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ORIGINAL ARTICLE

OPEN MESH HERNIA REPAIR AT A TEACHING HOSPITAL IN ADDIS ABABA, ETHIOPIA- A THREE YEARS RETROSPECTIVE STUDY

Engida Abebe Gelan, MD[1]

ABSTRACT

Background: *The treatment of hernias has been evolving very fast in the last few decades. The use of mesh for hernia repair has become increasingly popular and many centers consider it as a standard of care.*
Objective: *To determine the occurrence and types of abdominal wall hernias treated with mesh repair techniques and outcomes of patients.*
Methods: *A retrospective review medical records of all adult patients who underwent open mesh repair at St. Paul's Hospital Millennium Medical College from September 2013 to August 2016.*
Results: *Hernia surgery constituted 8% of adult elective surgeries. Of these, 130 (40.9%) had mesh repair. Incisional hernias 68 (52.3%) and groin hernias 44 (33.8%) being the most common forms repaired with mesh. Except inguinal hernias all hernias were more common in females. Laparotomy for bowel surgery and 29 (42.6%) and cesarean section/gynecologic surgeries, 27(29.7%) were the most common surgeries resulting incisional hernias. Of incisional hernias, 39 (57.4%) had emergency surgery and 23 (33.8%) had a low midline incision. Recurrent hernias accounted for 37 (28.5%) of the cases repaired with mesh. Postoperative complication was seen in 14 (10.8%) of the patients, surgical site infection being the main form followed by seroma formation in three and recurrence in three patients. There was an increased number of complications in females (p=0.043) and inpatients with co-morbidity (p=0.041). there was no death in this series.*
Conclusion: *This study found that meshes are being used increasingly for incisional and recurrent inguinal hernias. The outcome in this series of patients was comparable to those reported in literature.*
Key words: *Inguinal hernia; incisional hernia; Mesh repair*

INTRODUCTION

Hernias in general are among common surgical conditions resulting significant morbidity to patients. Incidence of hernia vary in different age groups, sex and type of hernia but groin hernias specifically inguinal hernias remain the commonest form all over the world (1,2). Ventral hernias (mainly occurring in the midline) include incisional hernia, umbilical, paraumblical and epigastric hernias (3).

Incisional hernia (IH) is defined as a breakdown or loss of continuity of a fascial closure following abdominal surgery. It can follow any type of abdominal surgeries and incision. The true incidence of incisional hernia is difficult to know due to under reporting, short follow ups, but it is reported to range from as low as 2% to as high as 40% (2,4-6,). IH is more commonly seen in midline incisions and those who had emergency surgery. The rate is higher on patients with post of complications like surgical site infections, postoperative cough (4,7) .The risk of incisional hernia is higher in the first year and slowly increases after that (8).

With increasing rates of both emergency and elective surgeries done in developing countries, the rate of incisional hernias is increasing (9). Epigastric and para-umblical hernias are midline defects in the Linea Alba at various distances from the umbilicus.

Hernias can be treated with various types' of tissue repair or tension free mesh repair techniques. The success of hernia treatment is measured mainly interms of recurrence rates which is significantly lower in mesh repairs (8). In developed world mesh repairs are the main form of treatment for primary, incisional and recurrent hernias. Because meshes are expensive in most part of developing countries, including Ethiopia tissue repairs are still the main form of treatment for all forms of hernias. Though literatures in mesh repair is scarce in the nation , in the last few years authors observed a tendency of surgeons using more and more mesh repairs in incisional and recurrent hernias. The objective of this study was to determine the rate and types of abdominal wall hernias treated with mesh repair techniques, and outcomes of patients.

1. St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia
Corresponding Author: engidaabebe@yahoo.com

PATIENTS AND METHODS

Retrospective review of all adult hernia patients who were admitted and operated with mesh repair techniques at St. Paul Hospital Millennium Medical College (SPHMCC) from September 2013 to August 2016 were included. SPHMMC is a referral teaching hospital engaged with both under graduate and postgraduate programs. During the study period there were eight general surgeons who were trained how to do open mesh repair in all forms of hernia. An operation theater logbook was used to identify patients. Data collection format (DCF) was developed and pretested.

