Al-Nahrain University
College Of Medicine
Department of Surgery

Laparoscopic repair of inguinal hernia

Research submitted to department of surgery /college of medicine /Al-Nahrain University in Partial Fulfilment for the Degree of M.B.CH.B

By:

Nabaa Jaafar Al-Bayati
Stager Student

Supervised by
Dr. Sajid H.Alhelfy
Professor of general surgery
Alnahrain medical college

2019

LIST OF CONTENTS

LIST OF TABLES & FIGURES

LIST OF ABBREVIATIONS

Symbols	Meanings
TAPP	**Trans abdominal pre-peritoneal**
TEP	**Totally extra-peritoneal**
IPOM	**Intra-peritoneal onlay mesh**
IEHS	**International endohernia society**

Acknowledgment

I would like to give my deepest gratitude to every person who helped me to accomplish this research.

My everlasting gratitude to my supervisor (Dr. Sajid Al-halafi) for everything he did, still does and for the encouragement and guidance that made this work amusing and meaningful.

Further, I am greatly indebted to surgery Department team at Al-Nahrain Medical School, whose professional expertise is matched only by their concern to make a researcher task as trouble-free as possible.

Finally, it is with particular pleasure that I express my gratitude to everyone who has helped me in finishing this work in any point of its implementation, conduction and final execution.

Dedication

Deep down in my heart,

I'd like to thank my mum (May her soul rest in peace),

My adorable dad,

My lovely sisters

& my soul mate and husband

for every support they offered me till this day and thereafter.

May god bless you all.

ABSTRACT

Introduction: Inguinal hernia repair is the most commonly performed operation in the United States, owing to a significant lifetime incidence and variety of successful treatment modalities. Approximately 800,000 cases were performed in 2003, not including recurrent or bilateral hernias. Advancements in perioperative anesthesia and operative technique have made this an outpatient ambulatory operation with low recurrence rates and morbidity. Given this success, quality of life and the avoidance of chronic pain have become the most important considerations in hernia repair [(2)]

Aim: evaluation of laparoscopic procedure in inguinal hernia

Patients and methods: This is a descriptive cross sectional study conducted on patients attending Al-imamain alkadhimain medical city teaching hospital aiming for surgery for inguinal hernia during the period from August 2018 till February 2019

Results: Sublay mesh is found to be associated with greater post-operative complication profile than onlay mesh in the sample of this study and postoperative complications has been occurred to 50% of the patients in this study.

Conclusion: onlay mesh, though worldwide known for more post-operative complications; it's tolerated better than sublay mesh it terms of complications as reported by patients included in this study

INTRUDUCTION

Inguinal hernias are a common prevalent condition worldwide, with more than 20 million repairs performed annually.(1)

Minimal access surgery is a marriage of modern technology and surgical innovation that aims to accomplish surgical therapeutic goals with minimal somatic and psychological trauma. This type of surgery has reduced wound access trauma, as well as being less disfiguring than conventional techniques. With increasing experience, it offers cost-effectiveness both to health services and to employers by shortening operating times, shortening hospital stays and allowing faster recuperation(2)

Inguinal hernia repair is the most commonly performed operation in the United States, owing to a significant lifetime incidence and variety of successful treatment modalities. Approximately 800,000 cases were performed in 2003, not including recurrent or bilateral hernias. Advancements in perioperative anesthesia and operative technique have made this an outpatient ambulatory operation with low recurrence rates and morbidity. Given this success, quality of life and the avoidance of chronic pain have become the most important considerations in hernia repair (3)

The inguinal canal is an approximately 4- to 6 cm-long cone shaped region situated in the anterior portion of the pelvic basin (Fig. 37-1). The canal begins on the posterior abdominal wall, where the spermatic cord passes through the deep (internal) inguinal ring, a hiatus in the transversalis fascia. The canal concludes medially at the superficial (external) inguinal ring, the point at which the spermatic cord crosses a defect in the external oblique aponeurosis. The boundaries of the inguinal canal are comprised of the external oblique aponeurosis anteriorly, the internal oblique muscle laterally, the transversalis fascia and transversus abdominis muscle posteriorly, the internal oblique muscle superiorly, and the inguinal (Poupart's) ligament inferiorly. The spermatic cord traverses the inguinal canal, and it contains three arteries, three veins, two nerves, the pampiniform venous plexus, and the vas deferens. It is enveloped in three layers of spermatic fascia. (3)

The laparoscopic approach to hernia repair provides a posterior perspective to the peritoneal and preperitoneal spaces. Intraperitoneal points of reference are the five peritoneal folds, bladder, inferior epigastric vessels, and psoas muscle. Two potential spaces exist within the preperitoneum. Between the peritoneum and the posterior lamina of the transversalis fascia is Bogros's (preperitoneal) space. This area contains preperitoneal fat and areolar tissue. The most medial aspect of the preperitoneal space, that which lies superior to the bladder, is known as the space of Retzius.

