarding etiology, Piano et al.[5] performed a Brazilian study that showed that the diagnostic profile of patients reached 92.4% only for osteoarthritis, as another study[4] revealed a smaller percentage of 84.9% of primary knee osteoarthritis, which is similar to another study with 87.65%.

The level of TKA infection of this stu/dy (16.04%) was higher than others found in the literature.13-16,19, Moreover, the level of superficial infections was up to five times higher, and deep infections exceeded level found in the national4,19 and international literature.[17]

Considering this worrisome scenario, it was decided to temporarily suspend TKA procedures and a protocol was elaborated by surgeons and the Hospital Infection Control Committee, which addressed various requirements that were not a routine procedure previously before considering TKA surgeries. Among these requirements are urine culture tests; if the result showed abnormal, the patient was treated with antibiotics and the test repeated. The surgical environment must be under laminar air flow; all surgical clothing should be waterproof and disposable; patients should be medicated with mupirocin nasal solution three days before surgery, in order to obtain nasal decolonization. Furthermore, antibiotic therapy must start 40 min prior to surgical incision with 2g cefazolin for patients weighting up to 120 Kg and 3g for heavier patients. The dose is repeated every 2h during the surgery and maintained every 8h for 24h postoperatively.

Brazilian researchers[11] showed that females were preferentially affected among patients with TKA infection, with a prevalence of 65.51%, a result similar to the present study (69.23%). Furthermore, we found a significant associations of TKA infection with the age over 65 years (p = 0.023), unlike the results of Pinto et al.,[19] which found no statistically significant association. Five patients (6.17%) submitted to TKA developed deep vein thrombosis and three of them had infection (p = 0.027), a much higher rate than that observed by Lenza et al.4 and Xu et al.[17] Only one patient of this study had died, almost half the prevalence found by Pinto et al.;[19] however, higher than Lenza et al.,[4] who had no deaths among patients undergoing TKA. Prophylactic antibiotics did not statistically correlate to infection prevention (p = 0.62), however, literature data is consistent regarding the indication of chemoprophylaxis to prevent TKA infection.[4,5,12] Systemic hypertension was the most prevalent comorbidity among infected patients, a result similar to other studies.[4,5] Patients with diabetes *mellitus* had no statistically significant association with TKA infection (p = 0.60). It is important to note that Malinzak et al.[15] concluded that diabetic patients are 3.1 times more likely to have TKA infection. Just as diabetes

mellitus, rheumatic diseases had a similar prevalence (15.38%) among patients with TKA infection, but there was no statistically significant association. Only one patient had rheumatoid arthritis among those infected, however, considering all 81 arthroplasties, 6.17% had rheumatoid arthritis, five times more prevalent than in the study by Lenza et al.,[4] and almost three times more prevalent than in the study by Pinto et al.[19]

V. Conclusion

Patients undergoing TKA are mostly elderly women, with primary knee osteoarthritis and comorbidities that evolve to infection in 16% of cases. TKA infection had as statistically significant risk factors age over 65 years and deep vein thrombosis. These results should serve to improve prevention of deep vein thrombosis. More studies are needed aiming to create specific protocols in order to improve the quality of clinical practice with consequent reduction of postoperative complications.

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The Threshold Problem in Implanted Patients

By S. M. Petrov

Abstract- The aim of this work is the consideration of the method of pure tone audiometry (PTA) in the implanted patients. What is the value of the results of PTA? How to perform PTA of the implanted patients? Is there sense to perform PTA? We describe the methods for determining and setting the electrical threshold levels (T-levels) in the program of the speech processor of cochlear implant (CI).

Keywords: *pure tone audiometry, cochlear implantation, T-levels, C-levels.*

GJMR-K Classification: *NLMC Code: WE 172*

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I. Introduction

The programming of the cochlear implant (CI) is essential for good performance [Vaerenberg B. et al, 2014]. Regardless of the type of the implant there are two main parameters of fitting: 1.-maximum comfortable levels (MCLs), i.e. the maximum amplitudes of the electrical stimuli (C-level) at which patient hears sounds near the threshold of discomfort and 2.- the electrical threshold levels (T-levels) at which patient hears sounds near the threshold of hearing (the quietest, hardly audible sound).

Accurate determination of T-levels of perception of the electrical stimuli in every channel of cochlear implant and recording these levels in the program of the processor is an important part of the fitting procedure of CI. For investigation of threshold perception pure tone audiometry (PTA) is used in some studies [Ramos-Macías Á. et al. 2014; Wang L. et al.2014; Ghiselli S. et al. 2016]. Our study is the consideration of the method of PTA in the implanted patients.

To facilitate understanding of this presentation, we assume that the trigger level of sound for the speech processor is 40 dB SPL. This value is close to real one. Trigger level is SPL when the processor produces an electrical stimulus with an amplitude equal to the value recorded in the program of the processor as the threshold current level. The patient hears (or doesn't hear) some sound. If the setting of electrical level THR is correct one patient perceives barely audible sounding - threshold sounding - at input sound 40 dB SPL.

Further we'll say a few words about the right performing of the PTA in CI patients and will look at how you can use results of this investigation in fitting of the implant.

Determination of threshold of audibility of a sound in the implanted children is far more complex procedure than in the hard-of-hearing patients.

Let's look at the method of estimated reaction. As a rule, hard-of-hearing children hear by the two(!) ears, have the auditory experience(!), know how to determine the sound source position in space(!). Unlike the hard-of-hearing patients the implanted patients perceive sounds through a single, omnidirectional microphone that nearly eliminates localization of the sound source. Therefore, the determination of threshold levels of perception by the estimated reaction is difficult (impossible?). Think about how little child, implanted, for example, on the right ear will be able to distinguish that the sound had become quieter because it is on the left side (owing to the shadow of the head), and not because of decreasing level of sound source on the right side.

In any case if you are going to perform PTA you first need to know in what channels of the implant (12) octave tone signals are processed. Depending on the frequency range of the implant these octave frequencies can be in 6-8 channels.

So let the tone threshold audiogram with the thresholds of 40 dB SPL is obtained. Looking at it, some people can say that the CI patient has a first degree of hearing loss. But this is a mistaken (false?) conclusion.

How can we talk about the first degree of hearing loss if CI-patients can distinguish only 12 painted(!) frequency bands in accordance with the location of the electrodes along the length of the basilar membrane. Patients with first degree of hearing loss can discriminate tens of tonal signals. Perception of suprathreshold SPL of hard of hearing and implanted patients has differences too. Obviously that to say about the first degree of hearing loss of CI patients in terms of audiology is absolutely wrong.

Further. This "first degree audiogram" can be obtained (even with great success) if THR levels are wrong. For example, when the levels of THR are 20% of most comfortable level (MCL). Such incorrect settings of the threshold current levels facilitates detecting of the sound of trigger level 40 dB SPL for the inexperienced patient. So the audiogram with "first degree of hearing loss" can be easily obtained. But this wrong setting decreases differentiation of current levels and negatively affects the intelligibility of speech [Petrov SM. 2002].

Therefore, it is necessary to understand that having audiogram after PTA at levels of "the first degree of hearing loss", you cannot say that the recorded threshold current levels in the processor program are wonderful ones. Moreover, if at the first examination you found that the threshold levels of sound perception in a young child are at the levels of 40 dB SPL, it obviously means that recorded T-levels of the electrical stimuli in

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the tested program is too high. Positive child's response to sound intensity of 40 dB SPL can be misinterpreted by parents as a result of the wondrous setting of T-levels with "the first degree of hearing loss". Not too competent audiologist will be able to dispel this misunderstanding. And even on the contrary, will strengthen the parents in it because the first degree of hearing loss is not very scary defect of hearing.

There is no rational reason to tell parents that after surgery their children will have the first degree of hearing loss and put it as a dignity and the achievement of the cochlear implantation. This statement, at least, means to introduce parents in the confusion.

As an argument in favor of correct setting of the threshold levels some of the "experts" claim the perception (and understanding!) whisper speech by CI-patient at a distance of 6 m. This is absolutely wrong statement. The real intensity of whisper is 20-25 dB SPL. And this intensity level is below a trigger threshold level of processor (40 dB SPL), i.e. the processor just can't "hear" whisper and, of course, that processor will not produce electrical stimuli at this SPL. N.B. High T-levels will not help to hear the real whisper.