Medical records of patient was reviewed and data including patients socio-demographic characteristics , type of previous surgery , type of previous incision , type of mesh repair technique , operation time and perioperative outcomes of patients was collected. Individual DCF were checked for completeness, coded entered into and analyzed with SPSS version 20. Results were shown using tables, graphs and central tendency statistics. During statistical test, associations were considered significant when p value was <0.05. Hernia was defined recurrent if hernia developed at previous site of surgery irrespective of the type of repair. Patients with tissue repair were only counted and not included in details of analysis. Ethical clearance was obtained from SPHMMC IRB.

RESULTS

A total of 318 patients with hernia were admitted and operated in the study period. Groin hernias were the most common form, accounting for 211 (66.3%) of the cases followed by incisional hernias in 68 (21.4%). Among groin hernia patients 195 (---92.4%) had primary hernia while the rest were recurrent inguinal hernias. Totally 130 (40.9%) of the patients had mesh repair, 68 (52.3%) incisional hernias and groin hernias 44 (33.8%) being most common forms repaired with mesh. Recurrent hernias accounted for 37 (28.5 %) of the hernias repaired with mesh. Among these, recurrent inguinal hernias were the most common form 16 ((43.2%), followed by incisional hernias repaired with tissue technique involving 12 (32.4%) of the patients, who were all of them referred from other hospitals. Seven (18.9%) of the recurrent hernia patients had mesh repair, of which four had incisional hernia that was treated with on-lay mesh repair technique. All incisional and recurrent hernias were repaired

Table 1: Types of hernia treated with mesh at St. Paul Hospital Millennium Medical College, Addis Ababa, 2017

Type of hernia	Type/site of hernia	Male		Female		Total	
		No.	%	No.	%	No.	%
Primary	Incisional Hernia	14	31.8	42	85.7	***56***	***59.9***
	Inguinal Hernia	28	63.6	0	0	***28***	***30***
	Umbilical Hernia	2	4.5	2	4.1	***4***	***4.3***
	Epigastric Hernia	0	0	4	8.2	***4***	***4.3***
	Spigelian Hernia	0	0	1	2	***1***	***1.1***
	Total	**44**	**100**	**49**	**100**	***93***	***100***
Recurrent	Inguinal Hernia	14	66.6	2	12.5	***16***	***43.2***
	Incisional Hernia	5	23.8	7	43.8	***12***	***32.4***
	Umbilical Hernia	1	4.8	5	31.3	***6***	***16.2***
	Epigastric Hernia	1	4.8	2	12.5	***3***	***8.1***
	Total	**21**	**100**	**16**	**100**	***37***	***100***

Sociodemographic characteristic of patient showed Incisional hernia to be more common in females, 49 (72%) versus 19 (28%), with a male to female ratio of 2.6:1, while groin hernia was more common in male, (42 (95.5%) versus 2 (4.5%), with a male to female ratio of 21:1.

The mean age of patients with incisional hernia was 48.7 years (range 25-75) and the majorities of the patients, 74 (56.9%), were above fifty years of age, and the occurrence increased with advancing age. The mean age of patients with inguinal hernia treated with mesh was 60 years (range 28-84) (Table 2).

Table 2- Socio-demographic distribution of patients with common abdominal hernias treated with mesh at St. Paul Hospital Millennium Medical College, Addis Ababa, 2017

Variables		Incisional Hernia		Groin Hernia		Umbilical Hernia		Epigastric Hernia		Total	
		No.	%	No.	%	No.	%	No.	%	No.	%
Age in years	<30	5	7.4	1	2.3	1	10	2	28.5	9	6.9
	30-39	13	19.1	2	4.5	3	30	0	0	18	13.8
	40-49	14	20.6	6	13.6	5	50	4	57.2	29	22.3
	50-59	20	29.4	7	15.9	1	10	1	14.3	30	23.1
	≥60	16	23.5	28	63.6	0	0	0	0	44	33.8
	Total	**68**	**100**	**44**	**100**	**10**	**100**	**7**	**100**	**130**	**100**
Sex	Male	19	27.9	42	95.5	3	30	1	14.3	65	50
	Female	49	72.1	2	4.5	7	70	6	85.7	65	50
	Total	**68**	**100**	**44**	**100**	**10**	**100**	**7**	**100**	**130**	**100**
Occupation	Farmer	7	10.3	25	56.8	1	10	0	0	32	24.6
	Office worker	18	26.5	9	20.4	2	20	2	28.6	31	23.8
	House wife	38	55.9	2	4.5	6	60	4	57.2	52	40
	Merchant	5	7.3	6	13.6	1	10	0	0	12	9.2
	Daily laborer	0	0	2	4.5	0	0	1	14.3	3	2.3
	Total	**68**	**100**	**44**	**100**	**10**	**100**	**7**	**100**	**130**	**100**