The posterior perspective also allows visualization of the myopectineal orifice of Fruchaud, a relatively weak portion of the abdominal wall that is divided by the inguinal ligament [3]

Laparoscopic inguinal hernia repair originated in the early 1990s as laparoscopy gained a foothold in general surgery. Inguinal hernias account for 75% of all abdominal wall hernias, and with a lifetime risk of 27% in men and 3% in women. Repair of these hernias is one of the most commonly performed surgical procedures in the world. In the United States, approximately 800,000 inguinal herniorrhaphies are performed annually. [4]

Laparoscopic inguinal hernia repairs reinforce the abdominal wall via a posterior approach. Principal laparoscopic methods include the trans-abdominal preperitoneal (TAPP) repair, the totally extra peritoneal (TEP) repair, and the less commonly performed intraperitoneal onlay mesh (IPOM) repair. Although laparoscopic repairs in experienced hands are relatively expedient, they necessitate the administration of general anesthesia and its inherent risks. Any patient with a contraindication to the use of general anesthesia should not undergo laparoscopic hernia repair. Occasionally, general anesthesia induction may result in reduction of an incarcerated or strangulated inguinal hernia. If the surgeon suspects this might have occurred, the abdomen should be explored for nonviable tissue either via laparoscopy or upon conversion to an open laparotomy. The indications for laparoscopic inguinal hernia repair are similar to those for open repair. Most surgeons would agree that the laparoscopic approach to bilateral or recurrent inguinal hernias is superior to the open approach. International Endohernia Society (IEHS) guidelines offer a Grade A recommendation that TEP and TAPP are preferred alternatives to Lichtenstein repair for recurrent hernias after open anterior repair. The possibility of bilateral repair should be discussed with all patients undergoing laparoscopic inguinal hernia surgery. [5]

The operating room configuration is identical for TAPP, TEP, and IPOM procedures. The patient is placed in the Trendelenburg position, and video screens are placed at the foot of the bed. The surgeon stands contralateral to the hernia, and the assistant stands opposite the surgeon. The patient’s arms are tucked to the sides.[6]

Approximately 75% of abdominal wall hernias occur in the groin. The lifetime risk of inguinal hernia is 27% in men and 3% in women. Of inguinal hernia repairs, 90% are performed in men and 10% in women. The incidence of inguinal hernias in males has a bimodal distribution, with peaks before the first year of age and after age 40. Abramson demonstrated the age dependence of inguinal hernias in 1978. Those age 25 to 34 years had a lifetime prevalence rate of 15%, whereas those age 75 years and over had a rate of 47%. Approximately 70% of femoral hernia repairs are performed in women; however, inguinal hernias are five times more common than femoral hernias. The most common subtype of groin hernia in men and women is the indirect inguinal hernia. [7]

Transabdominal Preperitoneal Procedure. The transabdominal approach confers the advantage of an intraperitoneal perspective, which is useful for bilateral hernias, large hernia defects, and scarring from previous lower abdominal surgery. The abdominal cavity is accessed using a dissecting trocar or open Hasson technique. Pneumoperitoneum is instilled to a level of 15 mmHg. Two 5-mm trocars are placed lateral and slightly inferior to the umbilical trocar, avoiding injury to the inferior epigastric vessels. The patient is then placed in the Trendelenburg position, and the pelvis is inspected. (8)

Totally Extraperitoneal Procedure. The advantage of the TEP repair is the access to the preperitoneal space without intraperitoneal infiltration. Consequently, this approach minimizes the risk of injury to intra-abdominal organs and port site herniation through an iatrogenic defect in the abdominal wall. As with TAPP, TEP is indicated for repair of bilateral inguinal hernias or for unilateral hernias when scarring makes the anterior approach challenging. (3)

Intraperitoneal Onlay Mesh Procedure. In contrast to TAPP and TEP, the IPOM procedure permits the posterior approach without preperitoneal dissection. It is an attractive procedure in cases where the anterior approach is unfeasible, in recurrent hernias that are refractory to other approaches, or where extensive preperitoneal scarring would make TEP or TAPP challenging. Port placement and inguinal hernia identification are identical to TAPP. Hernia sac contents are reduced; however, the sac itself is not inverted from the preperitoneal space. Instead, mesh is placed directly over the defect and fixed in place with sutures or spiral tacks. Because these anchors are placed through the peritoneum without preperitoneal inspection, the lateral cutaneous nerve of the thigh and the genitofemoral nerve are especially prone to injury. Furthermore, intraperitoneal mesh migration is a documented phenomenon that can lead to postoperative morbidity, recurrence, and reoperation. (6)

