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Correlation between Angiographic Findings and Risk Factors among Omani Patients with Ischemic Heart Disease at Sultan Qaboos University Hospital

By Husam Al-Balushi, Ali ALSharqi, Samuel George Hansdak & Hatem ALFarhan

Sultan Qaboos University

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Methods: This is a retrospective study, the data collection done by using Hospital information system in the period between January to December 2018. Patients were grouped according to the number of risk factors into; patients with a single risk factor and patients with multiple risk factors. Coronary angiography results were categorized into; insignificant coronary lesion and significant coronary lesion according to the percentage of stenosis (with a cut-off point of 50% occlusion). Categorical data were analyzed using the chi-square statistical test for quantitative data and, the P value of less than 0.05 was considered significant.

Keywords: ischemic, heart, diseases, risk factors, coronary angiography, oman.

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Correlation between Angiographic Findings and Risk Factors among Omani Patients with Ischemic Heart Disease at Sultan Qaboos University Hospital

Husam Al-Balushi ^α, Ali ALSharqi ^σ, Samuel George Hansdak ^ρ & Hatem ALFarhan ^ω

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Results: Total number of patients was 250 with the male being 198 and female 52. The mean age was 62.66 ± 11 years. Stable angina (SA) was the most common presentation in (65.2%) of the patients. Total of 77.6% of patients had multiple risk factors and Hypertension being the highest prevalent risk factor in (74.4%) of the patients and positive family history was the least prevalent in both gender (12.8%). The left anterior descending artery (LAD) was the most common site for significant coronary lesions (stenosis > 50%) in 75.2% of the patients. Majority of the patients were having multiple obstructive lesions in more than one coronary artery with 62.8%. There was a significant relationship between the presence of multiple risk factors and the occurrence of multiple obstructive coronary lesions with a P value = 0.016 ($P < 0.05$).

Conclusion: The significant relationship was observed and further studies are recommended in large patients' population to ensure the relationship between coronary angiographic findings and ischemic heart disease risk factors. Most of the risk factors seen in this study were modifiable-type risk factors. Therefore, more concentration on preventive strategies are also recommended.

Keywords: ischemic, heart, diseases, risk factors, coronary angiography, oman.

I. BACKGROUND

Ischemic Heart Disease (IHD) is the most common form of heart diseases. This disease occurs due to the imbalances between the supply and demand of oxygen to the myocardium resulting in myocardial ischemia (1). The presentation of ischemic heart disease patients varies according to the extent of the coronary arteries involved (2). The majority of patients present with stable angina (SA) which characterized by predicted chest pain on exertion. Other patients present with the acute coronary syndrome (ACS), which can be either unstable angina (UA), non-ST segment elevation myocardial infarction (NSTEMI) or the most advanced stage when the patient presents with ST-segment elevation myocardial infarction (STEMI) which indicate completely occluded coronary artery (2, 3). Acute coronary syndrome occurs as a result of atherosclerotic plaque rupture in most cases. This rupture can lead to thrombus formation and subsequently subtotal occlusion to one of the major coronary arteries (2).

Coronary heart disease (CHD) is the cause of death to one-third of people with age above 35 years old and a leading cause of disability in a developed country (4). It is the leading cause of mortality in half of the middle-age men and in one-third of women in the same age among all American adults. According to the American Heart Association update regarding heart disease statistics in 2016, it was estimated that every 42 seconds an American would be suffering from a myocardial ischemia and infarction (4).

Cardiovascular disease (CVD) is one of the major causes of mortality in developing countries and is the most common cause of death in developed countries (5, 6, 7). Ischemic heart disease is a subtype of CVD which considered as a major cause of death worldwide (7, 8). It is the second leading cause of disability all over the world. In Oman, ischemic heart disease was the leading cause of morbidity and the fourth common cause of mortality among 45-60 years old patients in 2006 (9).

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There are many well-known risk factors that are related to ischemic heart disease. These risk factors are classified into two categories. Modifiable risk factors include smoking, dyslipidemia (DLP), hypertension (HTN), diabetes mellitus (DM), obesity, physical inactivity, and unhealthy diet. Non-modifiable risk factors include age, gender, and genetic predisposition to ischemic heart disease (10-12). Women are less prone to have ischemic heart disease in their reproductive age and this is due to female's protective sex hormones and their tendency to prevent atherosclerotic plaque formation (13). However, postmenopausal women have a similar risk as well as men to develop ischemic heart disease (13-15).

Many tests are used to diagnose ischemic heart disease nowadays. Starting from the non-invasive test such as blood test to invasive once such as cardiac PET scan and coronary guide wire sensor technology with a large list of various tests in between (16, 17). However, Coronary angiography (CAG) is the standard gold method to assess the coronary vessels patency. It uses X-ray imaging with a contrast dye to visualize the coronaries to detect the blockage (16). Coronary angiography is a definitive diagnostic procedure that involves cardiac catheterization (18-21). The findings of coronary angiography can be classified into two categories according to the percentage of occlusion. Non-obstructive stenosis (occlusion of less than 50%) and obstructive stenosis (occlusion of more than 50%) (19, 22).

The ischemic heart disease risk factors may exhibit their effect on the coronary angiographic findings in patients with ischemic heart disease. Few studies were conducted, and the results showed that there is a significant relationship between the angiographic findings and ischemic heart disease risk factors (23). The results indicate that there is a significant relationship between the presence of multiple risk factors and the aggressive coronary angiographic findings. In other words, the more cluster risk factors the patient has, the more aggressive pattern will be seen in their coronary angiography (21, 23). Studies show that there is a relationship between coronary arteries involvement and cardiovascular risk factors in patients underwent coronary angiography. According to recent study published in 2018, it indicates that there is a significant association between the extent of coronary artery stenosis with different risk factors such as age, male gender, diabetes mellitus, smoking and positive history of cardiac disease among Iranian population (19).

To the best of our knowledge there is no similar studies have been conducted in Oman. Therefore, the main aim of this study is to investigate the relationship between the angiographic findings and risk factors among Omani patients with ischemic heart disease presented at Sultan Qaboos University Hospital.

II. MATERIALS & METHODS

A retrospective cohort study was conducted in the period between January to December 2018 in Sultan Qaboos University Hospital (SQUH) in Muscat, Sultanate of Oman. The access authorization to the hospital electronic medical records was provided by the Hospital Information System (HIS). All Omani patients who are known to have ischemic heart disease (IHD) and underwent coronary angiography at SQUH in the period between January to December 2018 where included in this study. Participants with no history of ischemic heart disease, non-Omani patients, patients with no documented data in their medical history were excluded.

Data collection was performed by accessing the Track Care system. Demographic and clinical characteristics including age, gender, history of smoking, hypertension, diabetes, family history of cardiac diseases, history of hospitalization as a result of cardiovascular diseases, history of coronary angiography (CAG) and the severity of coronary artery involvement were gathered.

In the first step, demographic and clinical data about patient's risk factors were collected using medical history & clinical notes. Patients were categorized according to their presentation in 3 groups: group one; patients with ST-segment elevation myocardial infarction (STEMI), group two; patients with non-ST-segment elevation myocardial infarction (NSTEMI) or unstable angina (UA) and group three those with stable angina (SA). The patients were further divided according to the number of risk factors into; patients with a single risk factor and patients with multiple risk factors.

In the second step of the data collection, the coronary angiographic findings were obtained by reviewing the Cath Lab angiography reports. Angiography results were grouped into two groups; insignificant coronary lesion group (non-obstructive occlusion of less than 50% stenosis) and significant coronary lesion group (obstructive occlusion of more than 50% stenosis). The main concern of this angiographic findings was looking primary at the changes on three major epicardial coronary arteries which are the left anterior descending (LAD), right coronary artery (RCA), and the left circumflex artery (LCx).

The data were analyzed by using IBM Statistical Package for the Social Sciences (SPSS) 23 computer program. The mean and standard deviation for age was obtained by using Frequency tables. Categorical data was analyzed using chi-square statistical test for quantitative data and P value of less than 0.05 was considered significant. The confidence interval in this study was 95%.

The present study was approved by the Ethics Committee of the College of medicine and health

sciences at Sultan Qaboos University. There was no need for a consent statement as the study was done by accessing the Track Care system only without patient's direct participation. Patient's confidentiality was respected when dealing with data files; by using coding numbers referred to each patient without including their names or any personal information when studying and analyzing the data.

III. RESULTS

The demographic data for the included patients in the study are shown in Table 1. There was a total number of 250 patients with a mean age of 62.66 ± 11 years. The minimum age was 30 years and 89 years was found to be the maximum age observed among our

ischemic heart disease patients. Male patients were 198 (79.2%) patients and female were 52 (20.8%) patients. All the included 250 patients were Omani. Among the 250 patients included in the study, there was 52 patients have a single risk factor while 198(79.2%) patients were found to have multiple risk factors. Amongst all the patients, 163 (65.2%) were presented with stable angina (SA), 27(10.8%) presented with STEMI, and 60(24%) with NSTEMI. The most frequent significant (obstructive > 50%) lesion was seen at the left anterior descending artery (LAD) (75.2%) in both genders followed by the right coronary artery (RCA) (59.2%) and lateral circumflex artery (LCx) (55.2%) respectively.

Table 1: Demographic and clinical characteristics

Variables (unit)		Number (%)	Mean \pm SD	Minimum	Maximum
Nationality	Omani	250 (100%)			
	Non-Omani	0 (0%)			
Age (years)		250 (100%)	62.66 ± 11	30	89
Gender	Male	198 (79.2%)			
	Female	52 (20.8%)			
Risk factors	Single	52 (20.8%)			
	Multiple	198 (79.2%)			
IHD presentation	STEMI	27 (10.8%)			
	NSTEMI	60 (24%)			
	SA	163 (65.2%)			
Coronary artery lesion based on angiography	LAD (significant)	188 (75.2%)			
	LAD (insignificant)	62 (24.8%)			
	RCA (significant)	148 (59.2%)			
	RCA (insignificant)	102 (40.8%)			
	LCx (significant)	138(55.2%)			
	LCx (insignificant)	112(44.8%)			

Figure 1 represents the prevalence of risk factors among the included patients. As it is shown; Hypertension was the highest prevalent risk factors among ischemic heart disease patients in both gender with 186 patients have it (74.4 %) followed by diabetes 162(64.8%), dyslipidemia 125(50%), smoking 49(19.6%), and positive family history 32(12.8%) which was the least prevalence.