The two most common surgeries followed by incisional hernia were laparotomy and cesarean section. Laparotomy for bowel surgery made in 29 (42.6%) of the incisional hernias while cesarean section accounted for 17 (25%) of the cases. Among patient who had Caesarean Section (CS) and developed IH, 11 (64.7%) had Low midline incision while the rest 6 (35.3%) had Pfannenstiel incision. The rate of incisional hernia was higher in patients who had emergency surgery than those with elective surgery, 39 (57.4 %) versus 29 (42.6%). Incisional hernias were seen most commonly in those who had a low midline incision accounting for 23 (33.8%) of the cases, followed by long mid line incision and right subcostal incision which contributed 19 (27.9%) and 9 (13.2%) of the cases, respectively.

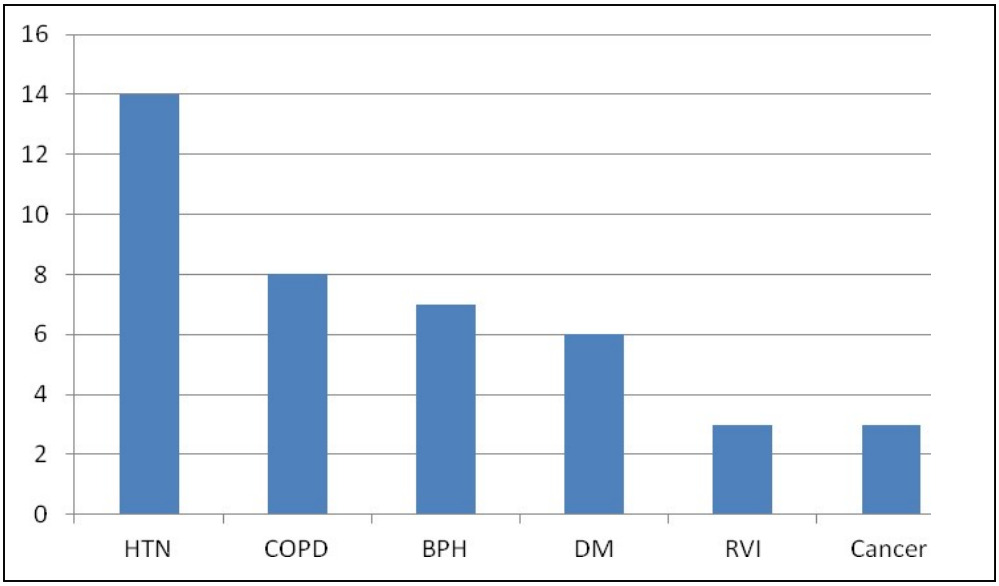
In elective surgery, lower midline incision (infra-umbilical) incisions, all of them following gynecologic surgeries, was the most common incision, 12 (46.2%), which complicated by IH. Right sub-costal incisions were the next common incisions seen in 9 (34.6%) of the patients. In emergency surgery, incisional hernias were seen mostly in those with long midline incision and lower midline incisions, in 17 (44.7%) and 11 (28.2%) of the patients, respectively (Table 3).

Table 3: Incidence of incisional hernia following abdominal surgeries in patients treated with mesh at St. Paul Hospital Millennium Medical College, Addis Ababa, 2017

Types of Surgery	Urgency of the surgery			
	Elective	Emergency	Total	Percent
Laparotomy for bowel surgery	5	24	29	42.6
Cesarean section	3	14	17	25
Other Gyn-Surgery	10	0	10	14.7
Cholecystectomy	7	0	7	10.3
Urologic Surgery	3	1	4	5.9
Pericystectomy (liver Hydatid cyst)	1	0	1	1.5
Total	**29**	**39**	**68**	**100**
Site of Incision				
Upper midline	1	3	4	5.9
Lower midline	12	11	23	33.8
Long midline	2	17	19	27.9
Pfannenstiel	2	4	6	8.8
Right Subcostal	9	0	9	13.2
Lanz	0	2	2	2.9
Left lower transverse	0	1	1	1.5
Lumbar	3	1	4	5.9
Total	**29**	**39**	**68**	**100**

The most common form of mesh repair in incisional and other midline hernias was on-lay technique done for 56 (65.1%) of cases. Sub-lay was done for only 30 (34.9%) of the cases. In inguinal hernia the classic Liechtenstein technique was employed in all cases. Drainage tube was placed in the majority of patients 106 ((81.5%)) and the average time of removal was 3.6 (range 2 -7) days.