Preparation for laparoscopic surgery

- Overall fitness: cardiac arrhythmia, emphysema, medications, allergies
- Previous surgery: scars, adhesions
- Body habitus: obesity, skeletal deformity
- Normal coagulation
- Thromboprophylaxis

Advantages of minimal access surgery

- Decrease in wound size
- Reduction in wound infection, dehiscence, bleeding, herniation and nerve entrapment
- Decrease in wound pain
- Improved mobility
- Decreased wound trauma
- Decreased heat loss
- Improved vision

Limitations of minimal access surgery

- Reliance on remote vision and operating
- Loss of tactile feedback
- Dependence on hand–eye coordination
- Difficulty with haemostasis
- Reliance on new techniques
- Extraction of large specimens. [9]

Complications of groin hernia repairs

Recurrence

Chronic groin pain

Cord and testicular Hematoma

Bladder injury

Wound infection

Seroma

Hematoma

Osteitis pubis

Prosthetic complications

Laparoscopic: Vascular injury /visceral injury/ Trocar site complications/ Bowel obstruction/ Miscellaneous

General: Urinary Paralytic ileus Nausea and vomiting Aspiration pneumonia Cardiovascular and respiratory insufficiency. [3]

Patients & method

This is a descriptive cross sectional study conducted on patients attending Al-imamain alkadhimain medical city teaching hospital aiming for surgery for inguinal hernia during the period from August 2018 till February 2019.

Selection of study samples:

Involved patients admitted to the surgical ward of imamain alkadhimain teaching hospital after surgery for inguinal hernia

Selection criteria:

To be included in this study, patient must have been admitted to imamain alkadhimain teaching hospital & diagnosed with inguinal hernia and undergone laparoscopic surgical repair for the inguinal hernia.

Exclusion criteria

Any patient with hernia other than inguinal hernia

Any patient who undergone open repair rather than laparoscopic repair of inguinal hernia

Study tools

A questionnaire form resembling the one attached to this study paper has been filled by direct interview with the patients

Statistical Analysis

Data has been analyzed by Statistical Package for the Social Sciences (SPSS) Version 21

Results

The study involved 16 participants, the male was (56.3%) and the female was (43.8%). Table (1)

Table 1 : gender distribution

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	9	56.3	56.3	56.3
	female	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Regarding the hernia distribution (56.3%) right sided and (25.0%) was left sided and bilateral was (18.8%). Table (2)

Table 2 : hernia laterality distribution

type of hernia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	right	9	56.3	56.3	56.3
	left	4	25.0	25.0	81.3
	bilateral	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Regarding the occurrence distribution of hernia (81.3%) was primary and (18.8%) was recurrent. Table (3)

Table 3: occurrence distribution of hernia

primary or recurrent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	primary	13	81.3	81.3	81.3
	recurrent	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Regarding the type of repair distribution in patients (75.0%) was mesh plug and (25.0%) was sublay mesh. Table (4)

Table 4: type of repair distribution in patients

type of repair

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	mesh plug	12	75.0	75.0	75.0
	sublay mesh	4	25.0	25.0	100.0
	Total	16	100.0	100.0	

Regarding the pain incidence (50.0%) was with pain and (50.0%) was without pain. Table (5A)

Table 5A: clinical features incidence: pain incidence

Pain

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	8	50.0	50.0	50.0
	yes	8	50.0	50.0	100.0
	Total	16	100.0	100.0	

Regarding the swelling incidence **(**93.8%) was present and (6.3%) was not present**. Table (5B)**

Table 5B: clinical features incidence: swelling incidence

Swelling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	1	6.3	6.3	6.3
	yes	15	93.8	93.8	100.0
	Total	16	100.0	100.0	

Regarding the **obesity (**62.5%) was obese and **(**37.5%) was no obese. Table (6A)

Table 6A: hernia cause distribution: Obesity

Obesity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	62.5	62.5	62.5
	yes	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Regarding the chronic cough (56.3%) was present and (43.8%) was not present. Table (6B)

Table 6B: hernia cause distribution: Chronic Cough

Chronic Cough

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	9	56.3	56.3	56.3
	yes	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Regarding the straining (62.5%) was present and (37.5%) was not present . Table (6C)

Table 6C: hernia cause distribution: straining

Straining

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	62.5	62.5	62.5
	yes	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Regarding the Intra-abdominal Malignancy (56.3%) was not present and (43.8%) was present . Table (6D)