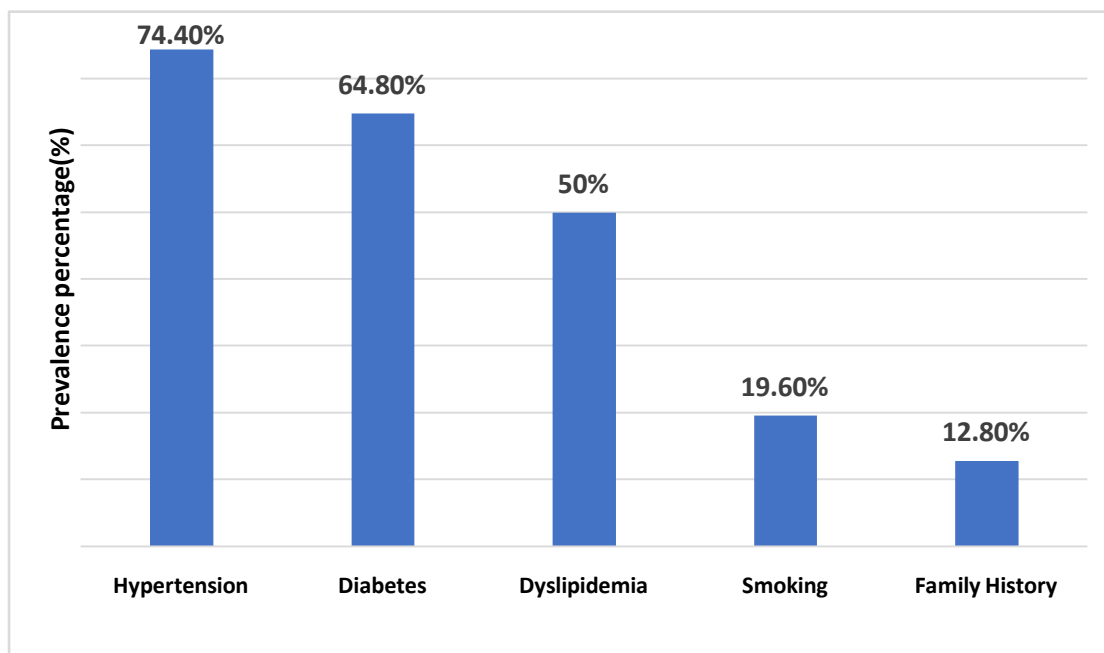


Figure 1: Prevalence of risk factors among the included patients.

Table 2 evaluates the relationship between the angiographical findings and the risk factors groups. As it is shown that there is significant relationship between the presence of multiple risk factors and the occurrence

of obstructive occlusion (stenosis>50%) in the LAD artery with a P value < 0.05 (P=0.049). However, this relationship was insignificant in the other two coronary arteries (LCx and RCA) with a P-value > 0.05.

Table 2: Relationship between the angiographic findings & risk factor groups (single & multiple).

Characteristics		Single risk factor	Multiple risk factors	P value
LAD findings	significant	36 (64.3%)	152 (78.4%)	P=0.04
	insignificant	20 (35.7%)	42 (21.6%)	
RCA findings	significant	28 (50%)	120 (61.9%)	P>0.05
	insignificant	28 (50%)	74 (38.1%)	
LCx findings	significant	27 (48.2%)	111 (57.2%)	P>0.05
	insignificant	29 (51.8%)	83 (42.8%)	

In the final analysis, we tested the relationship between the presence of multiple risk factors and the occurrence of multiple obstructive occlusion (stenosis>50%) in more than one coronary artery using

a chi-square test. The result showed a significant relationship with a P-value < 0.05 (p=0.016) as it is shown in table 3.

Table 3: Relationship between significant lesion groups (single & multiple) & risk factor groups (single & multiple).

Variable			Risk factors group		Total
			Single	Multiple	
Lesions group	Single	Count	29	64	93
		% within RFs group	51.8%	33.0%	37.2%
	Multiple	Count	27	130	157
		% within RFs group	48.2%	67.0%	62.8%
Total		Count	56	194	250
		% within RFs group	100.0%	100.0%	100.0%

IV. DISCUSSION

The current study was carried out to investigate the relationship between different ischemic heart disease risk factors and the coronary angiographic findings among Omani patients. This finding will play an important role in the prevention of ischemic heart disease.

The baseline characteristics of our study group showed that out of the 250 patients included in this study, 198 (79.2%) patients were males and 52 (20.8%) patients were females. This is in agreement with worldwide prevalence. This is probably due to female's protective sex hormones which make them less prone to have ischemic heart disease in their reproductive age as it is indicated in other studies as well (13,14). The mean and standard deviation of the age of the patients were 62.66 ± 11 years which almost equal to the mean age that found in Panduranga and his colleague's study (2).

Our study found a significant prevalence of different risk factors. Most of the patients found to have multiple risk factors (79%) rather than a single risk factor (21%). Similarly, Mohammed. A. et al found that most of the Iraqi patients had a combination of risk factors (23).

The most frequent significant (obstructive > 50%) lesion was seen at the left anterior descending artery (LAD) (75.2%) in both genders followed by the right coronary artery (RCA) (59.2%), and lateral circumflex artery (LCx) (55.2%) respectively. This is in agreement with a study done by Maroszyńska. Et al. which found that the most common lesion location among their study group was the left anterior descending (LAD) artery (61.6%) followed by the right coronary artery (RCA) (27.4%) and left circumflex artery (LCx) (11.0%) (24). Moreover, Mohammed. A. et al. coronary angiographic findings show the most common vessel involved was the LAD (41.6%) followed by LCx (29.3%) then RCA (25.9%), and the least prevalence obstructive occlusion was observed in the left main stem LMS (3.2%)(23).

Among all ischemic heart disease patients included in our study, stable angina (SA) was the most common presentation (65.2%) followed by NSTEMI (24%) and STEMI (10.8%). In contrast, to Maroszyńska. et al. found STEMI as the major ischemic heart disease presentation (57.6%) followed by unstable angina (UA) (26.3%) and NSTEMI (16.1%) (24). Also, Mohammed. A. et al. found NSTEMI as the highest prevalent patient's presentation (44.5%) followed by STEMI (32.7%) and lastly stable angina (SA) (22.7%) (23).

The chi-square test was used to compare between two groups of angiographic findings in each coronary artery in term of presence of multiple and single risk factors. The results showed a significant association between the presence of multiple risk factors and the occurrence of obstructive coronary lesion in the left anterior descending artery (LAD) with a

P -value < 0.05 . However, there was lack of statistically significant relationship when we applied the same test for the right coronary artery (RCA) as well as the left circumflex artery (LCx) with a P -value > 0.05 . This might be due to small sample size.

We tested the relationship between the presence of multiple risk factors and the occurrence of multiple obstructive occlusions (stenosis $> 50\%$) in more than one coronary artery using chi-square test. The result showed a significant relationship with a P -value < 0.05 ($P = 0.016$). This result was similar to those found by Mohammed. A. et al. They noticed that there were more chance to have significant coronary lesions in patients with cluster risk factors with a P -value < 0.05 . This result means that these severe angiographic findings are linked to the presence of multiple risk factors (23).

V. CONCLUSION

The significant relationship between the coronary angiographic findings and ischemic heart disease risk factors were observed, and further studies are recommended in the large patient population to ensure the relationship between coronary angiographic findings and ischemic heart disease risk factors. Most of the risk factors seen in this study were modifiable-type risk factors. Therefore, more concentration on preventive strategies are also recommended.

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Tips and Tricks in Managing Massive Venous Insufficiency in Nasolabial Perforator Flap

By Alp Ercan

Abstract- A 67-year-old man presented to our plastic surgery clinic with an ulcerating and enlarging mass over the left medial canthal region and bridge of the nose, which had developed rapidly. The mass was pathologically diagnosed as a basal cell carcinoma. After removal of the tumor with a 6-mm safety margin, the defect occupied a complex and wide defect extending from left medial canthal region to left nasal sidewall and root of the nose. We provided reconstruction of the defect by using a nasolabial perforator flap based on two vascular pedicles. Immediate venous return problem occurred after a couple of hours which got worse by the hour until no capillary refill could be seen. No surgical intervention was made apart from wishful waiting and the patient was discharged with oral antibiotics and local antibiotic ointment as wound care. At post-op 7th day, the flap was seen to suffer just marginal superficial de-epithelialization. During weekly follow-up flap was healed completely with no loss and a good cosmetic outcome.

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I. INTRODUCTION

Reconstruction of medial canthal area and neighboring sites is challenging. Basically the donor site is limited around the medial canthus, which results in excess skin traction and distortion [1]. Although glabellar flaps are used routinely for reconstruction of this particular area, there are limiting conditions for this procedure. Obliteration of glabellar region and approximation of eyebrows are significant points of concern for the patients.

Despite the widespread use of free tissue transfer by the modern head and neck surgeon, the local flaps stay as perfect alternatives for small to intermediate defects of the face. The nasolabial flap is such one flap which is simple and versatile. Based on either the inferior or superior pedicles of facial, transverse facial and angular vessels as well as a rich subdermal plexus, it is reliable as well (2). It is particularly useful for defects of nasal side wall and ala as single stage procedure or ala/rim reconstruction as two stage procedure (3). Although as its conventional form it is useful for many instances, it can't reach upper part of middle face such as medial canthal region or root of the nose. As a type C fasciocutaneous flap, it can be islanded on its perforator vessels and the reach can be expanded tremendously (4). We herein report a case of midface reconstruction with nasolabial perforator flap complicated with severe venous insufficiency.

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II. CASE PRESENTATION

A 66-year-old man presented with a 1-year history of a ulcerating black mass over the left medial canthal region and bridge of the nose. The tumor measured 18 mm (width) × 24 mm (length) at the first examination. A punch biopsy revealed that the tumor was in fact a basal cell carcinoma. We excised the tumor with a 6-mm safety margin keeping the perichondrial and periosteal layer intact (fig. 1a). The defect included the areas immediately neighboring the medial canthal region and base of the nose (fig. 1b). A propeller nasolabial perforator flap was planned for resurfacing the defect. A 9 cm (length) x 2 cm (width) flap was designed over the nasolabial sulcus and nasal sidewall-cheek junction (fig. 1c). While raising the flap two different vessel bundles were identified and dissected from the surrounding soft tissue-muscle units for tension-free rotation (fig. 1d). After a brief discussion among the team both of the vascular pedicles were kept intact. After meticulous dissection flap was rotated 180 degrees to the defect site and half of the flap is used for coverage of the donor site defect (fig. 1d). The residual lower part of donor site defect was closed primarily and the donor scar was left over the nasolabial sulcus (fig. 1e). After completion of the surgery the capillary refill over the flap was 1, 5 secs and no immediate venous problem was noted (fig. 1f). Over the 24 hours following surgery the venous insufficiency ensued and became evident (fig. 2a). . Even though couples of stiches were removed over the distal part to release the swelling and to ease the tension it was no use the flap became a dusky purple color and lost its capillary refill after roughly 36 hours (fig. 2b). . The flap was deemed as a failure and patient was discharged for a later debridement and possible graft coverage. The patient was recalled after one week for a follow-up control and flap was discovered to regain normal refill apart from the upper 10% percent, that is the marginal segment (fig. 2c). Only superficial de-epithelialization on the most distal part was present and local antibiotic ointment was continued for the duration of weekly follow-up controls. Swelling was subsided quickly and distal part healed completely after 4 weeks without any additional complications (fig. 2d). The excised tissue margin was histopathologically free of tumor cells. At 6 months postoperatively, no tumor recurrence or deformity was evident.



Figure 1



Figure 2

III. DISCUSSION

The nasolabial flap is widely used in facial reconstruction, due to its ease and reliability. Its use is well known for reconstruction of nasal, cheek defects but its extended indications can be reconstruction of upper lip, anterior floor of the mouth, the lower lip and nasal lining as a turn-over flap (5). The flap's rich subdermal plexus confers viability even allowing for a length-base relation of 3:1 instead of 2:1; but in this form its base should ideally measure from 2,5 up to 3,5 cm

making the primary closure of the donor site problematic.