In some systems of CIs there is the software's ability "WHISPER" which reduces the trigger level of the processor to 20 dB SPL ("Cochlear"). But in any case if the CI-patient repeats "whispered" words at a distance of 6 m it is either a loud whisper or soft speech. Therefore, the perception (not intelligibility!) of real whisper speech by CI-patient cannot be at a distance of 6 m.

If you are going to perform PTA in CI patient then this procedure should be done so. First, you need to know in which channels of the implant (12) octave tonal signals (6-8) are. Methods of PTA are well-known ones.

Let's you performed PTA and received the "audiogram".

What have you to do? You have to increase electrical T-levels in appropriate channels if patient has sound thresholds more than 40 dB SPL. You have to decrease electrical T-levels if patient has sound thresholds at level 40 dB SPL. After this correction of current T-levels in map you have to repeat PTA with subsequent regulation of the electrical T-levels. You have to perform PTA till you will achieve electric T-levels to the sound trigger level of 40 dB SPL. I.e. patient hardly hears 40 dB SPL and if you will decrease electrical T-level by 1 step down patient will not hear any sound. These electrical levels you can write as T-levels in program of processor. Naturally, the question is arised. Do you need to perform this bulky PTA examination? There is no need. It is absurd, because if CI-patient can give reliable results in this durable PTA "survey", there is no sense to waste time. Indeed, such intelligent CI-patient can simply estimate the threshold levels of electrical stimuli from the program "Maestro" and quickly to determine current T-levels in each of the 12(!) channels. And these levels are recorded in the map as T-levels. No problems.

If patient cannot participate in measuring of electrical threshold levels, then we should behave like that. We determine threshold discomfort SPLs using the program SHCHUP (audiometer, calibrated on B&K 4153 artificial ear) [Petrov SM. et al. 2009]. Further we correct electric MCLs till the sound discomfort levels will be 106 dB SPLs. The T-levels are set at 10% of this electric MCLs. T-levels can be less, because it was shown that even zero THR levels has almost no effect on intelligibility [Spahr AJ. et al. 2005; Boyd PJ. 2006].

This is understandable from the curve of implant's MAP-Law (output compression function). Curve MAP-Law shows the dependence of the current values on the SPL of the sound input. In the same studies [7,8] there are data that the overestimation of the T-levels degrades speech intelligibility, which also is clearly understanded from MAP-Law. So that the dynamic range of current (MCL-THR) 15% is not enough, and 20% (it is recommended by some "experts"), just harms to CI patient. Result of elevated T-levels is a narrowing of the optimal dynamic range of current. Result of this narrowing is compression of the dynamic range of the speech sound and consequently the deterioration of its perception [Petrov SM. 2002]. But for CI patient every microbit is necessary (expensive) one. Someone will be able to fully understand speech when high (wrong) T-levels are used (spectral redundancy of speech is great [Petrov SM. 2003], but for understanding of speech he will need to make greater "listening efforts". To live will be more difficult. Why to do so? And what about principle of medicine "Do no harm"?

Questions about electroaudiometry in candidates for a cochlear implantation were reviewed by us earlier [Petrov SM. 2003]. You can understand that electroaudiometry is the same not too useful procedure for CI as PTA. You had seen reaction of patient. But can small child say: "Now I don't hear sound. I feel electrical current"? Never. N.B. Sometimes I felt current and didn't hear sound during the electroaudiometry selftesting.

In more details some of the issues of threshold problem in CI-patients are concerned in our "Instruction" [Petrov SM. et al. 2015].

II. Conclusions

1. Pure tone audiometry in CI patients is time consuming and absurd procedure.
2. The threshold levels of current are set at levels of 10% (or less) of the electric MCLs defined by the program SHCHUP (audiometer calibrated on B&K 4153 artificial ear.

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The New Surgical Technique to the Positioning of Hip Prosthetic Implants: The Medial-Inguinal Approach

By Dr. Luca Lucente, Dr. Andrea Palmesi, Dr. Damiano Longo & Prof. Mauro Papalia

Casa di Cura Nuova Itor

Abstract- *Introduction:* True to the concept of Tissue Sparing Surgery, we invented this new surgical technique to reach the coxo-femoral joint by starting at the inguinal-medial region.

Metthods: We performed total hip arthroplasty on 50 patients suffering from hip arthritis, and hemiarthroplasty with bipolar prostheses implants on 15 cases on medial fractures of femoral neck.

Results: In our case study, operation time and blood loss were lower, there were no complications, and recovery time was incredibly fast.

Discussion: We have invented a surgical process that allows for a safe, easy and fast replacement of the hip, and that spares the hip stabilizer muscles completely. Throughout the operation, the surgeon can view the acetabulum from the front, a view that is preferable to the one available with known techniques. There is no need for special equipment or special operating tables, and surgeons don't face a steep learning curve when first introduced to the procedure. Since risks of dislocation are non-existent, the patient is allowed to lie in bed in any position.

Keywords: *the medial-inguinal approach.the new surgical approach to the hip, innovation in hip surgery.*

GJMR-K Classification: *NLMC Code: WE 172*

Strictly as per the compliance and regulations of:

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Conclusion: The authors think that, thanks to its low costs and ease of performance and replication, this technique offers nothing but advantages for the patient. Easier rehabilitation is another positive aspect. The procedure can be considered a valid alternative to other common surgical approaches.

Keywords: the medial-inguinal approach.the new surgical approach to the hip, innovation in hip surgery.

I. Introduction

Reaching the hip joints via the medial region is not a novelty. In 1908, Ludloff had hypothesized the procedure as a way to reduce congenital hip dislocation. In an article published in 1913, Ludloff described the access through the medial region as a simple, fast, and safe way to carry out the tenotomy of the ileopsoas muscle that blocked the bloodless reduction of the femur head in the acetabulum.(1-2) In later years, several authors took an interest to the procedure, and they each contributed certain modifications: Chiari in 1957, Saltzer et al. in 1967, Dorr in 1968, Man et al. in 1971, Ferguson in 1973(11) and Weinstein et al. in 1979. All the above authors used this technique only in newborn patients for the sole purpose of performing ileopsoastenotomy. (6).

Since this technique is used in newborns, it must be a simple, fast, and non-invasive surgical procedure, with low risks of operating and post-operating complications. Hence, we devised the idea to go through the medial-inguinal area to implant a hip prosthetic. Starting from 2002, a technique via the medial region, similar to the one proposed by the authors and invented by Prof. Wolfram Thomas in collaboration with Dr. Lucente, was used to implant a hip prostheses. In the former procedure, however, the preparation of the femoral canal was complicated and impractical. In cadaver labs, we perfected the procedure of implanting a hip prostheses by working around the difficult preparation of the femoral canal. Thanks to this revised technique, the hip joint can be reached without cutting through any muscle, the amount of time necessary for the surgery is greatly reduced, and – most importantly – a clear view of the acetabulum is maintained. In comparison with other known hip surgical procedures, the entire circumference of the acetabulum is visible straight on. The complete view of the acetabulum and of the femoral canal allows us to position prosthetic components without error. Through this medial-inguinal access, we can perform hip resurfacing operation, implant a prosthetsesfor femoral neck conservation (metaphyseal fixation), or implant a standard prostheses with a diaphysiary-fixing stem. Our surgical technique does not require a specific instrument: traction bed, angled handles. Standard instruments are used to implant all three kinds of prostheses, and no special operating table is required. It is a true Tissue Sparing Surgery (TSS), since no muscles are severed. The only exception is the adductor longus tendon, which is sutured at the end of the surgery, permitting a fast and easy post-op recovery for the patient. Because the access to the hip joint is direct and no muscles are severed, there is reduced blood loss. Prostheses dislocation risks are null, and this allows an easier surgical process for the patient, because there is no need for lower limb divarication devices, toilets seat risers, or other special adaptations. Our goal was to offer surgical orthopedists a valid surgical alternative for implanting hip prostheses.

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II. Materials and Methods

We implanted 50 full hip prostheses on patients suffering from hip arthritis and 15 biarticular prosthetics on medial fractures of the femoral neck. The majority of the patients were female (12 full prostheses on female patients, 8 on male patients; 10 biarticularprotheses on female patients, 5 on male patients). The average age of patients undergoing surgery for a full hip replacement was 68, withan Harris average equal to 65. while the average age for patients undergoing surgery for biarticular prosthetic implants was 80. Female patients underwent vaginal disinfection 3 days before surgery, the morning of surgery, and three days after surgery, with chlorhexidine or 10% betadine based products. One hour before operating time, all the patients underwent antibiotic prophylaxis and, unless otherwise noted, an intravenous inoculation of 1 gr. of tranexamic acid. Before sterilizing the operating field, all patients were scrubbed around the area of incision with a chlorhexidine or betadine based solution. We never resorted to draining, because blood loss was so low.