The mean intra-operative time was 74.5 minutes and post-op stay was 3.4 days. Co-morbid conditions were present in 41 (31.5%) of the patients, hypertension being the commonest documented in 14 (34%) (Figure 1).



HTN-Hypertension , COPD- Chronic obstructive pulmonary disease ,BPH- Benign prostatic hyperplasia , DM –Diabetes mellitus , RVI (Retroviral infection)

Figure 1- Associated co-morbid diseases in patients treated with mesh hernia repair at SPHMMC, Addis Ababa, 2017

Postoperative complication was seen in 14 (10.8%) of the patients. Surgical site infection was noted in five and Seroma formation in three cases (Figure 2). Of the patients who had complications, 11 (78.6%) were incisional hernia cases. There was no perioperative death.

Being female (AOR=4.4; 95% CI 1.05-18.50; p=0.043) and patients with co-morbid disease (AOR=4.2; 95% CI 1.06-16.44; p=0.041) were statistically significantly associated with complications (Table 4).

Table 4: Bivariate and multivariate out put on factors affecting rate of complication after mesh repair at St. Paul Hospitals Millennium Medical College, Addis Ababa, 2017

Variables		Complication		Bivariate analysis COR(CI)	Multivariate analysis AOR (CI)
		Yes	No		
Sex					
Male		3	62	1	1
Female		11	54	4.2 (1.12-15.88)*	4.4 (1.05-18.51)*
Co-morbidities					
Yes		6	33	1.9 (.61-5.86)	4.2 (1.06-16.44)*
No		8	83	1	1
Intra-op stay					
<60		3	55	1	
60-120		9	57	2.9 (.74-11.26)	
>120		2	4	9.2 (1.17-71.71)*	
Post-op stay					
<=3		2	75	1	1
>3		12	41	11.0 (2.34-51.43)**	14.2 (2.72-73.66)**

*Significantly associated at p-value <0.05, ** significantly associated at p-value <0.005

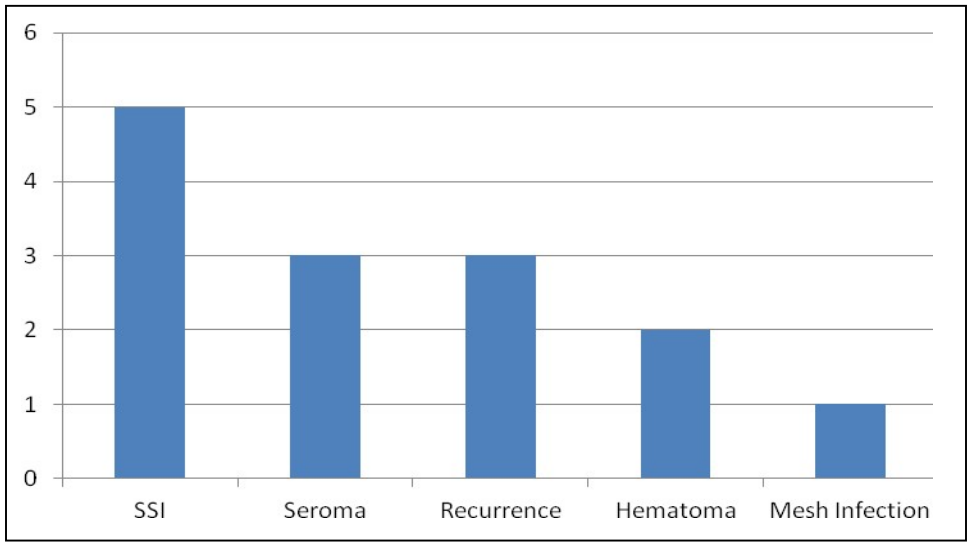


Figure 2: Frequency of complications after mesh repair at SPHMMC, Addis Ababa, 2017