It is possible to expand the versatility of nasolabial flap by using its perforator counterpart. The nasolabial perforator flap uses the same donor site as traditional nasolabial flap but implements a free-style islanded flap nourished by a well-designated vascular pedicle based on angular artery or one of its branches (2). Flap motion can be either rotation up to full propeller or simple advancement. Once identified, pedicle can be up to dissected up to 3 cm providing necessary mobility

to the flap to reach all the way to the base of the nose. By using a designated vascular pedicle we can break free from dimension restrictions such as 3:1 or 2:1 and raise long flaps with a dimension ratio of 9:2 as in this case. An islanded flap can move freely to all areas of mid face and the remaining portion of the flap not covering the defect can fill the donor site making primarily closure possible and easy.

Propeller motion is used in this case utilizing two different vascular pedicles. While the upper pedicle is released just enough to make necessary rotation, the lower pedicle is dissected thoroughly to avoid tension on the pedicle when the lower part of the flap (where the lower pedicle is connected) advanced all the way into the defect site. Propeller motion can become an issue in some cases especially in relatively large flaps. Even though the artery can withstand the twisting motion and the arterial flow can persist, the veins of the perforators can collapse easily. Because of that choosing the right perforator and using the right motion is imperative in survival of the flap. In this particular case, using both of the perforators was probably a mistake. Early transient venous insufficiency is expected with these kind of flaps, but venous outflow problem with this flap was most severe to the point that flap lost all its visible capillary refill after 36 hours and deemed as failure. We think after the 180 rotation the veins of the lower perforator was likely collapsed while the both arteries continued providing robust blood flow to the flap resulting in excessive venous insufficiency. Couples of stitches were taken out for both relieving the tension and interfering with accumulation of blood under the flap causing additional pressure. Despite both this maneuvers, as stated capillary refill was lost over the flap.

Immediate debridement and coverage with graft can be tempting because that way the issue can be resolved quickly and without much fuss. But according to our experience, venous outflow problems with facial perforator flaps are common and can be severe in few instances. We think instead of interfering wait-and-see option should be the way to go because;

- a) Almost always the problem resolves in 48-72 hours
- b) These flaps are quiet resilient and can recover from even dire situations.

Having said that, we weren't expecting full recovery from that point. Our expectation was loss of a significant portion of the flap and having a second surgery after demarcation of the necrosis. There are no reports of a facial perforator flap recovering from this kind of severe venous problem without any intervention, so we thought it would be valuable for presentation.

IV. CONCLUSION

Free-style perforators on the face are used more and more recently instead of conventional flaps because of their versatility and reliability. The common

down-side of these flaps are venous insufficiency but it usually resolves in couple of days. We hereby presented a good example for the resilience of the nasolabial flap. Although it is one case and can't represent a wider scope, we think this recovery shows even in grave situations patience observation and conservative approach can be utilized.

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Study of Clinicobiochemical Changes in Patients with Small Bowel Obstruction

By Pankaj Singh, M. Birkumar Sharma, Rumi Debbarma & Amit Kumar

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Abstract- Introduction: Small intestinal obstruction is a common surgical emergency that accounts for at least 20% of all admissions to a surgical service.

Aims and objectives: To study the various clinical features and biochemical profile in small intestinal obstruction and to study the biochemical changes with outcome of treatment.

Materials and methods: Observational cross-sectional study was conducted in RIMS, Imphal, Manipur for two years with sample size of 82 patients of small intestinal obstruction getting admitted in the Department of Surgery.

Results: Total 82 patients were included out of which 63 were males and 19 were females presented with symptoms of pain abdomen, vomiting, constipation and abdominal distension. Mechanical obstruction was recorded in 76 (92.68%) cases, paralytic ileus in 5 (6.1%), while in 1 (1.21%) the type was not determined. Causes of intestinal obstruction were of obstruction followed by strangulated hernias (15.85%) and ileocaecal TB peritonitis (9.76%) was the main cause of paralytic ileus.

Conclusion: Most common cause of small intestinal obstruction was adhesions and bands and 52 patients managed by surgery and 30 students managed conservatively.

Keywords: intestinal obstruction, paralytic ileus, hernias.

GJMR-I Classification: NLMC Code: WI 420



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Study of Clinicobiochemical Changes in Patients with Small Bowel Obstruction

Pankaj Singh ^α, M. Birkumar Sharma ^σ, Rumi Debbarma ^ρ & Amit Kumar ^ω

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Conclusion: Most common cause of small intestinal obstruction was adhesions and bands and 52 patients managed by surgery and 30 patients managed conservatively.

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I. INTRODUCTION

Small intestinal obstruction is defined as failure in forward propulsion of the contents in the intestine either due to dynamic or adynamic cause.^{1,2,3} Dynamic obstruction is a mechanical problem caused by a physical blockage which can either be extraluminal (extrinsic), mural (intrinsic) or intraluminal. Adynamic obstruction (functional) is due to paralysed bowel without any mechanical cause.^{4,5}

Small intestinal obstruction is a universal problem with a wide geographical variation in the aetiological patterns. Even in same geographical location the aetiology varies with time.^{6,7} In the tropics patients are seen late with dehydration, circulatory collapse, biochemical derangements and sepsis leading to considerable morbidity and mortality.⁶ Depending on the site of obstruction, intestinal obstruction can be of either small intestinal obstruction or large intestinal obstruction. Krebs HB et al studied the incidence of

intestinal obstruction and found that small intestinal obstruction is far more common than the large intestinal obstruction (77% versus 23%) respectively.⁸

In high small intestinal obstruction vomiting occurs early, is profuse and causes rapid dehydration with minimal distension and little evidence of dilated small intestinal loops on abdominal radiography. Whereas in low small intestinal obstruction, pain is predominant with central distension and multiple dilated small intestinal loops on abdominal radiography.⁹

In addition to all these signs and symptoms there is change in the internal milieu of the body also. This is mainly due to the improper absorption, repeated vomiting, constipation all leading to the biochemical changes in the body. These biochemical changes have severe adverse effects on the body so the timely correction of these changes can save the patient from grave consequences like seizures, cardiac arrhythmias, acute renal failure and even death also. The knowledge of these biochemical changes occurring in the body during small intestinal obstruction helps the surgeon to decide further management plan.^{10,11}

RIMS, is the main referral and teaching hospital in Manipur. It receives emergencies from neighbouring states as well as other part of country. Some patients are finally seen at the hospital several days after onset of intestinal obstruction especially referrals. So the aim of this study was to find out the presentation, aetiological pattern, management and outcome of intestinal obstruction at the RIMS.

II. AIMS AND OBJECTIVES

1. To study the various clinical features and biochemical profile in small intestinal obstruction.
2. To study the biochemical changes with outcome of treatment.

III. MATERIALS AND METHODS

a) Study design

Observational cross sectional study.

b) Study Period

October 2013 to September 2015 with minimum period of one month for follow up of last case.

c) Study population

The study will be done on all the patients attending RIMS OPD, casualty and emergency services

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with signs and symptoms of intestinal obstruction and requiring admission under the Department of General Surgery.

d) *Inclusion criteria*

Patients aged more than 12 years coming to hospital with signs and symptoms of intestinal obstruction and are willing for management in our hospital are included after taking informed written consent.

e) *Exclusion Criteria*

- Infants with intestinal obstruction due to congenital causes.
- Patients those who are treated on OPD basis/refused admission/terminally ill patients.

f) *Sample size*

82 patients of small intestinal obstruction getting admitted in the Department of Surgery within the study period who are willing to give valid consent and who fulfils the inclusion and exclusion criteria will be studied and included in study.

g) *Study variables*

Age, Sex, clinical presentation, biochemical parameters.

h) *Method of Data Collection*

1. Data will be collected from patients who are admitted in Surgical wards of RIMS, with a provisional diagnosis of small Intestinal obstruction.
2. Clinical study will be through questionnaires and clinical examination.
3. All patients will undergo routine biochemical and special investigations.

4. Treatment modality will be planned once the definitive diagnosis of intestinal obstruction is arrived at.
5. Post operative observation of patients for any complications.
6. Regular follow up and health education for the patients treated.

i) *Statistical analysis*

Statistical analysis will be done by using data based programme, descriptive statistics such as mean, proportion, percentage will be used. The result of the study will be interpreted using SPSS software 21 version. Chi square test will be used as a test of significance of the study. p-value <0.05 will be taken as significant.

j) *Ethics*

All the participants will be informed about the nature of the study and those agreed to participate will be asked to sign the informed consent formed. Participants are assumed that they could withdraw from the study at any time. The approval of the Institutional Ethics committee, Regional Institute of Medical Sciences (RIMS) will be taken. Confidentiality will be maintained.

IV. RESULTS AND OBSERVATION

a) *Age distribution*

The age range was between 13 years to 94 years. Most of the patients were between 21- 40 years accounting for 53.2% while the least group was above the age of 70 years (5.2%).

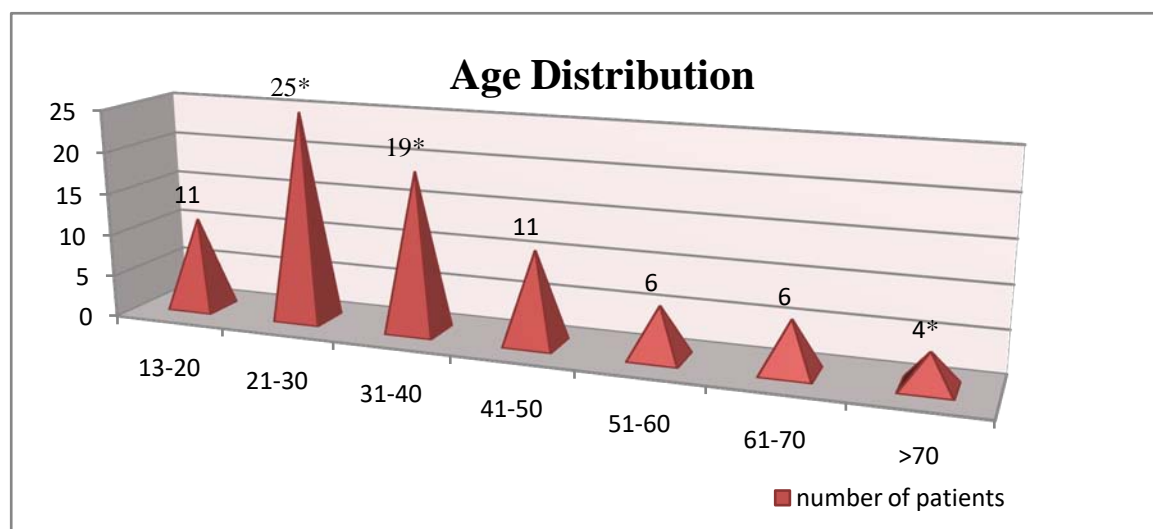


Figure 1: Age distribution of study population (n=82)

b) Sex distribution

There were 63 (77%) male patients and 19 (23%) female patients giving a male to female ratio of 3.2:1.