Post operation, we never utilized either devices to maintain the lower limbs spread, or toilet seat risers. Since the risk of dislocation is close to zero, patients were able to lie down in their preferred position right away, as long as the chosen position wasn't too extreme. With the exception of comorbidity cases, which mostly afflicted more elderly patients with femoral neck fractures, all other patients were able to walk a few hours after surgery. All patients went through a brief rehabilitation program. They were evaluated using the Harris Hip Score.

a) Surgical Technique

The patient is laid on their back on a standard operating table for lower limb abduction and hyperextension of the limb on which to operate. The waist is shifted so that the side requiring the operation lies next to the external edge. Articulated supports are then placed on the operating table to ensure the waist is perfectly aligned and cannot move at all. The lower limbs are abducted (Fig.1a), so that the operational surgeon can sit between them.The first assistant is positioned at the same side that required the surgery. Thesecond assistant flanks the side that does not require surgery. After having adequately prepped the operative field, the limb requiring the operation is flexed and abducted in “frog leg” position. The cutaneous incision circa 8 cm. long is curved and centered on the cutaneous projection of the adductor longus tendon, about 5 cm. from the inguinal fold (Fig.1b). The subcutaneous tissue is cut in order to reach the adductor longus tendon. The tendon is prepared according to its length. If it is clearly visible, suture strings are attached to it before severing it, so as to make suturing easier after the operation. In case the tendon is short, it is preferable to implant a metal or a riassorbible anchor where it intersects the ileopubic ramus so it can be fixed at the end of the operation. Retracting the pectineus muscle with a curved Hohmann retractor allows for access to the hip articular capsule. The pectineus muscle constitutes the bottom part of the triangle of Scarpa and retracting it affords protection of the femoral vascular nerve fascia. Before proceeding with the capsulotomy, the medial circumflex branch of the femoral artery is isolated, ligated, and sectioned. Prior to optional luxation of the femoral head, we proceed to the capsulotomy and the successive osteotomy of the femoral neck. Once it is exposed with Hohmann retractors, the surgeon can have a complete frontal view of the acetabulum's circumference (Fig.2a). We continue with the preparation of the acetabulum with standard acetabular frese and we position the acetabulum and the test insert (Fig.2b). In order to prepare the femoral canal, we hyperextend the femur by lowering the operating table's lower limb support base about 20 degrees. Then, with the aid of a hook inserted into the femoral canal and with a distalizing maneuver, we shift the greater trochanter from the acetabular border. At this point, the lower limb is moved from the operating table support base to a sterile sack previously prepared with canvases during the set-up of the operating field. By now, the femoral canal is widely exposed and the positioning of the test femoral stem and head can be prepped with ease (Fig.3a,b). We reduce the prostheses and its test components; we raise the operating table's lower limb support base to the same height of the counter-lateral support base; we place both legs in neutral position to monitor metrics and perform all the movements needed to measure the functionality and stability of the prosthetic implant (Fig.4a). Once these trials are completed, we remove the test parts and implant the actual prosthetic by following the same steps as above. If the capsule has been preserved, we proceed to perform capsulorrhaphy; if not, we proceed directly to the tenorrhaphy of the adductor longus and then, to the suturing first the subcutaneous, then the cutaneous, plane. All that is required is a light compressive dressing. Before being brought back to recovery, the patient undergoes a standing X-ray exam of the operated hip.

III. Results

We obtained operational times of 60 minutes, with a minimum of 45 minutes and a maximum of 90 minutes. Obviously times became lower the further we went along the learning curve. Blood loss is extremely low, 200 cc. average, and such that there is no need for a transfusion. We encountered no prostheses dislocations, aseptic or septic mobilization of the prosthetic implant, or vascular and/or nervous damage.

Moreover, we observed no ossification and thromboembolic events. Only in one case did a patient develop a lymphangitis of the operated limb, but it was treated pharmacologically. There was only one case of delayed healing of the surgical wound due to a superficial infection treated with surgical toilette and prescribed antibiotics. This complication occurred in an elderly female patient who underwent a procedure for a fractured femoral neck. For several days she wore her diaper and due to Alzheimer's disease she had poor compliance. All patients, except those with a comorbidity that delayed a speedy recovery, were able to walk a few hours after surgery. Two days after the operation, they were able to move autonomously with or without Canadian crutches, depending on their level of compliance. Thirty days after the operation, the most collaborative and motivated patients gave us a Harris Hip Score of an average of 93.

IV. Discussion

By combining the concept of Tissue Sparing Surgery with the need for an easy, safe, and fast procedure, we began studying a new surgical approach that provides the most direct way possible to the hip joint. We began by referencing Ludloff's studies from the early 1900s. He proposed a surgical procedure that would reach the hip through the inguinal-medial area. His technique, which has undergone changes over the years, is still the most widely used today to reduce the femoral head in the acetabular cavity in newborn patients who suffer from congenital hip dislocation. This technique has been proven to be conservative, risk-free, easily carried out and feasible in short operating times.(4-6-11) In the early 2000s, after taking such characteristics into account, together with Prof. Wolfram we started looking for a new surgical path to implant hip prostheses.(3-5-8). We abstained from this technique, however, because the preparation of the femoral canal and the subsequent implant of a femoral stem were particularly difficult. Following numerous anatomical studies in cadaver labs, we made the necessary changes to the procedure in order to make it appropriate for implanting hip prostheses. It is truly a Tissue Sparing Surgery, because no muscle or tendon is sacrificed except the adductor longus tendon, which is sutured at the end of the operation. The adductor's action is not nullified thanks to the fact the adductor longus and brevis are not cut. It is an extremely safe technique because the medial circumflex femoral artery is the only anatomical structure that we need to watch out for and this is done first, by ligating it and then sectioning it. For our purposes, this is irrelevant, since the artery supplies blood exclusively to the femoral head. Having sectioned the adductor longus tendon and prepped it for a post-op suture, reaching the hip joint is fast. We divaricate the pectineus muscle and then arrive at the articular capsule in less time than other known surgeries. Even the closing of the operational site is much quicker, because – once we sutured the adductor longus tendon – we only had the subcutaneous and cutaneous levels to suture.

The surgeon has a better view of the acetabulum because he or she can look at its entire circumference straight on. This allows for an easy preparation of the acetabulum and avoids poor positioning of the prostheses. The same goes for the femur. In fact, we never needed X-rays during operations.

This is a versatile procedure that, thanks to the excellent surgical view, allows surgeons to implant all commercially available prostheses: resurfacing, femoral neck conservation, and diaphysiary-fixing stem. The procedure's only contraindication is ankylosis, and we advise against resorting to it with patients who have a BMI value ≥ 32.

Managing patients in the ward is simple. Immediately after surgery, patients can lie in their preferred position, as long as it isn't extreme. They will not need lower limb spreading devices, nor will they need toilet seat risers, and genital hygiene is particularly easy.

Compared with other known surgical techniques that cut through hip stabilizing muscles, patients sense a much better stability right away. For this reason, they use Canadian crutches for much less time, and their rehab is easy and short. Another praise-worthy aspect is the low cost of this new surgical procedure for implanting prostheses. It does not require specific operating tables or tools, and is much less demanding, technically speaking, than the anterior access. All that is required is a standard operating table and a base kit of tools for prosthetic surgery. With this technique, surgeons can implant all types of hip prosthetics commercially available, contributing to considerable savings for the prosthetics industry. From a surgical point of view, it is an easy technique that is easily replicated with a short learning curve. The last advantage is aesthetic, particularly appreciated by young, female patients, because the scar is about 8 cm. and is practically invisible, since it is hidden in between inguinal skin folds. (Fig.4b).

V. Conclusion

The authors believe that the inguinal-medial approach is a perfect example of Tissue Sparing Surgery. Because of its lack of complications inside and outside the operating room and because of the reduced hospital and recovery time for patients, the procedure lowers the social costs of hip replacement surgery. Always in the concept of tissue sparing surgery, patients operated with this technique, not having suffered damage to the muscles which stabilize the hip, will be

able to deal with a possible revision surgery with considerably higher results than those who are subjected to a first prosthetic implant through a lateral or postero-lateral access. While not being a replacement for other existing techniques, this procedure is an extremely advantageous alternateve for surgeons and especially for younger patients.