DISCUSSION

The overall hernia disease burden at SPHMMC showed the condition to be among common indication for admission. The contribution of hernia in surgical ward admission pattern report in our study was lower when compared with 12.5% in Nigerian study & 22% in Indian study (1, 10).This differences may be related to the hospitals setting. The finding of inguinal hernia as most common form and mainly affecting males is in agreement with literatures from both developing and developed nations (1,10-12). Studies showed male to female ratio of inguinal hernia ranging from 7.6:1 in Nigerian to 82:1in Indian study (1,10,12). The male female inguinal hernia incidence rate difference is explained by the anatomical differences in the two genders and involvement of males in heavy duties including farming, and daily labors.

The incidence of IH was higher in our study (21.5%) than seen in some literatures probably due to referrals of patients from primary and secondary hospitals or patient preference to have their complications fixed in a better tertiary center (1,3,10,11,13). Our study also found that ventral hernias including IH to be more common in older females; this was also shown in other literatures (3,10,11,13). For example, Nigerian, Pakistan and Indian studies showed IH occurrence in the range of 3%-10% (3,10,11,13). The higher rate of IH in older women is related to multiparty, obesity and obstetric/gynecologic indications of surgery.

The increase in the incidence of abdominal wall hernia with increasing age was also shown (1,10,11). The mean age of our patients with IH & inguinal hernia is comparable with other studies.

Laparotomy for bowel surgery & obstetric/ gynecologic surgeries were the two most common surgeries which preceded incisional hernias in our patients. These conditions made 82.3% of the IH. These operations are made mostly for emergency and complicated conditions. The increased rate of incisional hernias in patients who had emergency surgeries is shown in this study and literatures (14). Emergency surgeries are more likely to have surgical site and systemic complication due to the indications and urgency.

The higher rate of incisional hernia in elective gynecologic surgeries is likely due to the frequency of the operations and the low midline incision which is anatomically deficient,(no rectus sheath in the lower half)(14) .The possibility of malignant condition, obesity and number of previous cesarean section contribution should also be considered. Studies from Nigeria, South Africa & Jordan reported post obstetric and gynecologic surgeries to be the most common cause of incisional hernia (3,10,13,15). The higher number of incisional hernia seen in cholecystectomy is likely related to the volume of the gall stone disease. Additionally cholecystectomy is clean contaminated and at times can be contaminated or dirty depending on the intra-op finding and accidents (16). Literatures reports of SSI following open cholecystectomy ranges from 1.8% - 8.4% (17,18).

Though mesh utilization in primary hernia was low, the use in IH and recurrent hernia was excellent. The pattern of hernia repair is shifting towards mesh repair in many parts of the world (9,19). Our clinical observation and practice is a witness for the change in the trend of mesh utilization, both in primary hernias and complicated surgeries. The main challenge for developing nation patients and surgeons in the use of commercial mesh is the cost. Hence, to reduce the cost and gain the benefits of mesh repair several authors in developing nations showed mosquito bed net as alternative with excellent outcome (20).

Though sub-lay technique is the preferred mesh repair technique, most of the patients in our study had on-lay repair may be for its technical ease, experiences of surgeons and late presentation of patients which make the hernia complicated (3,21).

The rate of post-op complication in mesh hernia repair reported ranges from 4%-12% which is similar to our finding (1). Most of the complication seen happened in female patients with IH. Reasons for this can be the higher rate of IH in females and the technical difficulty associated with IH. The rate of IH surgery complication in our study was comparable to findings from South African and the Netherlands study both of which reported 17% complication rate (13,22). Similarly, the rate of 7.4% wound infection in incisional hernia was comparable with 10% in South African study (13).

The overall mesh infection rate and incisional hernia mesh infection rate in our study was very low and comparable to literatures report (18,23).

Co-morbid illnesses play a role as an etiology of hernia & are associated with increased mortality and morbidity in the post-operative period (1). Hypertension was the main co-morbid condition in our patients and its presence has contributed for higher rate of complications. Hypertension also ranked highest co-morbid condition in Hernia patients in other literatures (1,3).

Conclusion: Our study found that meshes are being used increasingly for incisional & recurrent inguinal hernias. Outcomes from surgery are comparable to published literatures. Multicenter study on utilization of mesh and outcomes of patient in Ethiopia can give a better picture on the topic and need to be done.

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