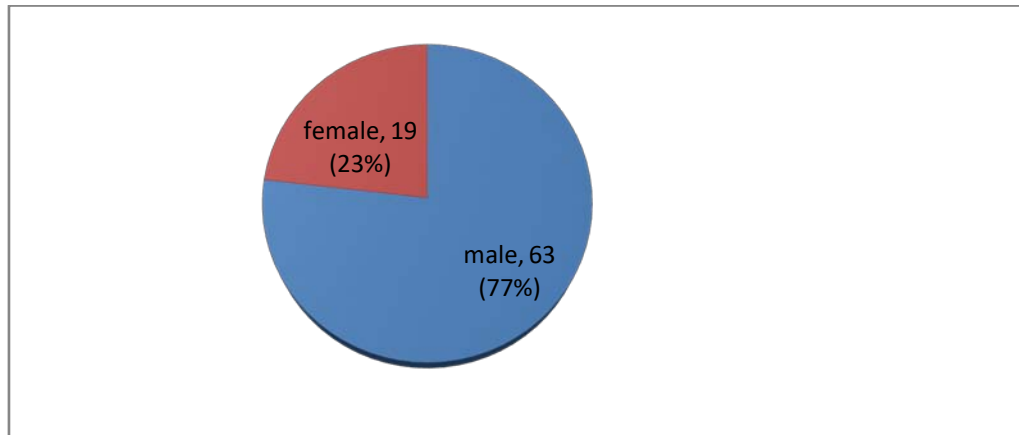


Figure 2: Bar diagram of gender distribution

c) Symptoms

The pattern of frequencies of the common presenting symptoms were as follows: abdominal pain

(96.1%) vomiting (87.3%), constipation (77.3%) and abdominal distension (66.4%). None of the symptoms were found in isolation, they co-existed.

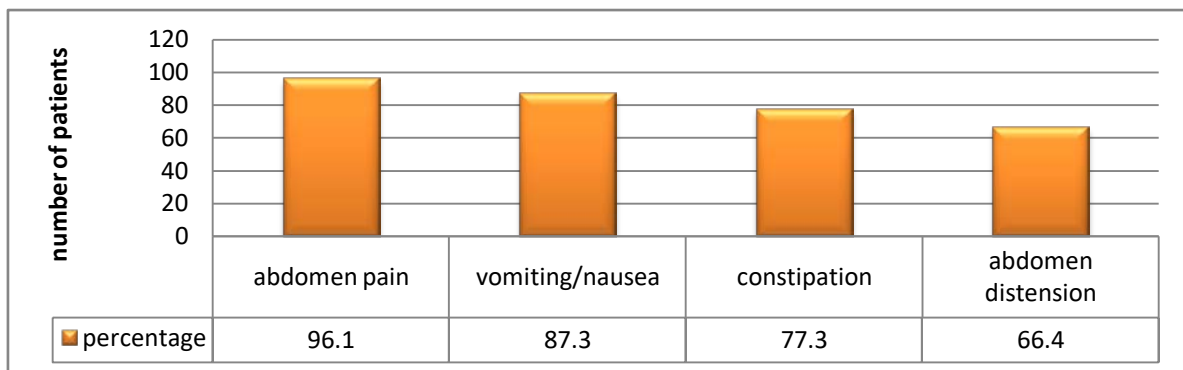


Figure 3: Distribution of symptoms in percentage

d) Duration of symptoms

The duration of symptoms was as shown in the table below. These were divided into intervals of 3 days for simplicity of presentation due to wide range. 46 (56.09%) patients were seen within the first three days of symptoms. The duration of symptoms was not documented in 1 (1.21%) patients.

Table 1: Duration of symptoms (n=82)

Duration of symptoms (Days)	Number of cases	Percentage
0-3	46	56.09%
4-6	16	19.51%
7-9	10	12.19%
>9	9	10.97%
unknown	1	1.21%
Total	82	100%

e) Physical signs

The frequencies of the main physical findings were as shown in the table below. No single finding was in isolation they co-existed.

Table 2: Physical findings

Findings	Total Number	Percentage (%)
Abdomen distension	60	73
Abdomen tenderness	56	68.5
Increased Bowel sounds	48	59.2
Abdomen scar	26	32.4
Decreased Bowel sounds	21	26.1
Hernia	17	20.4
Dehydration	13	15.4
Tachycardia	89	10.9
Visible Peristalsis	7	8.8
Hypotension	5	6.1
Abdomen mass	4	5.0
Fever	2	2.5

Abdominal distension was the commonest finding 73%, abdominal tenderness 68.5% and elevated bowel sounds 59.2%. Previous abdominal scars were found in 32.4%, while reduced bowel sounds were recorded in 26.1%. Other less frequent signs were as shown in the table.

f) Type of intestinal obstruction

Mechanical obstruction was recorded in 76 (92.68%) cases, paralytic ileus in 5 (6.1%), while in 1 (1.21%) the type was not determined.

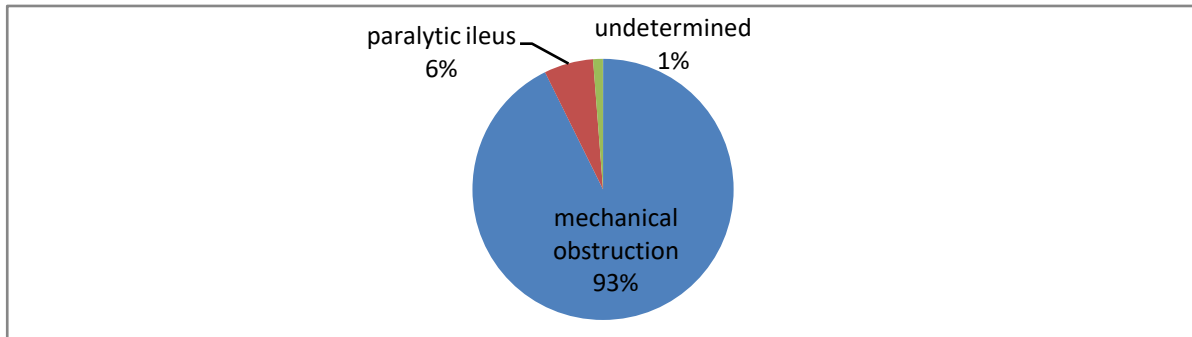


Figure 4: Type of intestinal obstruction

g) Causes

These are summarised in the table below for the different types of intestinal obstruction.

Table 3: Causes (n=82)

Cause of intestinal obstruction	Number of patients	Percentage
Adhesions	56	68.29%
Hernia	13	15.85%
Ileocaecal tuberculosis	8	9.76%
Intussusceptions	3	3.66%
Tumours	2	2.44%
Total	82	100%

Overall, adhesions and bands were the commonest (68.29%) cause of obstruction followed by strangulated hernias (15.85%) and ileocaecal TB peritonitis (9.76%) was the main cause of paralytic ileus.

h) Distribution

Distribution of hernias:

Table 3(a): Hernia distribution (n=13)

Type of hernia	Number	Percentage
Inguinal	11	84.62%
Umbilical	1	7.69%
Femoral	1	7.69%
Total	13	100%

Of all strangulated hernias, inguinal hernias were commonest 84.62%, umbilical and femoral hernia were very rare each accounted for around 7.69% overall.

i) Management

Overall, operative management was instituted in 52 (69.41%) patients while the rest 30 (30.53%) were managed conservatively.

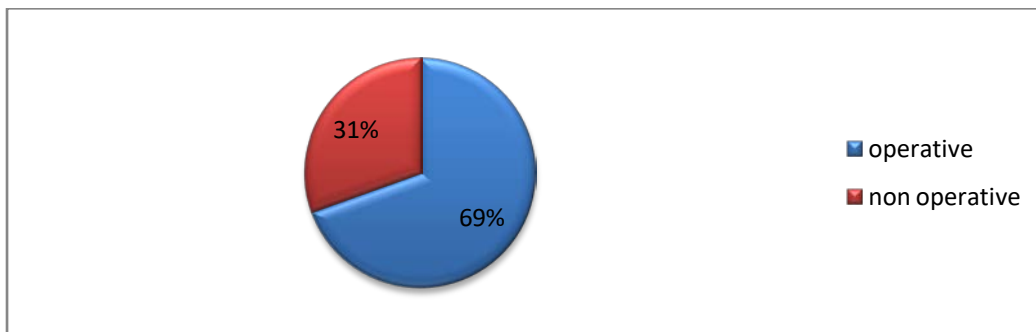


Figure 5: Management

Overall, surgery was performed in 69.47% of all the patients the type of which depended on cause and intra-operative findings. The rest of the patients, 30.53%, were managed conservatively.

j) Complications

Overall, 31 (37.80%) patients had complications while 51 (62.2%) had none. Complications were

observed either pre-operatively or post-operatively as shown in the tables below. These did not occur in isolation since at least two could be found in one case.

Table 4(a): Pre-operative complications

Complications	Number of patients	% of total patients
Dehydration	12	14.43%
Peritonitis	11	13.41%
Gangrene	9	10.97%
Electrolyte imbalance	4	4.88%
Sepsis	4	4.88%
Gut perforation	2	2.44%
Renal failure	1	1.22%

Table 4(b): Post-operative complications

Complications	Number	% of total patients
Recurrence	3	3.66%
Wound infection	2	2.44%
Fistula formation	1	1.22%
Burst abdomen	1	1.22%
DVT	1	1.22%
Total	8	9.76%

Complications were relatively fewer post-operatively (9.76%). There was however a significant association between pre-operative peritonitis, pre-

operative guts gangrene and post-operative wound infection and fistula formation.

k) Hospital stay

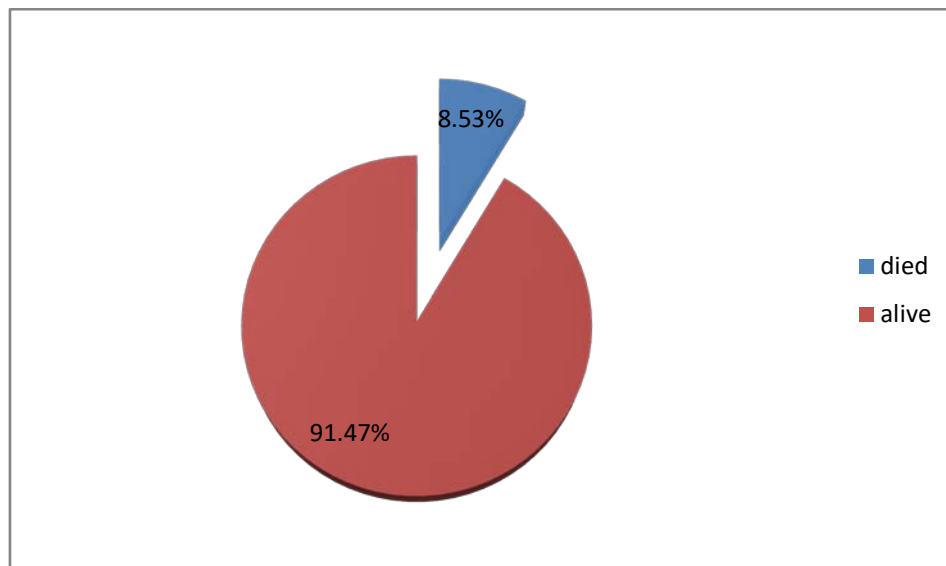
The figure below shows the number of days taken in hospital with a mean hospital stay of 7.39 days. Majority 51 (62.19%) were discharged within the first one week, 24 (29.27%) were discharged within the second week while 7 (8.54%) stayed in hospital for more than two weeks.