Fig.1a

Fig.1b

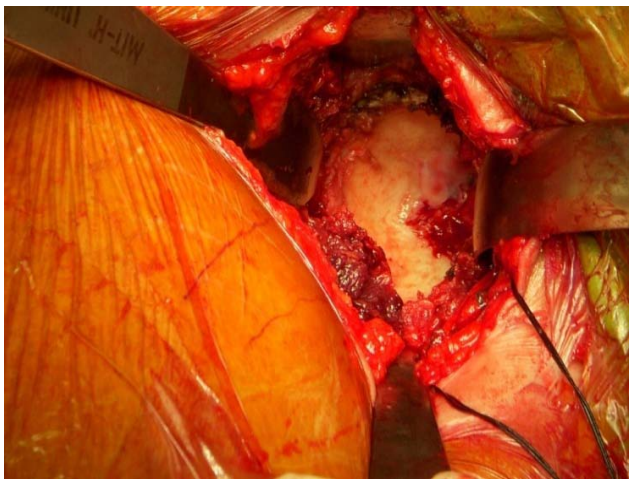

Fig. 2a

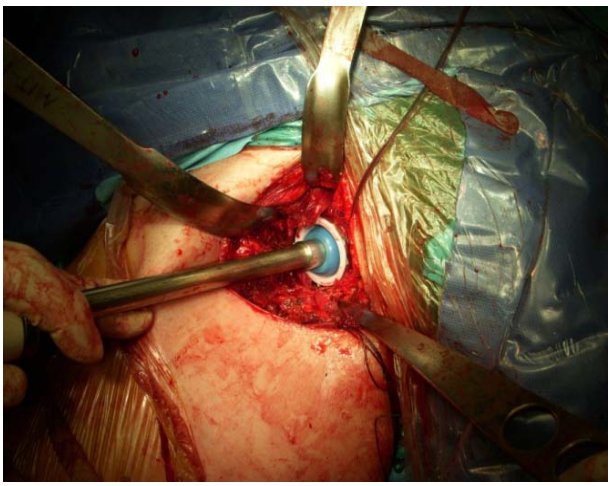

Fig. 2b

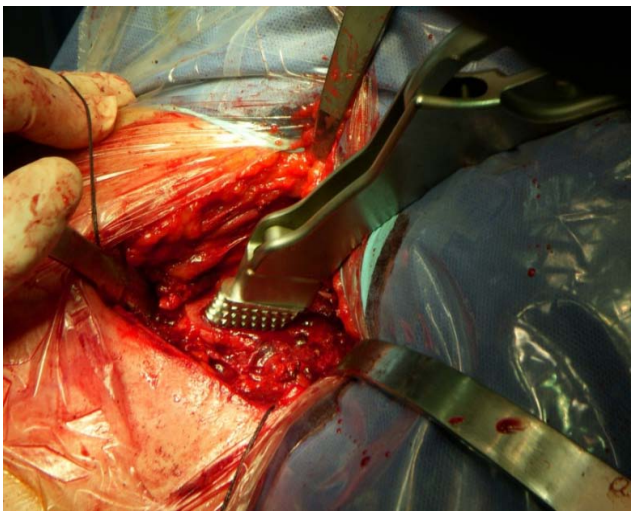

Fig. 3a

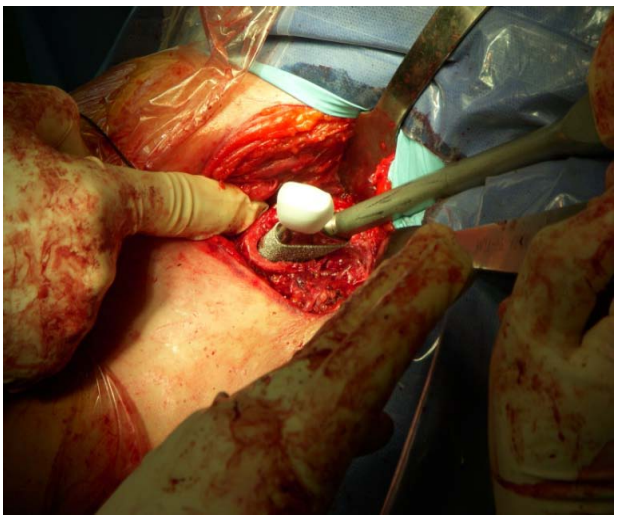

Fig. 3b

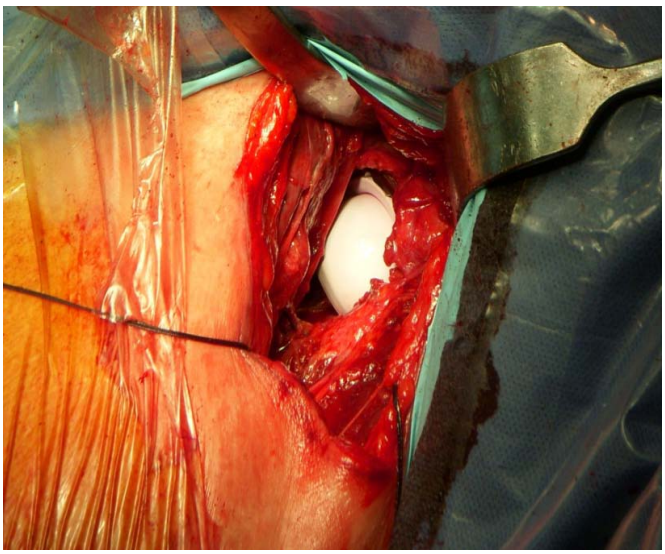

Fig. 4a

Fig. 4b

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Prevalence of Antimicrobial Resistance among Gram-Negative Isolates in an Adult Intensive Care Unit at a Tertiary Care Center in Saudi Arabia (2010-2014)

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King Saud Bin Abdulaziz University for Health Sciences

Abstract- *Introduction:* Infections caused by multidrug resistant (MDR) organisms can result in significant increases in morbidity and mortality. This risk is amplified in critically ill patients usually residingin intensive care units (ICU).

Methods: A retrospective cross-sectional study was conducted to explore the progression of antimicrobial resistance of Gram negative bacteria (GNB) in a tertiary care hospital in Riyadh, Saudi Arabia. All organisms were isolated from the adult ICU of King Abdulaziz Medical City between 2010 to 2014. Organisms were identified to the species level. Antimicrobial susceptibility testing was performed using an automated system (The VITEK® 2 system, BioMariex, France) and the antimicrobial susceptibility testing was confirmed by E-Test.

GJMR-K Classification: *NLMC Code: WX 218*

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Results: The total number of GNB was 7600. The most frequently isolated GNB were *Klebsiella pneumoniae, Acinetobacter baumannii, and Escherichia coli. Klebsiella r*esistance was significantly increased to Cefepime and Ceftazidime. *Acinetobacter baumannii* demonstrated an increase in resistance towards Imipenem. The resistance pattern for*E.coli*seemed to be increasing to Cefazolin, Cefepime, and Ceftazidime.

Conclusion: A continuous surveillance program to observe the emergence of different bacterial resistance patterns is advised to establish unified guidelines across Saudi Arabia to reduce further progression in the emergence of MDR organisms.

I. Introduction

Antibiotic resistance is when bacteria develop the ability to resist the bactericidal or bacteriostatic effects of one or more antibiotic class (multidrug resistance (MDR)) (1). This resistance is most commonly noted in intensive care units (ICUs), which is due to the widespread use of antibiotics in these units compared to the other hospital departments (2). A study found that the incidence of ICU nosocomial infections worldwide was between 5%-30% (3). According to the national healthcare safety network report in the United States (US); age, comorbid diseases, duration of hospitalization, length of ICU stay, immune status, and disease severity are all considered host risk factors for developing nosocomial infections in ICUs (4). In a study done on southern and eastern Mediterranean hospitals, overuse was one of the factors associated with increased antibiotic resistance (5). However, antibiotic resistance differs between ICUs in different countries due to various reasons including the different patterns of antibiotic use, the variation in infection control policies, and the effect of local resistance data in some countries directing the suitable antibiotic therapy which in turn leads to various outcomes on patients and healthcare systems (6). A previous study done in King Abdulaziz Medical City (KAMC), Riyadh Saudi Arabia from 2004-2009 including only Gram-negative bacteria (GNB) in the adult ICU, *Acinetobacter baumannii*, followed by *Pseudomonas aeruginosa*, *Escherichia coli (E.coli)*, *Klebsiellapnemoniae*, *Stenotrophomonasmaltophilia*, and *Enterobacter* were the most commonly isolated organisms (7). During the study period, the resistance of different common pathogens was increasing significantly. Globally, the efficacy of antibiotics against various ICU pathogens is decreasing over the past few years (7). Therefore, continuous surveillance studies should be conducted locally to observe the emergence of different bacterial resistance patterns, as there are clear differences between international and national data.