Table 6D: hernia cause distribution: Intra-abdominal Malignancy

Intra-abdominal Malignancy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	9	56.3	56.3	56.3
	yes	7	43.8	43.8	100.0
	Total	16	100.0	100.0	

Regarding the post-operative complications distribution, pain percent was (50.0%), discharge was(43.8%), infection (6.3%). Table (7)

Table 7: post-operative complications distribution

Complications

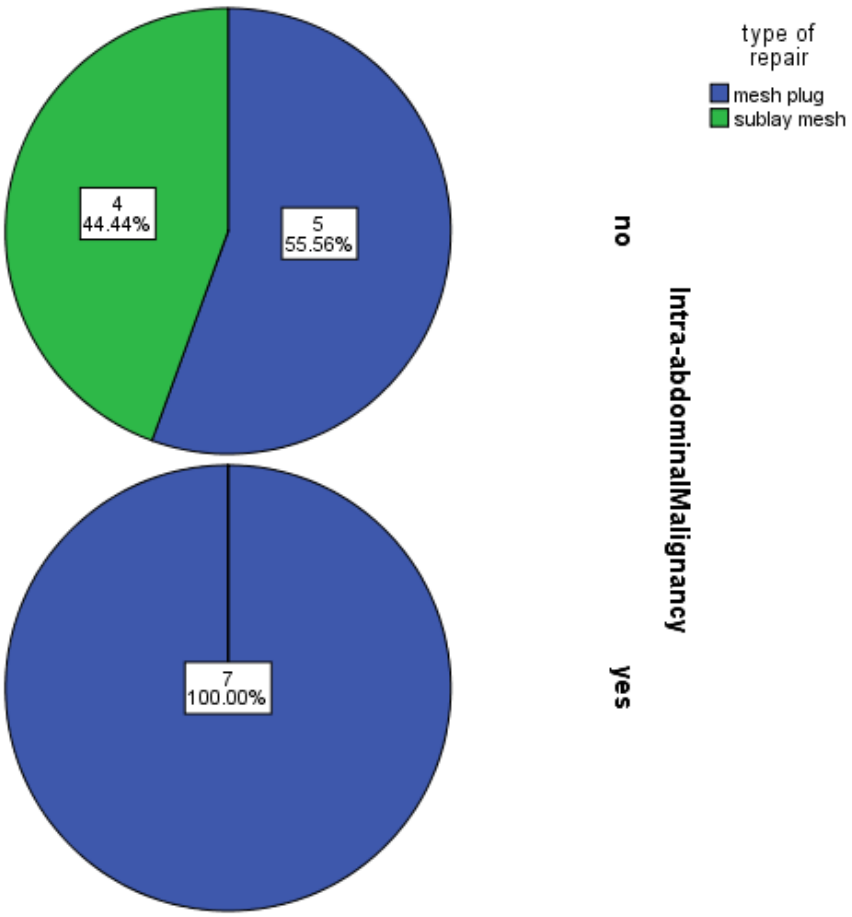
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	discharged	7	43.8	43.8	43.8
	pain	8	50.0	50.0	93.8
	infection	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Regarding the type of repair association with Intra-abdominal Malignancy : mesh plug was 7 and sublay mesh was 0. Table (8)

Table 8: type of repair association with Intra-abdominal Malignancy

type of repair * Intra-abdominal Malignancy Cross tabulation

		Intra-abdominal Malignancy		
		no	yes	Total
type of repair	mesh plug	5	7	12
	sublay mesh	4	0	4
Total		9	7	16