Table 5: Duration of hospital stay (n=82)

Hospital stay (days)	Number	Percentage
1-7	51	62.19%
8-14	24	29.27%
15-21	3	3.66%
>21	4	4.88%
Total	82	100%

l) Mortality

The mortality rate was 8.53% (7) patients of the 82 cases.

**Figure 8:** Mortality rate in percentage

Mortality/duration of symptoms

The mortality rate increased with increased duration of symptoms as shown in the tables below.

Table 6: Overall mortality/duration of symptoms (n=7)

Duration(days)	Number	Percentage
1-2	1	14.29%
3-4	2	28.57%
>5	3	42.86%
Unknown	1	14.29%
Total	7	100%

m) Association

Table 6(a): Mortality versus duration of symptoms

Duration of symptoms	Mortality		Total
	Yes	No	
1-2	1(2.17%)	45(97.82%)	46
3-4	2(12.5%)	14(87.50%)	16
>5	4(20.0%)	16(80%)	20
Total	7	75	82

Level of significance $p < 0.05$. Pearson Chi-square=0.000. This shows a significant association between duration of symptoms and mortality. There was an increase in mortality rate compared to increase in duration of symptoms.

n) *Electrolyte profile**Table 7(a): Sodium profile*

Electrolyte conc. Na ⁺ (meq/l)	Number of patients	Percentage of patients
120-125	5	6.10%
125.1-130	18	21.95%
130.1-135	20	24.40%
135.1-140	19	23.17%
140.1-145	15	18.30%
145.1-150	5	6.10%
>150	0	0%
Total	82	100%

Table 7(b): Potassium profile

K ⁺ (meq/l)	Number of patients	Percentage (%)
3-3.5	9	10.97%
3.51-4.0	12	14.63%
4.01-4.5	20	24.40%
4.51-5.0	30	36.59%
5.01-5.5	8	9.76%
5.51-6.0	3	3.66%
Total	82	100%

Table 7(c): Chloride profile

Chloride conc.	Number	Percentage (%)
90-95	31	37.80%
95.1-100	27	32.92%
100.1-105	20	24.40%
>105	4	4.88%

Table 8(a): Effect of duration of symptoms on serum sodium levels in patients with small bowel obstruction

Sodium levels	Duration of symptoms	Number of patients	Percentage of patients
Hyponatremia	5	37	45.12%
Normonatremia	2	45	54.88%

The study shows that 45.12% patients had hyponatremia with delayed presentation of around 5 days whereas those patients with early presentation don't have significant changes in the sodium levels. No patients with small bowel obstruction had hypernatremia. The p value was <0.0001.

Table 8(b): Effect of duration of symptoms on potassium levels in patients with small bowel obstruction

Potassium levels	Duration of symptoms	Number of patients	Percentage of total patients
Hypokalemia	4	13	15.85%
Normokalemia	2	59	71.955
Hyperkalemia	6	10	12.20%

Of the total 82 patients with small bowel obstruction 13 patients had hypokalemia with an average time of presentation around 4 days, 10 patients had hyperkalemia with more delayed presentation of around 6 days of symptoms. Around 59 patients with

early presentation had normal potassium levels. The p value was 0.020.

Table 8(c): Effect of duration of symptoms on serum chloride levels in patients with small bowel obstruction

Serum chloride levels	Duration of symptoms	Number of patients	Percentage of patients
Hypochloremia	5	24	29.26%
Normochloremia	2	52	63.41%
Hyperchloremia	3	6	7.32%

Of the total 82 patients with small bowel obstruction 24 patients with delayed presentation of around 5 days had low chloride levels where as 6 patients had high chloride levels. 52 patients with early presentation had normal potassium levels. The p values was 0.036.

V. DISCUSSION

In this study, 63 (76.82%) cases were male while 19 (23.17%) were female giving a male: female ratio of 3.3:1 which showed a male preponderance (figure 2). This compares to an earlier study by Ngugi J³⁶ intestinal obstruction from adhesions where the ratio was 3:1. The mean age was 37.50 years with a range of 13-94 years (figure 1). The peak age group was in the third and fourth decades accounting for 53.2% compared to the fifth decade in the United Kingdom.⁴¹

In this study, Mechanical small bowel obstruction (SBO) was the commonest type, 92.68%, followed by paralytic ileus found in 6.1% of the cases. Mechanical SBO occurrence is more frequent since the main causes of mechanical obstruction (adhesive obstruction and hernia strangulation) mainly occur at the level of small bowel (table 3).

The pattern of intestinal obstruction at RIMS compares to that in the western advanced countries which contrasts earlier reports by McAdam W. J³² and Paul Ivo Garrido³³ where strangulated hernias were found to be the commonest cause in developing countries. The main cause of intestinal obstruction at RIMS is due to adhesions and bands, mainly associated with previous laparatomies. A small group may occur due to peritoneal infections or inflammatory conditions for which laparotomy has not been done.³⁶ This pattern differs with other developing countries contrary to literature.⁸

Akcakaya A⁴² in Turkey noted that the most frequent cause of intestinal obstruction in the developed countries is adhesions while strangulated hernias are more common in developing countries, which does not appear to be the case at RIMS. In India, Tamijmarare et al⁴³ k. showed that in a study of 572 patients admitted with Small intestinal obstruction between 1984 and 1992, 219 patients had obstructed external hernias as the leading cause while adhesive obstruction was second in 176 patients.

India is a developing country but the pattern of intestinal obstruction compares to that of developed countries due to the fact that the health delivery in urban centres tends to simulate that of developed countries.³⁶ With hernias being electively repaired and obstructive hernias becoming less common, adhesive obstruction has emerged as the leading cause of intestinal obstruction in the west⁴³ which could possibly be the case at RIMS.

In evaluation of the patients, the most useful guide to diagnosis was plain abdominal X-rays, where in combination with history and physical findings, distended bowel loops with air-fluid levels was diagnostic. The severity of obstruction can be determined from the number of air-fluid levels as it increases with the number of levels. It should however, be noted that in adults, two inconstant fluid levels may be regarded as normal one at the duodenal cap and the other in the terminal ileum.¹⁵ The laboratory evaluation included haemogram and biochemistry including serum, electrolyte profile.

The development of hyponatremia was largely dependent on the duration of symptoms as suggested by very low p-value which was less than 0.001. This could be due to high concentration of Na^+ in gastrointestinal secretions.^{44,45} On an average, in the first 3 days of obstruction, the patient had normal Na^+ levels, and after 4 days, patient had hyponatremia. Na^+ levels were either normal or below normal. There was no patient with hypernatremia. Normal Na^+ levels existed among patients who presented within first 3 days.⁴⁶

On an average 2 days elapsed before K^+ levels changed, becoming hypokalemic and later hyperkalemic. Patients with intestinal obstruction lose K^+ both in secretions and urine. As the distal convoluted tubule respond to aldosterone in the shock like state of intestinal obstruction. They reabsorb Na^+ ions. The reabsorbed Na^+ is exchanged for H^+ and K^+ . In small bowel obstruction low H^+ exist due to vomiting. Since H^+ is also low in early obstruction, K^+ is lost to the tubular lumen instead. That may explain the early hypokalemia. K^+ is also lost to the intestinal lumen. Later on, serum H^+ is increased due to anaerobic metabolism and lactic acid production. The increased H^+ is excreted instead of K^+ . Thus K^+ level goes up. Also on acidosis H^+ is pumped into the cell in exchange for Na^+ instead of K^+ . This is accentuated by high aldosterone levels that are in consonance with hypovolemia that occurs in intestinal obstruction.⁴⁷ The p value was 0.020, which was statistically significant. Thus the general trend was as expected physiologically.

The trend of serum chloride concentration in patients presenting after a short duration of small intestinal obstruction was normochloremia followed by hyperchloremia then hypochloremia, patients had a statistically significant p value of 0.036. This tie up with scientific explanation that most patients are assumed to

have had normal levels before intestinal obstruction, hyperchloremic then hypochloremia. Patients followed initial hypochloremia could be explained by the initial reabsorption of Na^+ . This is effected by the proximal convoluted tubule. This is more effective before aldosterone levels rise. The Na^+ is followed by Cl^- for electroneutrality in the proximal convoluted tubule thus Cl^- levels rise initially.⁴⁸

Later hypochloremia could be explained by; as hypovolemia develops, aldosterone levels rise. This favours Na^+ reabsorption in the distal convoluted tubules. In the distal convoluted tubules, Na^+ reabsorption is in exchange for K^+ and H^+ . A transient hypokalemia seems to occur on average in patients presenting after 4 days, whereas hypochloremia existed in patients presenting after 6 days. Thus, the Na^+ reabsorbed in the distal convoluted tubules in the presence of aldosterone is exchange for H^+ instead of K^+ . Thus Cl^- ions will be lost in the form of paradoxical aciduria⁴⁸ and even when the transient hypokalemia shifts to hyperkalemia hypovolaemic shock exists. Thus there is anaerobic respiration and lactic acidosis. The H^+ excreted is still followed by Cl^- thus favouring Cl^- ion loss in urine further with consequent hypochloremia.⁴⁹

Majority (62.19%) of the patients were discharged from hospital within the first week (figure 7). Hospital stay was determined by severity and outcome. The mean duration was 7.39 days. Most of the patients were followed up at the surgical outpatient clinic, Patients' follow up was determined by the cause and outcome. Patients managed operatively were booked for follow up. Some patients booked for follow up did not attend the clinic for reasons that could not be established in this study.

VI. CONCLUSION

Commonest physical findings in this study was abdominal distension (73%) followed by abdominal tenderness (68.5%). The type of obstruction most common was mechanical obstruction (92.68%) and most common cause of obstruction was adhesions and bands (68.29%) followed by hernia (15.85%). Inguinal hernia was most common. 52 patients were managed by surgery and 30 patients by conservatively.

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Authors' Contribution

I declare that this work was done by the author named in this article.

Conflicts of Interest

No conflicts of interest are associated with this work.

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A Prospective Study Comparing Polyurethane Film Dressing with Petroleum Gauze Dressing on Split Thickness Skin Graft Donor Sites in Suburban Hospital in Nigeria

By Awe, Oluwafemi Olasupo

Ambrose Alli University

Abstract- Introduction: Split-thickness skin grafting is a very significant procedure in surgery and it is frequently done. This procedure has been part of the armamentarium of the reconstructive surgeon since antiquity. Many of this procedure, are carried out with the outcome of the primary wound in focus, without considering the possible distress associated with the donor sites.

Objective: To compare the outcome of the donor sites following the polyurethane dressing and the multi-layered petroleum gauze dressing in a Suburban Hospital in Nigeria.