II. Methodology

A retrospective cross-sectional study was carried out of GNB from the adult ICU of King Abdulaziz Medical City (KAMC) between 2010 and 2014. The yearly antibiogram data obtained from the ICU department was used to seek the percentage of GBN resistance against specific antibiotics. The result of 7600 GNBisolates were interpreted according to the guidelines of the Clinical and Laboratory Standards Institute (CLSI). Gram-negative bacilli were identified to the species level and AST performed using an

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automated system (The VITEK® 2 system ,BioMariex, France) and the antimicrobial susceptibility testing confirmed by E-Test (AB Biodisk). Only one isolate per patient per year was included in the analysis. The following antimicrobial agents were tested either by the breakpoint method (with the vitek 2 system) or by the ETEST method using the following antibiotics on (Muller Hinton Agar Plate): amikacin ampicillin ceftazidime ceftriaxone ciprofloxacin gentamicin imipenem trimethoprim- sulfamethoxazole Quality control was performed by testing these same antimicrobials on E.coli ATCC 25922, E coli ATCC 35218, P aeruginosa ATCC 27853, and Enterococcus faecalis ATCC 29212 to check the thymidine level on Muller Hinton Agar.

The proportion of susceptible isolates was calculated as the sum of susceptible organisms (neither intermediately susceptible not resistant) relative to the total number of organisms tested. Multidrug resistance was defined as resistance to three or more antimicrobials (imipenem, ceftazidime, ciprofloxacin, pipracillin-tazobactam, and/or an aminoglycoside). The trend in the susceptibility rate over a 5-year period (between 2010-2014) was calculated and analyzed to identify a statistically significant increasing or decreasing trend using chi-square for linear trend analysis. Associations between categorical variables were tested using the chi-square test. The percent of change of antibiotic susceptibility was calculated as the difference between the later (e.g. 2014) and earlier (e.g. 2010) susceptibilities percentages divided by the earlier one. All P values were two-tailed. P value <0.05 was considered as significant. The data were analyzed using the Statistical Package for the Social Sciences, Version 20.0 (IBM Corporation, Armonk, NY, USA).

III. Results

Throughout the study period (2010-2014), Klebsiella was the most commonly GNB in ICU (20.26%), and number of isolates in 2010 was 22.5% and 21.4% in 2014. Klebsiella resistance was significantly increased for Cefepime (81% to 89%; P-value= 0.001), and Ceftazidime (58% to 94%; P-value<.0001). In addition, Klebsiella resistance faced significant decrease in Ceftriaxone (67% to 43%; P-value<.0001), Carbapenems (meropenem 22% to 11%; P-value<.0001, and Imipenem 18% to 14%; P-value<.0001), Aminoglycosides (Amikacin 45% to 12%; P-value<.0001, and Gentamicin 50% to 27%; P-value<.0001), and Fluoroquinolone (Ciprofloxacin 70% to 38%; P-value<.0001).

Acinetobacter baumannii accounts for 17.97% of all GNB, and number of isolates were 17.04% in 2010 and 11.8% in 2014. Acinetobacter baumannii demonstrated increase in resistance toward Carbapenems (Imipenem 87% to 92%; P-value<.0001); however, resistance pattern seems to be decreasing in Meropenem (97% to 92%; P-value= 0.473), Colistin (22% to 7%; P-value<.0001), and Amikacin (81% to 77%; P-value= 0.121).

E.coli was 9.6% of all GNB, and the number of isolates were 10.17% in 2010 and 9.32% in 2014.The resistance pattern seems to be increasing in beta-lactam antibiotics including Cefazolin (67% to 100%; P-value<.0001), Cefepime (48% to 100%; P-value<.0001), Ceftazidime (38% to 100%; P-value<.0001), and fluoroquinolone (Ciprofloxacin 65% to 70%; P-value= 0.271). On the other hand, E. coli resistance rate decreased for Piperacillin-tazobactam (36% to 27%; P-value= 0.276), and no resistance difference in imipenem and meropenem throughout the study period (0%; P-value=0.325).

Enterobacter isolates account for 4.5% of GNB, and number of isolates were 5.4% in 2010 and 4.3% in 2014. The resistance for some beta-lactam is increasing especially in Cefepime (47% to 69%; P-value=0.260), Ceftazidime (56% to 95%; P-value=0.002). Moreover, Carbapenems (meropenem 3% to 5%; P-value=0.670, and Imipenem 6% to 23%; P-value<.0001) showed slight increase in the resistance pattern against Enterobacter. Aminoglycosides (Amikacin 41% to 2%; P-value<.0001, and Gentamicin 31% to 8%; P-value<.0001), and fluoroquinolones (Ciprofloxacin 31% to 19%; P-value=0.016) showed decrease in resistance toward Enterobacter.

IV. Discussion

Most of the hospital-acquired infections are related to invasive procedures and devices which are commonly seen in ICUs (8). The resistance pattern is most commonly noted in ICUs due to the widespread use of antibiotics in these units compared to the other hospital departments (2), and 70% of these infections were caused by GNB. (3). The increase in multidrug resistant organisms were shown to negatively affect the patient safety in which they can prolong the hospital stay, increase mortality rates, and health care costs (9).

This 5-year surveillance study is aimed to continue assessing the pattern of antibiotic resistance in GNB from adult ICU KAMC, Riyadh. As the annual antibiogram system were used in 2004 to 2009 to analyze the most common organisms and pattern of antibiotic resistance in our ICU. During the previous study period Acinetobacter baumannii revealed significant increase in resistance toward imipenem (45% to 90%), meropenem (67% to 90%), ciprofloxacin (78% to 90%), and amikacin (88% to 94%). Pseudomonas aeruginosa resistance markedly increased in 2007 specifically to carbapenems (34% to 74%), and ciprofloxacin (33% to 51%). E.coli showed significant increase in resistance to Cefuroxime (26% to 64%), ceftazidime (24% to 54%), cefotaxime (24% to 54), cefepime (23% to 50%), and ampicillin (64% to 73%). S

marcescens showed increase in resistance toward cefotaxime (27%% to 68%), ceftazidime (9% to 65%), and pipracillin-tazobactam (20% to 36%). Enterobacter resistance was markedly increased to ceftazidime (66% to 95%), cefotaxime (66% to 94%), and pipracillin-tazobactam (49% to 65%).

In our study (2010-2014) the most commonly isolated GNB wereKlebsiella pneumoniae, Acinetobacter baumannii, Escherichia coli, and Enterobacter. In contrast, the previous surveillance (2004-2009), Pseudomonas aeruginosa and Stenotrophomonas maltophilia were considered as part of the most common GNB. Our data showed significant increase in resistance of Klebsiellatoward beta-lactams antibiotics especially ceftazidime (58% to 94%), and significant decrease in resistance in meropenem (22% to 11%). Most of the isolated Klebsiella showed increased beta-lactamase activity, and the rate of Extended-spectrum beta-lactamases (ESBL) isolates increased from 12% in 2004 to 21.4% 2014. This increase might be due to implementation of new screening program in 2007. In the previous study, there was one case of carabamenase-resistant klebsiella. However, carbapenems are still considered very effective agent against Klebsiella and the resistance pattern seems to be decreasing during our study period (meropenem 22% to 11%, and Imipenem 18% to 14%). Despite that, carabapenamase resistant isolates should be taken into consideration due to their potential dissemination. The trend of the overall resistance pattern is illustrated in figure-1 and figure-2.

In addition, Acinetobacter baumannii resistance was significant toward imipenem (87% to 92%). For that, the resistance pattern seems to be progressing over the period of 2004-2014. Furthermore, meropenem showed a slight decrease in resistance (97% to 92%) that is not statistically significant. Colistin remains the most effective antibiotic against Acinetobacter baumannii and our study showed significant decrease in the resistance (22% to 7%). As the treatment options for carbapenem resistant Acinetobacter baumannii are limited and challenging, colistin might be used empirically in the setting of our ICUs. The trend of the overall resistance pattern is illustrated in figure 3 and figure 4.