Methodology: This is a prospective study comparing the outcome of two types of dressing used for donor sites of the split-thickness skin graft. Informed consent was taken directly from the patient. All patients were adult to allow for qualitative assessment of some parameters like itching. The details obtained from the patient include the bio-data, indication for surgery, duration of healing, and complications. These were analyzed using SPSS version 22. A p-value less than 0.05 were considered to be statistically significant.

Keywords: donor sites, split-thickness skin graft, polyurethane film, petroleum gauze.

GJMR-I Classification: NLMC Code: WJ 768



Strictly as per the compliance and regulations of:



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Results: Thirty-three (33) patients with forty-seven (47) donor sites were involved in the study, 21 (63.6%) males and 12 (36.4%) female with M: F of 1.75:1. The ages of the patients range from 23 to 68 years, with a mean age of 42.21 years. The patients were consecutively allotted into two groups, i.e. the polyurethane group consists of 16 patients with 23 donor sites while the multilayered group was 17 patients that have 24 donor sites. Fourteen (14) of the patients had bilateral donor sites, and these were shared equally into the two groups. The indications for the procedure include burns, trauma, chronic leg ulcers, diabetic foot ulcers, necrotizing fasciitis, and malignancy. Trauma had the highest with 34%, and the least of the indication is from necrotizing fasciitis. The average cost of dressing for the polyurethane group was #4,435 (US\$12.32) while that of the multilayered group was #6,325 (US\$17.57). Complications like delayed healing, infection, hypertrophic scar and itching were analyzed. Delayed healing and infection rates was 34.8% and 21.7% respectively in the polyurethane group while they were 58.3% and 50% in the multilayered group with P-value of 0.032. Hypertrophic scar and itching were 87.0% and 100% respectively in polyurethane dressing and 95.8 and 100% in multilayered dressing.

Conclusion: This study has been able to reveal that the polyurethane dressing is a more reliable and closer to an ideal

dressing for the donor sites of split-thickness skin graft compared to the multilayered petroleum gauze dressing. It is cheaper, requires less care, and reduced morbidity.

Keywords: donor sites, split-thickness skin graft, polyurethane film, petroleum gauze.

I. INTRODUCTION

Skin grafting is one of the most frequent procedures performed by surgeons (including general surgeons, orthopedic surgeons, plastic surgeons and others). The donor site is the secondary defect in the skin created by the surgeon to harvest skin graft to cover the primary defect. It is one of the options in the reconstructive ladder. The skin graft could be either full-thickness or split/partial thickness skin graft depending whether the whole or part of the dermis was harvested with the overlying epidermis. The donor site split-thickness skin graft is expected to heal (re-epithelized) uneventfully from the remnant of the skin appendages left. The split thickness skin graft donor site is comparable to a partial thickness burn wound and it is expected to heal before 14 (fourteen) days after the surgery and any healing after 14 days is considered to be morbidity¹. This should be without pain, delay, or abnormal scarring (Fig 1 a & b). There have been some factors identified to affect the outcome of the donor site. These factors include the technique and the depth of the skin harvested, the dressing material used, and patient's factors like co-morbidity, cigarette smoking, and nutritional status. It has been proven that the type of dressing contributes immensely to the rate of healing/re-epithelization, associated pain, frequency of change of dressing, and complication rate². The less these last three factors, the more skin grafting are acceptable to the patients. Many studies have compared different types of dressing and measure the primary outcomes³⁻⁵. The cost of dressings and availability are very key factors in the choice of dressing. There have been few of these studies done in the developing countries and among the color-skinned, especially Africans.

Dressings that were involved in these studies include hydrocellular foam (Allevyn), Alginates, petroleum-gauze-antibiotic, Polyurethane, etc. This

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study is to compare the primary outcomes of the donor site using multilayered petroleum gauze dressing and Polyurethane film (single-layered dressing). It has been identified that there is epithelial layer in-growth into the multilayered petroleum gauze dressing that results in repeated trauma during the change of dressing whenever there is need. There is also a problem with wound review because the wound cannot be reviewed unless it is removed. The polyurethane dressing is a

transparent semi permeable film which allows for wound review without any need for a change of dressing (Fig. 2). This dressing is more convenient for the patient and also allows for a bath. However, there could be an accumulation of serum or hematoma underneath the dressing, which may predispose to infection. These two types of dressing methods are the ones used in our unit for the management of the donor sites of split-thickness skin graft.

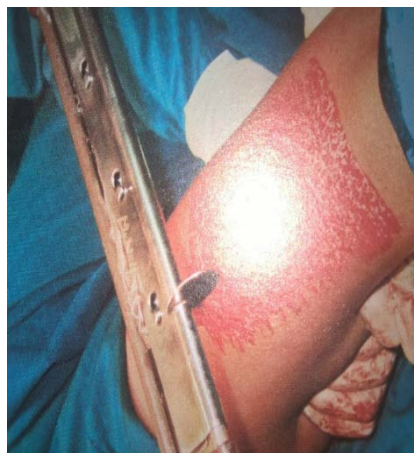


Fig. 1a



Fig. 1b



Fig. 2

II. METHODOLOGY

This was a prospective study carried out in the Plastic Surgery Unit, Department of Surgery of the Irrua Specialist Teaching Hospital, Irrua, Edo State, Nigeria, between January 2017 and December 2018. Thirty-three (33) consecutive patients were co-opted into the study after fulfilling the criteria. The indications for the split-thickness skin grafting include trauma, chronic leg ulcers, burn, necrotizing fasciitis, etc. All the patients had the following investigation done: complete blood count, wound biopsy for histopathology, microscopy, culture and sensitivity, serum protein, and fasting blood sugar level. The patients had informed consent. All patients included in this study were above the pediatric age to be able to effectively measure some qualitative parameters like pain and itching. Most of the patients had regional anesthesia, especially spinal because most of the donor and recipient sites were on the lower limbs while the rest had general anesthesia. The donor sites were from the anterolateral aspect of the thigh harvested with the aid of manual dermatome (Fig. 3 Hurmby's knife). Initial hemostasis was achieved with adrenaline (1:200,000) solution and compression bandaging for 5mins before the application of the dressing. The multilayered petroleum gauze dressing comprises of i) Innermost petrolatum gauze as the non-adherent layer ii) Gauze dressing soaked in povidone-iodine as the capillary layer iii) Gam-gee layer as the absorbent layer and iv) The outermost bandage as the retention or

adhesive layer. The polyurethane dressing is a transparent semi-permeable self-adherent dressing called 'OPSITE' (Fig. 4). The duration of dressing was also assessed using a stop-watch (in seconds) after hemostasis has been achieved in both groups. The patients' donor sites were not reviewed until the 7th day after the operation to check for strike-through, pain, and discharge. The presence of these may indicate infection and the need for a change of dressing. If there was no complaint, the wound review was at 14th day after the operation when the donor site is expected to have re-epithelialized.

Exclusion criteria include a) The patients with hematocrit level less than 11g/dl, b) Those with serum protein less than 3.5g/dl, c) The patients who didn't want to be part of the study. d) Those lost to follow-up before six months. The patients were placed consecutively into two groups depending on the dressing used for the donor sites. The first group had single-layered polyurethane dressing while the second had multilayered petroleum gauze dressing.



Fig. 3



Fig. 4

III. RESULTS

Sixty-seven (67) patients had split-thickness skin grafting during the period under review, however, 33 patients (49.25%) with 47 donor sites were involved in the study. The age of the patients ranges from 23 to 68 years with the mean age of 42.21 years SD 14.14, the median age of 40 years. There were 21 (63.6%) males and 12 (36.4%) females involved with M: F of 1.75: 1. 16 patients were in the polyurethane group while the remaining 17 patients were in the multilayered dressing group. The polyurethane group consists of 23 donor

sites with seven (7) of the patients had bilateral donor sites, while the multilayered petroleum gauze dressing group had 24 donor sites with also seven (7) patients having bilateral donor sites (Fig. 5). The indications for the procedure include the following: excision of malignant lesions, burn injury, trauma, necrotizing fasciitis, chronic leg ulcer, and diabetic foot ulcer. Trauma has the highest incidence with 11 (34%) patients and the least being necrotizing fasciitis with 2 (6%) patients (Fig. 6).

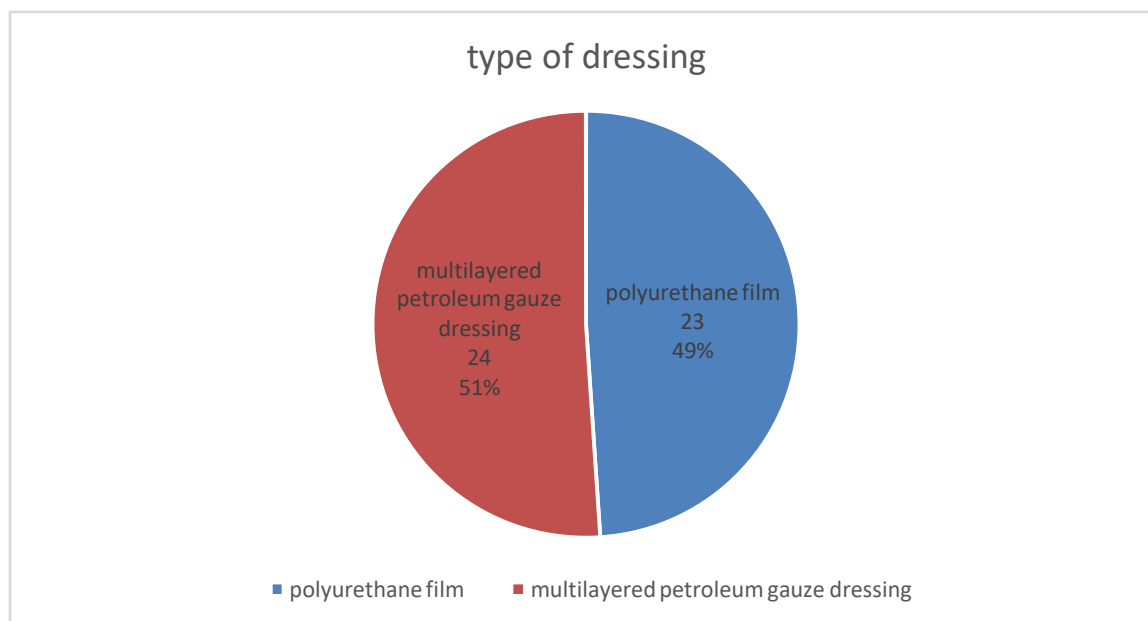


Fig. 5: Types of Dressing Materials

48.9% of all the donor sites only require a single dressing, which was done during the procedure. In polyurethane group, 65.3% had only one dressing done, the remaining 34.7 % required twice or thrice dressing while it was 33.3 % of the multi-layered group that had

only one dressing and remaining 66.7 had multiple dressing up to eight (8) times (Table 1). The cost of dressing of each of the donor site in the polyurethane group was #3000 (US\$8.33) and #2500 (US\$6.95) for the multilayer group. The average cost of dressing in the

polyurethane group was significantly lower #4,435 (US\$12.32) compared to that of the multilayered group #6,325 (US\$17.57) because of the reduced frequency of dressing. The mean duration of dressing was 150.6 +/- 25.6 secs for the polyurethane group and 282.8 +/- 40.2 secs for the multilayer group, which was statistically significant. The five common donor site complications were considered (delayed healing, pain, infection, hypertrophic scarring, and itching). The rate of delayed

healing was 34.8% for the polyurethane group and 58.3% for the multilayered group. Most of the delayed healing in both groups were as a result of infection. Though the infection rate in polyurethane was 21.7% while 50.0% in the other group. Presence of pain after 14 days was considered as morbidity and correspond to that of delay healing. These results were statistically significant. The incidence of hypertrophic scarring and itching were similar in both groups.