Most of E. coli isolates exhibited ESBL activity, and resistance is significantly increased in all beta-lactams antibiotics especially ceftazidime (38% to 100%); while the previous surveillance study showed E. coli resistance to ceftazidime (24% to 54%). Pipracillin-tazobactam showed slight decrease in resistance (36% to 27%); however, this decrease is not statistically significant. All our ESBL-producing isolates were susceptible to carbapenems. There was no significant increase in the rate of E. coli ESBL from 2004 (9%) to 2014 (9.34%). The trend of the overall resistance pattern is illustrated in figure-5 and figure-6.

Enterobacter exhibited significant increase in resistance mostly toward ceftazidime (56% to 95%), and carbapenems showed unique increase in resistance to imipenem (6% to 23%). However, meropenem increase in resistance was not statistically significant. Aminoglycosides remain the most effective antibiotic against Enterobacter with amikacin being broadly active. The trend of the overall resistance pattern is illustrated in figure-7 and figure-8.

V. Conclusion

Our study concluded that Gram-negative bacterial resistance is still a major issue in KAMC, Riyadh adult. ICU. The most commonly isolated GNB were Klebsiella pneumoniae (20.26%), Acinetobacter baumannii (17.97%), Escherichia coli (9.6%), and Enterobacter (4.15%). Carbapenems is considered the most effective agent for E. coli and Klebsiella ESBL. Aminoglycosides is the most effective agent for Enterobacter, and Colistin is the drug of choice for most cases of Acinetobacter baumannii. This significant resistance observed in ICU is mostly due to the overuse of broad-spectrum antibiotics, prolonged patient stay, and variation in infection control policies. Thus, the importance of collaboration between the ICU, infection control, infectious disease departments is very essential to substantially decrease the resistance rates. Furthermore, establishment of local database of antibiogram across the whole kingdom of Saudi Arabia will aid in the improvement of treatment strategies and guidelines based on unit-specific data.

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Appendix

Appendix 1:

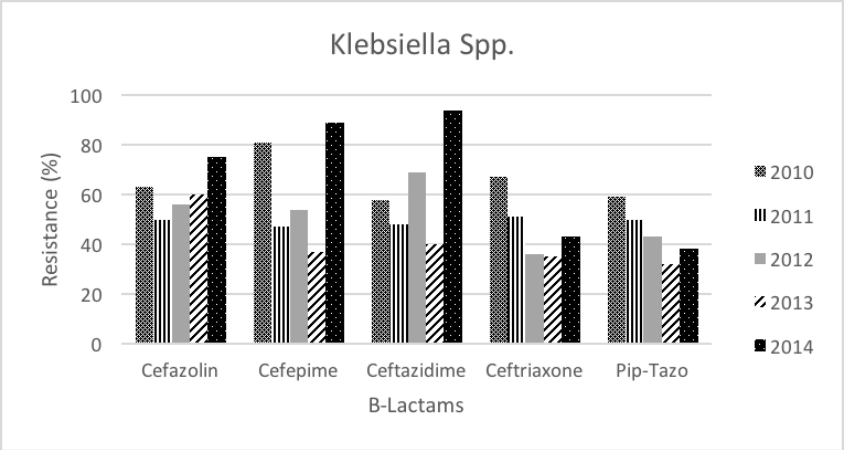

Figure 1: Beta-lactams Antibiotic Resistance for Klebsiella Spp. Isolates Tested Between 2010-2014.

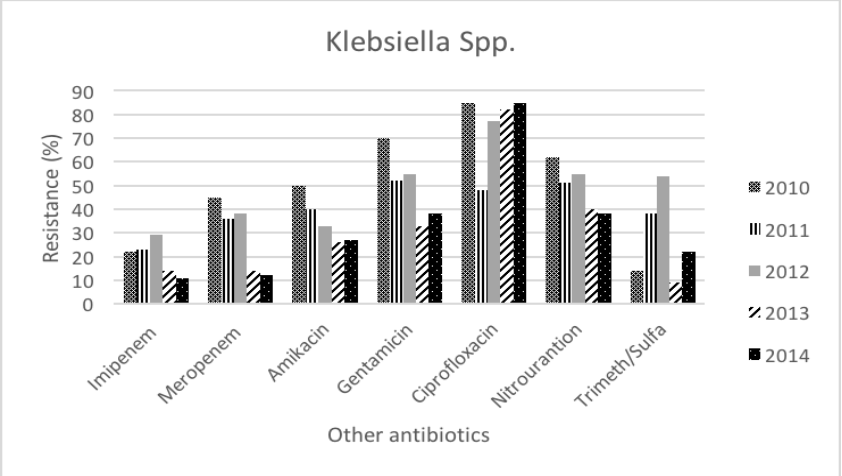

Figure 2: Carbapenems, Aminoglycosides, Fluoroquinlones, Clostin, Nitrourantion, Trimethoprim/Sulfamethaxole Antibiotic resistance for Klebsiella Spp. Isolates Testes Between 2010-2014.

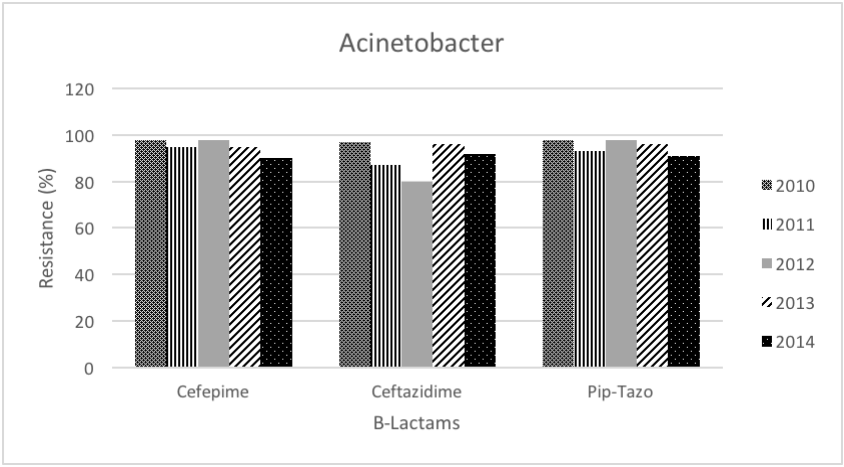

Figure 3: Beta-lactams Antibiotic Resistance for Acinetobacter Isolates Tested Between 2010-2014.

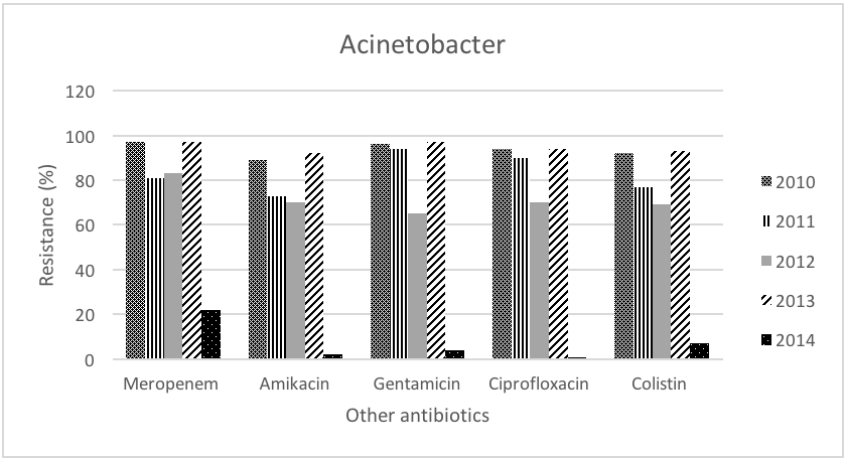

Figure 4: Carbapenems, Aminoglycosides, Fluoroquinlones, and ClostinAntibiotic resistance for Acinetobacter Isolates Testes Between 2010-2014.