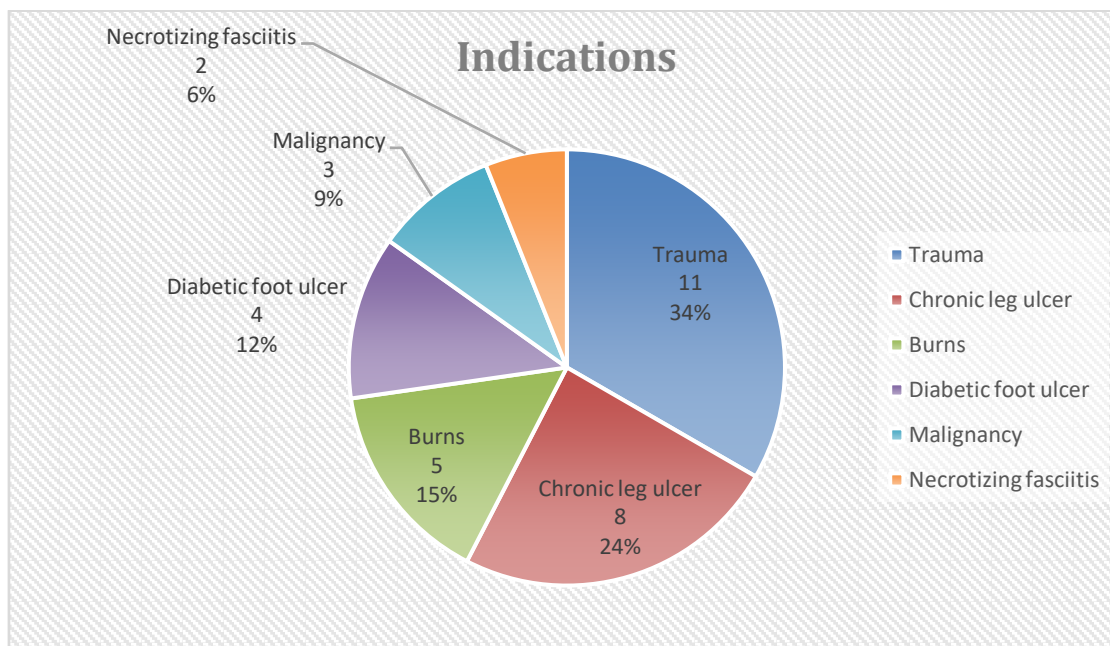


Fig. 6: The indications for split-thickness skin graft

Table 1: Frequency of dressing/ Type of dressing material cross-tabulation

Frequency of dressing	Polyurethane dressing	Multilayered dressing	Total
1	15 (65.3%)	8 (33.3%)	23 (48.9%)
2	5 (21.7%)	3 (12.5%)	8 (17.1%)
3	3 (13.0%)	3 (12.5%)	6 (12.8%)
4	0	5 (20.8%)	5 (10.6%)
5	0	1 (4.3%)	1 (2.1%)
6	0	2 (8.3%)	2 (4.3%)
7	0	1 (4.2%)	1 (2.1%)
8	0	1 (4.2%)	1 (2.1%)
Total	23 (100%)	24 (100%)	47 (100%)

Table 2: Complications/ Type of dressing material cross-tabulation

Complications	Polyurethane (23)	Multilayered dressing (24)	Total (47)
1. Delay healing	8 (34.8%)	14 (58.3%)	22 (46.8%)
2. Infection	5 (21.7%)	12 (50.0%)	17 (36.2%)
3. Pain	7 (30.4%)	14 (58.3%)	21 (44.7%)
4. Hypertrophic scarring	20 (87.0%)	23 (95.8%)	43 (91.5%)
5. itching	23 (100%)	24 (100%)	47 (100%)

IV. DISCUSSION

Skin grafting is a very frequent procedure and has been practiced by many physicians, because of this, it is considered as a minor surgical procedure. Though, not usually associated with mortality, it can lead

to significant morbidity if appropriate techniques are not strictly followed. Skin graft can be broadly divided into full-thickness and split-thickness skin graft. However, the split thickness skin graft can be further subdivided into thin, intermediate and thick depending on the thickness of the dermis associated with the graft. Only a few

articles have been written concerning split thickness skin grafting from Sub-Saharan Africa.

The key equipment needed for the split-thickness skin graft is the dermatome, and used in the harvesting of the graft from the donor site. The dermatome can be manual or powered. The power dermatome may be by electricity, battery, or compressed air. The power dermatome has a significant advantage over the manual in the following ways: a) the power dermatome can be used to harvest skin from any part of the body, and b) the thickness of the graft can be accurately determined by the settings on the machine. In this study, the manual dermatome was used for the harvesting of all the skin grafts because it is the only dermatome available in the hospital. This was similar to that done in South eastern Nigeria⁶. Another equipment of note is the skin-mesher. The meshing machine is needed when the skin graft available is not adequate, and there need for expansion. This machine expands the skin graft by placing regular fenestrations on the graft. The next is the skin boards that are used to maintain flat presenting surface while harvesting with a manual dermatome. It is also used to spread skin before application to the recipient site.

Donor sites of this graft could be from any part of the body, but many studies have emphasized that as much as possible the graft should be harvested from areas that could easily be hidden with a cloth. Many surgeons have taken several skin grafts from the scalp to resurface burn injury to the head, face, and neck, especially the hair-bearing areas. Some have also harvested skin from the back and buttocks because the scars from these can be hidden even with bikinis. Hexcel et al⁷ in their study, harvested split-thickness skin graft from the post-auricular skin to resurface the face, neck, and the upper chest.

Several types of dressing that have been used for donor sites, and many of these had been compared in various studies. The search for the ideal dressing for the split-thickness skin graft donor is still on. This dressing should be easy to apply, inexpensive, cause less pain, require minimal care, and reduced or nil morbidity⁸⁻¹⁰. The dressing materials that had been used include petroleum gauze, povidone-iodine foam (Betafoam)¹¹, Hydrocellular foam (Allevyn), Biobrane, Polyurethane foam, or film. These dressings have been classified into five (5) groups i.e. open, semi-open, close, semi-closed, and no dressing³. Kilinc et al¹⁰ compare three major groups of dressing- open, semi-open, and closed. It has also been divide into dry (petroleum gauze) or moist dressings (honey)¹²⁻¹³.

The cost of dressing and availability of the dressing are very relevant in the provision of care for patients in the low-income and middle-income nations like Nigeria. Petroleum gauze and polyurethane film dressing are readily available and affordable for the patient as donor sites dressing. Many researches in the

developed countries of the world, had compared these two dressings. The conclusion was that the primary outcome was better in the polyurethane group than the multilayered petroleum gauze group.^{5, 14-16}

Complications such as delayed healing pain, infection, hypertrophic scarring, hyper pigmentation, and itching were analyzed in many studies. Infection rate and hypertrophic scar notice by Otene et al⁶ within the first one month was 17.5% and 4.0% respectively, while the infection and hypertrophic scar in this study 36.2% and 91.5%. The infection was assessed on or before the 14th day after the operation. The higher rate of infection may be due to the hygiene of the patients, smaller sample size, and the use of wound swab for microscopy, culture, and sensitivity with a higher possibility of false positive. The incidence of infection was higher in wounds dressed with petroleum gauze in Kenya.¹⁴ Similar outcome was observed in this study; 50.0% in the petroleum gauze group in comparison to 21.7% in patients dressed with polyurethane. Hypertrophic scar and itching have a very high incidence in this study; almost all the patients had hypertrophic scar and itching sometime during the period of the study. It has been discovered that there are risk factors that predispose the patient to persistent hypertrophic scarring. These include complexion (more in blacks), the depth of the donor site harvest, the total of autograft amount, the site of the donor, and longer time to epithelialization¹⁷.

V. LIMITATION

The use of manual dermatome was a limitation because accurate reproducible thickness of graft could not be obtained. The sample size was relatively small and the results may not translate to the wider population. Compounding co-morbidities were also not excluded from this study.

VI. CONCLUSION

Split-thickness skin grafting will remain a significant aspect of reconstructive surgery. Therefore, donor site dressing and management will remain very relevant. This study has established like that of others that the used of polyurethane dressing is superior in outcome to petroleum gauze dressing even in suburban communities.

Conflict of interest

The author declares that there is no conflict of interest and no sponsorship of any kind for this study.

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Repair of Inguinal Hernia in an Ambulatory Way

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Summary- Introduction: The surgical treatment of inguinal hernia has increased in the last decade and its prevalence is not known.

Objective: To evaluate the results of ambulatory surgical treatment of this Entity, describe the population, techniques and complications, from January 2009 to December 2018.

Methods: An observational, descriptive and prospective study of 760 patients with the diagnosis of inguinal hernia was performed, which were operated on an outpatient basis in the General Teaching Hospital "Enrique Cabrera" since January. From 2009 to December 2018. Emergency operated patients were excluded.

Results: The highest incidence of inguinal hernia was found between the ages of 60 and 80 years. Indirect right inguinal hernia appeared more frequently. Desarda's anatomic surgical technique was the most applied in 410 (54%) of the cases and Lichtenstein's hernioplasty with 224 (29.4%) followed in frequency. There was a total of 5 (0.6%) recurrences. Local anesthesia was applied in 609 (90.8%) of the patients, on an outpatient basis they were 100%. The total complications were 31 (4.0%).

Keywords: inguinal hernia; outpatient treatment; hospital costs.

GJMR-I Classification: NLMC Code: WI 950



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Conclusions: Surgical treatment of inguinal hernia on an outpatient basis is an appropriate process. It creates comfort in patients, decreases the risk of hospital infection, reduces waiting lists and hospital costs.

Keywords: inguinal hernia; outpatient treatment; hospital costs.