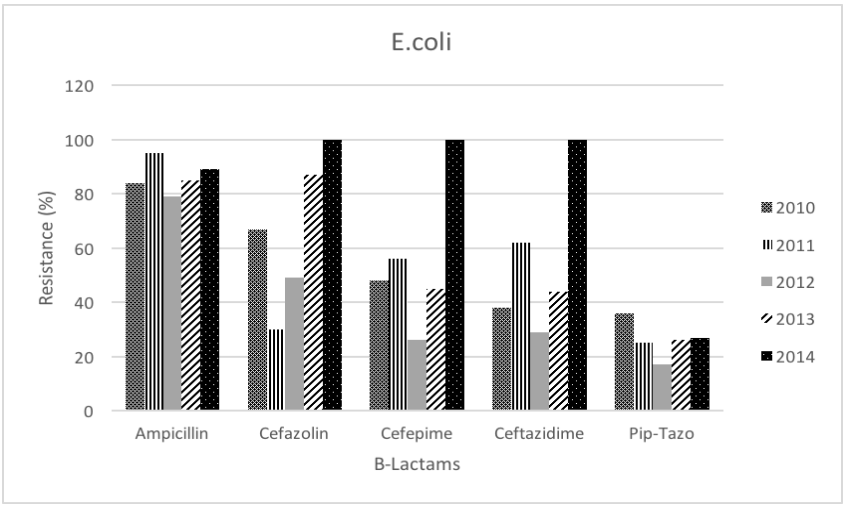

Figure 5: Beta-lactams Antibiotic Resistance for E.coli Isolates Tested Between 2010-2014.

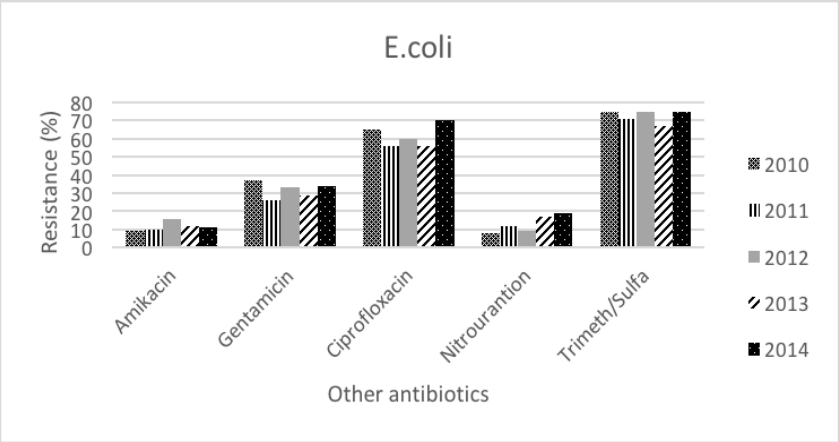

Figure 6: Aminoglycosides, Fluoroquinlones, Nitrourantion, and Trimethoprim/Sulfamethaxole Antibiotic resistance for E. coli Isolates Testes Between 2010-2014.

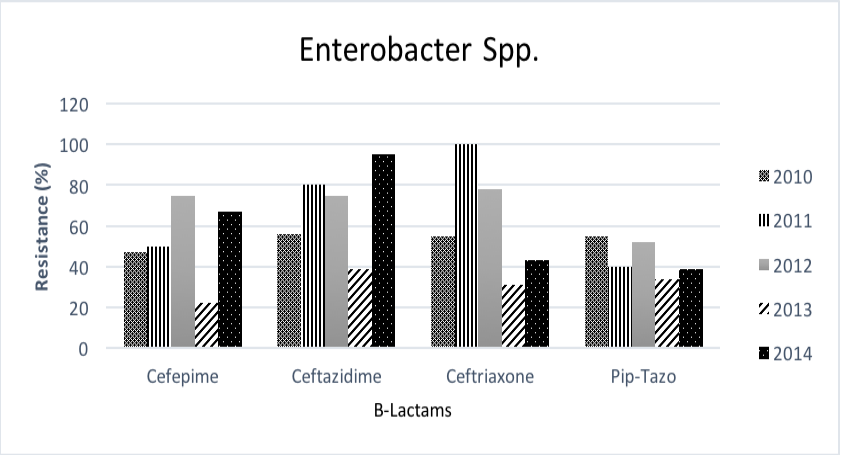

Figure 7: Beta-lactams Antibiotic Resistance for Enterbacter Spp. Isolates Tested Between 2010-2014.

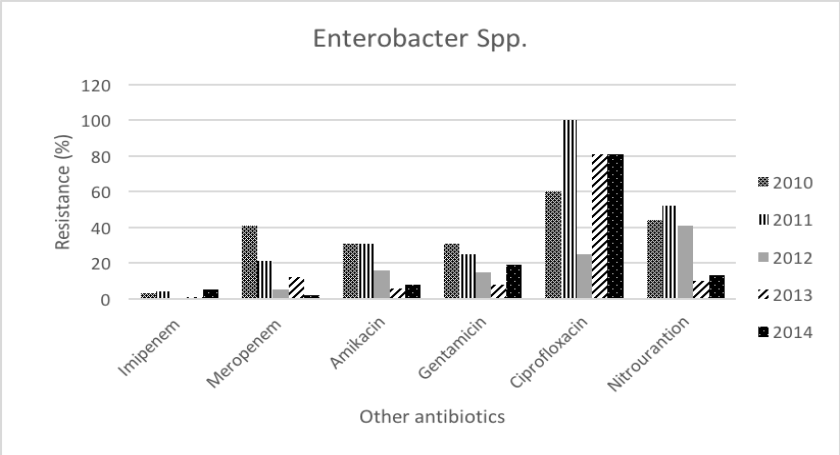

Figure 8: Carbapenems, Aminoglycosides, Fluoroquinlones, Nitrourantion, and Trimethoprim/Sulfamethaxole Antibiotic resistance for Enterbacter Spp. Isolates Testes Between 2010-2014.

Appendix 2:

Table 1: Comparison between 2010 and 2014 antibiotic resistance of Klebsiella Spp.:

Antibiotic	Resistance (%) in 2010	Resistance (%) in 2014	P-value	Trend
Beta-Lactam Antibiotics:				
Cefazolin	67%	100%	<.0001	↑
Cefepime	48%	100%	<.0001	↑
Ceftazidime	38%	100%	<.0001	↑
Ceftriaxone	45%	59%	<.0001	↑
Pip-Tazo	36%	27%	<.0001	↑
Other Antibiotic Groups:				
Imipenem	18%	14%	<.0001	↓
Meropenem	22%	11%	<.0001	↓
Amikacin	45%	12%	<.0001	↓
Gentamicin	50%	27%	<.0001	↓
Ciprofloxacin	70%	38%	<.0001	↓
Nitrofurantoin	85%	85%	<.0001	–
Trimeth/Sulfa	62%	38%	<.0001	↓

Table 2: Comparison between 2010 and 2014 antibiotic resistance of Acinetobacter baumannii:

Antibiotic	Resistance (%) in 2010	Resistance (%) in 2014	P-value	Trend
Beta-Lactam Antibiotics:				
Cefepime	98%	90%	0.001	↓
Ceftazidime	97%	92%	0.298	↓
Pip-Tazo	98%	91%	0.026	↓
Other Antibiotic Groups:				
Imipenem	87%	92%	<.0001	↑
Meropenem	97%	92%	0.473	↓
Amikacin	81%	77%	0.121	↓
Gentamicin	81%	69%	0.010	↓
Ciprofloxacin	97%	93%	0.232	↓
Colistin	22%	7%	<.0001	↓

Table 3: Comparison between 2010 and 2014 antibiotic resistance of E.coli:

Antibiotic	Resistance (%) 2010	Resistance (%) 2014	P-Value	Trend
Beta- Lactams antibiotics				
Cefazolin	67	100	<0.0001	↑
Cefepime	48	100	<0.0001	↑
Ceftazidime	38	100	<0.0001	↑
Pip-Tazo	36	27	0.276	↓
Others antibiotics				
Amikacin	9	11	0.617	↑
Gentamicin	37	34	0.908	↓
Ciprofloxacin	65	70	0.271	↑
Nitrourantion	8	19	0.002	↑
Trimeth/Sulfa	75	75	0.809	_

Table 4: Comparison between 2010 and 2014 antibiotic resistance of Enterobacter:

Antibiotic	Resistance (%) 2010	Resistance (%) 2014	P-Value	Trend
Beta- lactams antibiotics				
Cefepime	47	67	0.260	↑
Ceftazidime	56	95	0.002	↑
Ceftriaxone	55	43	<0.0001	↓
Pip-Tazo	55	39	0.047	↓
Others antibiotics				
Amikacin	41	2	<0.0001	↓
Gentamicin	31	8	<0.0001	↓
Ciprofloxacin	31	19	0.016	↓
Nitrourantion	60	81	0.064	↑
Imipenem	0	23	<0.0001	↑
Meropenem	3	5	0.670	↑
Trimeth/Sulfa	44	13	<0.0001	↓

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The Role of Diet on Diabetes Mellitus

By Nikolin Daija
University of Tirana

Abstract- In this study we took 2921 dogs, 34% were adults and 66% of them were young. These dogs were subjected to tests for the diagnosis of diabetes mellitus, and 10 of them were positive. 34% of adult dogs were overweight and obese. All dogs were grouped according to the type of food they consumed. The percentage of obesity based on the type of food they consumed was: dry food 35%, home food 30%, mix food 25%, cans 10%. The study showed that 6 dogs were obese and diabetic, 4 dogs were diabetic but not obese.

Keywords: *obese, overweight, cans, dry food, mix food, home food, diet.*

GJMR-K Classification: *NLMC Code: WK 810*

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The Role of Diet on Diabetes Mellitus

Nikolin Daija

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I. Introduction

The prevalence of combined overweight and obesity in domestic canine populations has been reported to range from 23%[1] to 41%[2]. Other studies in canine pet populations have found relationships between canine obesity and musculoskeletal disorders[3,5], cardiovascular problems[5],glucose intolerance and diabetes mellitus [6,7] and bladder [8] and mammarycancer[9].The main objectives of this study were to recognize obesity in dogs and its impact on Diabetes Mellitus.

II. Materials and Methods

The study was focused at 5 clinics in the city of Tirana. The dogs presented to the clinics for various purposes, such as vaccination or other routine checks, went through a rapid blood test. During the period 2013 - 2015 as many as 2921 dogs of different breeds were an integral part of the study. All of them were subjected to a rapid test of blood glucose. Those dogs with indicators standing at levels above 120 mg / dl underwent further comprehensive blood tests to determine their case better. The animals with pregnancy problems were excluded from the study because their glucose indicators might be compromised. Those animals with levels at above 120 mg / dl were considered to be positive. Results for each animal testing positive were recorded and questionnaires were completed accordingly with information about the animal and also about the living conditions and their food. All these data are entered into a database. Breeds of dogs are classified on the basis of breed manuals with cross breeds being considered as mixed ones. Also, positive animals were grouped according to their age, gender, and breed.

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III. Results and Discussion

A total number of 2921 dogs of different breeds were examined in this study, including Labradors retrievers, mixed, coli, Yorkshire terriers and others. These dogs underwent rapid tests and the following results were obtained. Blood glucose analysis showed that 10 individuals or 0.34% of dogs examined in clinics across Tirana district tested positive with diabetes. Those 10 dogs that were positive for diabetes tests, 6 of them were with diabetes and obese, 4 of them were diabetic but not obese. This figure points to a low frequency of diabetes as well as to the fact that the pathology shows no upward tendency.

Total	2921	100%
Not diabetic	2911	99.66%
Obese diabetic	6	0.20%
Not obese diabetic	4	0.14%

Figure 1: Diabetic dogs

Blood glucose analysis showed that 10 individuals or 0.33% of dogs examined in clinics across Tirana district tested positive with diabetes. This figure points to a low frequency of diabetes as well as to the fact that the pathology shows no upward tendency. Adult dogs over 34% (338 dogs) of them were overweight and obese. The prevalence of obesity in adult dogs was 6.5%. (65 dogs).

Total	993	100%
Normal dogs	655	66%
Obese	65	6.5%
Overweight	273	27.5%

Figure 2: obese and overweight dogs

In this study, we analyzed the type of food they consumed to see its impact on obesity. Dogs that consume liquid foods or canned (10%), consume dry food (35%), indoor food as their main source of diet (30%) mixed food (25%).

Types of food	2921	100%
Cans	292	10%
Dry food	1022	35%
Home food	876	30%
Mix food	731	25%

Figure 3: Types of food

The study showed that some dogs who consumed processed foods, were more likely to be obese. 1.5% of dogs who consumed the cans were obese, 2% of dogs who consumed dry food were obese, 1% of dogs who consumed the food home were obese, 2.3% of dogs who consumed mix of food were obese.

Obesity	65	6.5%
Cans	7	0.7%
Dry food	29	2.9%
Home food	11	1.1%
Mix food	18	1.8%

Figure 4: Obesity by food type

The food to diabetic dogs should provide adequate calories to achieve and maintain optimal body condition. Dogs with poorly controlled diabetes have a decreased ability to metabolize the nutrients absorbed from their gastrointestinal tract and lose glucose in their urine, so require more calories for maintenance than healthy dogs. The diet should be nutritionally balanced and needs to be palatable so that food intake is predictable. Meals should ideally be time so that maximal exogenous daily insulin-dosing regimen tends to be fixed for diabetic dogs [10]. It is also important that a predictable glycogenicresponse is achieved following each meal. Consequently, every meal should contain roughly the same ingredients and calorie content, and should be fed at the same times each day. The owners of diabetic dogs should be aware that a consistent insulin dosing and feeding routine is optimal although, for practical reasons, a certain amount of compromise may be necessary in individual cases. For several decades, there has been a great deal of interest in research into the composition of an optimal diet for people diagnosed with the various forms of diabetes mellitus. As a result, it is now recognized that dietary management plays a central role in the treatment of diabetic people. More recently, veterinary researchers have started to follow this and comparison can now be made between the dietary recommendations for diabetic people and those for dogs. Before the advent of insulin therapy, fat and protein were the main sources of energy in the diets prescribed for people with diabetes. Dietary carbohydrate was avoided in an effort to reduce hyperglycemia. Diets currently recommended for diabetics are the result of substitution of the saturated fat content with complex carbohydrates. The primary reason for this change was the realization that the risk of death due to cardiovascular disease could be greatly reduced by lowering plasma cholesterol [11].It is now highly recommended that 55 to 60% of a diabetic dogs total energy should be provided from carbohydrate and the majority of the carbohydrates should be complex, containing high amounts of resistant starch and fiber [12]. There is no clear evidence of clinical benefit in diabetic dogs of diets formulated with higher amounts of fiber than normal diets formulated. Alterations in lipid metabolism are common in men and dogs with insulin deficiency. In dogs, unlike what happens in humans, there are no meaningful relationships between diabetes, arteriosclerosis and coronary heart disease. In many diabetic dogs, however, are present exocrine pancreatic diseases [13]; diabetes can also be a risk factor for pancreatitis. A diet high in fat and hypertriglyceridemia are possible causes of canine pancreatitis [14]; for dogs with chronic pancreatitis are recommended diets with a low-fat content (<20%), and since it can be difficult to identify dogs with pancreatic subclinical, it would be prudent to feed all the dogs with diabetic diets with a share of restricted fat (<30%).There is an inverse relationship between the dietary fat, postprandial blood glucose and insulin response. Random clinical checks have shown that low-fat diets can lead to an improvement of the lipid profile, but they can contribute to undesirable weight loss. Although, therefore, there are no obvious clinical benefits in feeding diabetic dogs with restricted fat diets, this option can be recommended for dogs that have both conditions (diabetes and pancreatitis). By contrast, in already meager dogs it is not advisable to give the same diet to prevent further weight loss that would aggravate the condition of the animal. A diabetic dog diet has been formulated which sets an ideal protein; so that in this way there are no differences between healthy and diabetic dogs. With the reduction of carbohydrates and fats, proteins tend to represent the main source of energy; however, even if they are not reported adverse effects, if the necessary calories come from protein, for a share of 30- 45%, adequate attention should be given to subjects with microalbuminuria and proteinuria [16]. L-carnitine exerts an important role in the metabolism of fatty acids. An addition of 50 ppm in the diet, in dogs, the increases fatty acid oxidation and protects muscles from catabolic processes when there is a large weight loss [14]. The dogs where there is the monitoring of diabetes, lose weight, have alterations in lipid metabolism and undergo cytogenesis, are, therefore, benefit from carnitine supplementation to the diet. Since for most older dogs and middle-aged, the reduction of body mass is already present before the start of the weight loss associated with diabetes; consequently carnitine is a valuable aid for these animals [16].

IV. Conclusion

Successful long-term management of a diabetic dog sometimes requires permanent changes to the lifestyles of both owner and dog and so individualization of the advice given is imperative. A relationship based on trust and co-operation between veterinarian and client invariably leads to the most satisfactory outcome.

The ongoing treatment of a diabetic dog can be one of the more rewarding experiences of small animal practice and many diabetic dogs and their owners come to occupy a special place within the clinic environment.

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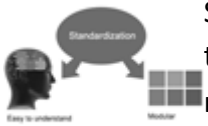

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3. Submission of Manuscripts,

4. Manuscript's Category,

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The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

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

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

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

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

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

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

Results:

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

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

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

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
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- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

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- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
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- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- 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.
- Try to present substitute explanations if sensible alternatives be present.
- 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?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
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Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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