I. INTRODUCTION

The inguinal hernia is known since man adopted the erect position, so it is one of the most frequent conditions. Its history is as old as humanity itself. It is a topic of interest not only for historians, but for compulsory knowledge for anatomists and surgeons. The first description of hernia reduction dates from the time of Hammurabi in the Egyptian papyri.¹ According to the Papyrus of Ebers, dating from 1560 BC, the hernia is a tumor in the genitals in which the intestines move. It is the protrusion of an organ of the abdominal cavity through a natural or acquired orifice. Hesinten, in 1794,

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establishes a Differentiation between hernias treated by direct and indirect inguinal sacs. It is important to note that this had already been demonstrated by Cospar Stromary in 1599, who insisted on the uselessness of the sacrifice of the testicle in direct hernias.²

In 1804, Cospar described the transverse fascia and pointed out that this layer and not the peritoneum and external oblique aponeurosis was the main barrier to avoid herniation. He also defined direct hernia as a defect that occurs through the Hesselbach triangle.³ With the passing of time came the modern era of hernia surgery, which began with the discovery of antisepsis by Lister, studies on anesthesia, knowledge of the normal physiology of the inguinofemoral region, the introduction of antibiotics and the best understanding of the repair process tissue and scarring. Everything was linked to the emergence of better surgical methods as shown by the work of Henry and Marcy in the USA. UU by E. Bassini in Italy.⁴

We must point out that from the second half of the eighties a new era began, characterized by the use of prosthetic meshes and patches with which better results are obtained in this surgery. Among the materials used is polypropylene, which is biocompatible with high tensile strength, flexible, impermeable to water and resistant to high temperatures, which makes it sterilizable.⁵

The application of outpatient surgery has the following advantages: Altering only alters the patient's life, which receives more individual attention; the anxiety of the patient is attenuated; costs are reduced; decreases the risk of hospital infection and disability; It also facilitates the return to work. All this contributes to improve the quality of the services.

One of the most important aspects of this type of surgery is the application of local anesthesia that improves the cost-benefit ratio of the procedure, decreases the use of hospital beds and allows the patient's collaboration if necessary.

The objective of this study is to evaluate the results of outpatient surgical treatment of this entity, describe the population, techniques and complications from January 2009 to December 2018.

II. METHODS

A cross-sectional, retrospective, descriptive observational study of patients operated out of inguinal hernia was performed in the surgery service of the

"Enrique Cabrera" General Teaching Hospital in the period from January 2009 to December 2018. The universe consisted of patients operated on inguinal hernia in the surgery service of the General Teaching Hospital "Enrique Cabrera" from January 2009 to December 2018. The sample consisted of patients operated on inguinal hernia on an outpatient basis by the Group. Basic Work (GBT) No. 1 in the surgery service of said hospital in the aforementioned period. This study included all patients aged 18 years or older, ASA III or lower risk of anesthesia, obesity not over 50% overweight and carriers of the disease under study. Patients with associated, decompensated and overweight diseases greater than 50% of their body weight were excluded.

The hernia classification used was that of Lloyd M. Nuhys, American surgeon in 1991, who describes a publication based on anatomical criteria.

Type I: Indirect inguinal hernia with normal internal ring.

Type II: Indirect inguinal hernia with enlargement of the inner ring.

Type III: Contemplate in turn three possibilities:

Type IIIa: Direct inguinal hernia,

Type IIIb: Mixed inguinal hernia or in trousers,

Type IIIc: Femoral hernia.

Type IV: All recurrent hernias.

Type IV: All recurrent hernias. 6

The principles related to the code of ethics were followed, according to the Helsinki declaration. The security and confidentiality of the information was guaranteed.

III. RESULTS

It is observed that the most frequent location of the inguinal hernia was the right side with 384 patients for the (50.6%) of the total, of which 66.3, were indirect. The average age of the patients included in the study was 57.4 years. There were five recurrent hernias (0.6%). According to the Nyhus classification, there were a total of 760 patients with hernias belonging to types II and III b, which were the most frequent (Table 1).

Table 1: Sex, location and classification of hernias

Sex	No.	%
Female	92	12,1
Male	668	87,9
Location		
Right	384	50,6
Left	286	37,6
Bilateral	90	11,8
Variety		
Indirect	504	66,3
Direct	224	29,4
Mixed	32	4,3
Classification of Nyhus		
Type I	0	-
Type II	288	37,8
Type IIIa	196	25,7
Type IIIb	206	27,2
Type IIIc	0	-
Type IV	70	9,3

The operative techniques most used in inguinal hernias are shown in Table 2. Non-prosthetic techniques were applied and of these the most performed was the

Mohan P. Desarda technique in 410 patients (54.0%). Within the prosthetic techniques the most applied was that of Lichtenstein, in 224 patients (29.04%).

Table 2: Relationship between relied techniques and recurrence

Techniques	No.	%	Recurrence	%
Shouldice	6	0,7		
Zimmerman I	10	1,3		
Madden	8	1,0	1	12,5
Mc Vay	20	2,6		
Goderiche	8	1,0	1	12,5
Bassini	10	1,3		
Camayd	2	0,2		
Lotheissen Mc Vay	6	0,7		
Halsted	6	0,7		
Desarda	410	54,0	2	0,4

Plug de Rutkow	2	0,2		
Marcy	12	1,5		
Rives	22	9,8		
Lichtenstein	224	29,4	1	0,4
Rutkow-Robbins	8	1,0		
Abraham	0	-		
Zimmerman II	6	0,7		
Total	760	100,0	5	0,6

Table 3 shows the most used anesthetic patients (90.8%) of the total, followed by spinal procedures. Local anesthesia was applied in 690 patients or spinal anesthesia in 66 patients (8.8%).

Table 3: Analgesic Procedures

Procedures	No.	%
Local Anesthesia	690	90,8
Spinal Anesthesia	66	8,8
General and Endotracheal Anesthesia	2	0,2
Acupuncture Anesthesia	0	-
Peridural Anesthesia	0	-
General Endovenous Anesthesia	2	0,2
Total	760	100,0

The associated diseases are shown in Table 4, (19.0%) and the conditions associated with umbilical hernia with 10 patients (1.3%).

Table 4: Diseases and Associated Conditions

Associated Diseases and Associated Conditions	No.	%
Ischemic Cardiopathy	27	3,5
Arterial Hypertension	145	19,0
Diabetes Mellitus	28	3,6
Umbilical Herniorraphy	10	1,3
Femoral Herniorraphy	4	0,5
Incisional Herniorraphy	2	0,2
Eversion of Vaginal	2	0,2
Total	218	28,6

The Table 5 shows the distribution of the period from January 2009 to December 2018, at the complications in patients undergoing local anesthesia in "Enrique Cabrera" General Teaching Hospital.

Table 5: Complications

Complications	No.	%
Seromas	9	1,1
Recurrences	5	0,6
Hematomas	3	0,3
Orchitis	5	0,6
Bladder Piercing	1	0,1
Infection of the surgical site	8	1,1
Total	31	4,0

It is observed that the seroma was the complication that most frequently presented 9 patients (1,1), followed by infection of the surgical site 8 patients (1,0) and in total 31 complicated patients (4,0).

IV. DISCUSSION

The results obtained in this series are consistent with those obtained by different authors and differ from others who point out the primacy of inguinal hernia in younger patients. There was predominance of males, results similar to those referred in several studies on the subject.^{7, 8}

According to experts in the field, up to 25% of males and only 2% of females will develop inguinal hernia at some point in their life. This fact has been related to the descent of the testicle, with a greater thickness of the spermatic cord and with a lower obliquity of the inguinal canal in man.

In the opinion of the authors, who share the Goderich criterion, when other conditions are concomitant, patients should be treated before having herniorrhaphy to avoid postoperative discomfort and the increase in the recurrence rate. There are also criteria that the McBurney incision during appendectomy is related to the appearance of inguinal hernia. In the

present work the ages ranged between 60 and 80 years, which is similar to the literature reviewed. The right inguinal hernia was the most frequent, as well as the indirect variety on both sides. It was also observed that the highest number of hernias corresponded to variety II, from the Nyhus classification, 6, 9 (144 patients) and variety III b (103 patients). Every surgeon who frequently intervenes in patients with a hernia of the inguinal region knows that there are innumerable surgical techniques, to which advantages and disadvantages are indicated. The purpose is to reduce complications and, above all, to avoid recurrences.¹⁰ There are so-called classical (anatomical) techniques that repair the defect of the inguinal wall with the patient's own tissues and, the so-called prosthetic techniques, which use synthetic materials that have had a great development in recent decades and whose application always leads to the same purposes as anatomical.

It was observed that the most used anatomical technique was that of Mohan P. Desarda, followed by the Lichtenstein technique. For some years now, a basic working group of our surgical service has applied the anatomical technique of Professor Desarda and has obtained good results. This technique, as pointed out by its creator, has some advantages, among which are its easy learning and execution, available to residents and surgeons not specialized in the treatment of this disease.^{11,12} The technique provides a posterior wall of the canal Strong inguinal, mobile and physiologically active. When not using the mesh (foreign body) the fibrosis is minimal or does not exist, there is no rejection to foreign body and the postoperative pain on the fifth day of the operation is less than with the techniques that use prosthesis. With the application of local anesthesia, to carry out the outpatient procedure in these patients, the complications were minimal.^{13,14}

By carefully analyzing the number of recurrences and the level of preparation of the acting surgeon, it was found that all patients operated by residents were helped by specialists, who correct the possible defects of the operative procedure; this contributes to the technical improvement and the increase of skills and skills during the surgical act. In Cuba, this has greater relevance, since the teaching care system guarantees the integral surgical training of the resident, an aspect not comparable with what is referred to in the international medical bibliography, where this centralization does not exist.^{15,16,17}

In this series there were no deaths. None of the operated patients had the need to change their occupation, or difficulty to get into their job before 60 days. It is important to highlight the late complications of this procedure, such as the rejection of the bioprosthesis and the appearance of fistulas and granulomas.

We must point out that in this center the various techniques of hernia repair, facial and aponeurotic are

applied, with the use of prosthetic meshes or without these, with good results, especially in the repair of hernias with tension-free facial techniques, since anatomically it is more physiological, compared at the same time, with national and international studies.¹⁸ Taking into account the large number of patients operated during the study period, the savings contributed to the hospital by the reduction of occupied beds, the decrease in the cost of materials and medicines, the faster recovery of patients and the incorporation into their social environment and labor. It is concluded that outpatient surgery with local anesthesia plus sedation is a beneficial method for patients and hospital institutions and this is shown in the results in this case.^{19,20,21,22,23}

V. CONCLUSIONS

The male sex, the right location of the hernia and the type II of Nuhys predominated the herniorrhaphy Desarda, the local nestesia and serona as a complication were more frequent, being the hernia recurrence in our work was 0.6%. As summary we can say that the treatment of inguinal hernia on an outpatient basis results in satisfactory results.

Conflicts of interest

The authors do not declare having conflicts of interest.

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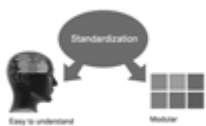
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15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

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

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

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



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

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

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

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

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

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

Final points:

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

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

The discussion section:

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

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

General style:

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

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



Mistakes to avoid:

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

Title page:

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

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

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

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

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

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

Approach:

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

Introduction:

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



The following approach can create a valuable beginning:

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

Approach:

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

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

Procedures (methods and materials):

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

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

Materials:

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

Methods:

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

Approach:

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

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

What to keep away from:

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



Results:

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

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

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

Content:

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

What to stay away from:

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

Approach:

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

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

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

Figures and tables:

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

Discussion:

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

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

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



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

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

Approach:

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

Describe generally acknowledged facts and main beliefs in present tense.

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BY GLOBAL JOURNALS

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Topics	Grades		
	A-B	C-D	E-F
<i>Abstract</i>	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
<i>Introduction</i>	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
<i>Methods and Procedures</i>	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
<i>Result</i>	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
<i>Discussion</i>	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
<i>References</i>	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring



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