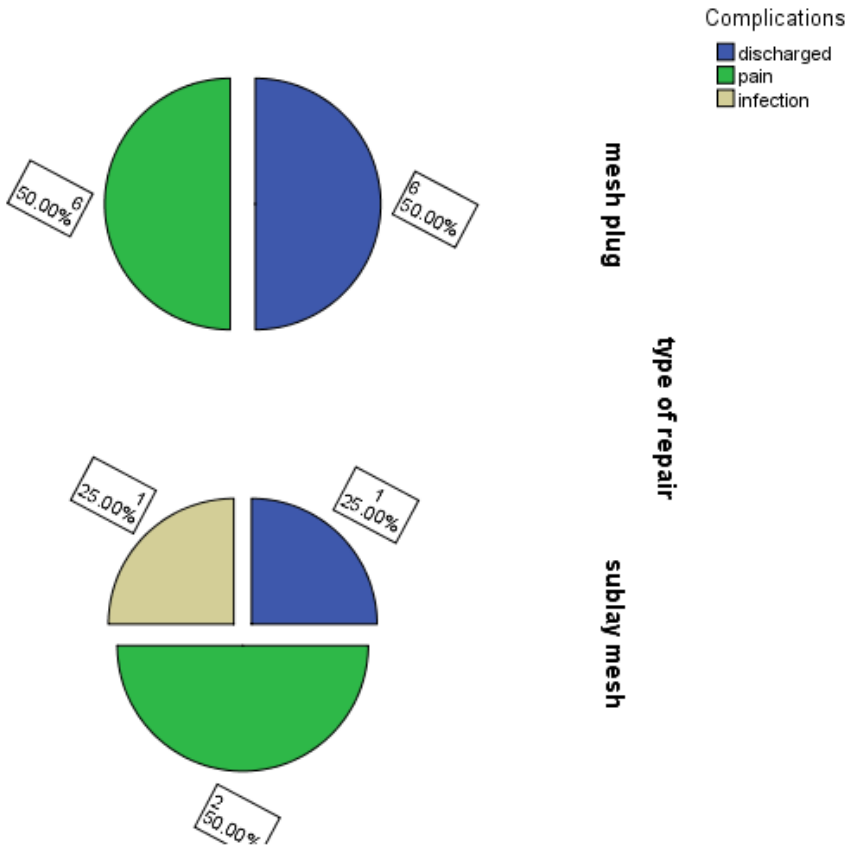
Graph 1: type of repair association with Intra-abdominal Malignancy

Regarding the type of repair association with post-operative complications : mesh plug associated with 6 discharged and 6 pain while sublay mesh associated with 2 pain and 1 discharge and 1 infection. Table (9)

Table 9: type of repair association with post-operative complications

type of repair * Complications Cross tabulation

		Complications			
		discharged	pain	infection	Total
type of repair	mesh plug	6	6	0	12
	sublay mesh	1	2	1	4
Total		7	8	1	16



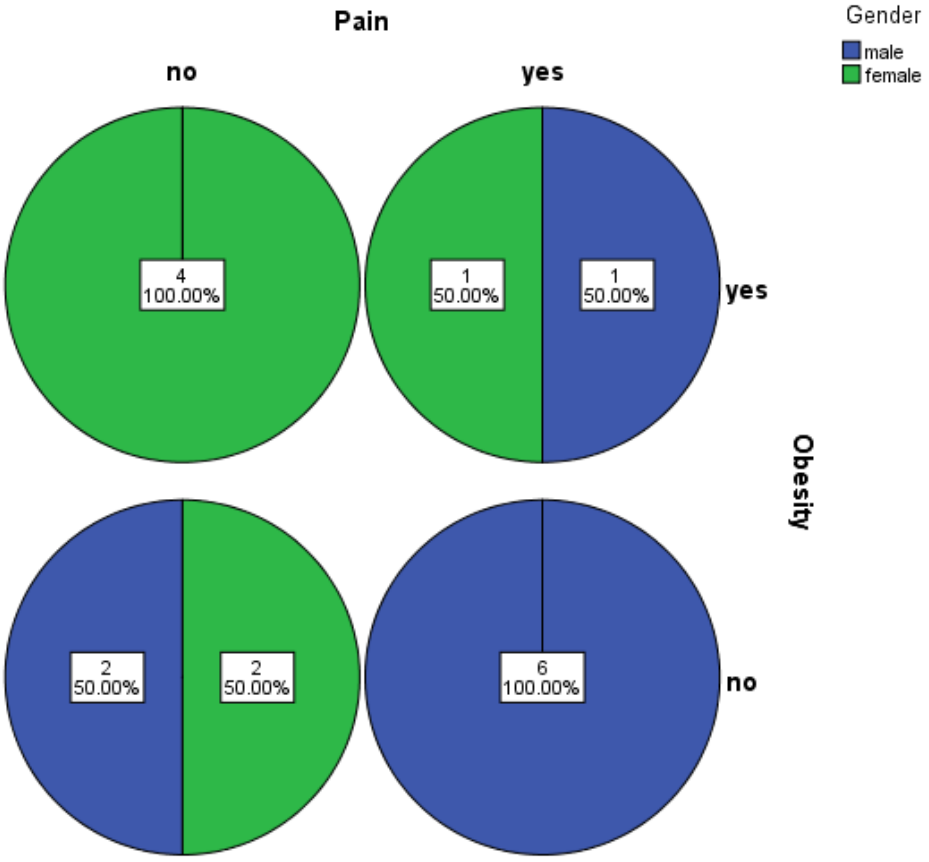
Graph 2: type of repair association with post-operative complications

Regarding the gender association with Pain : male was 7 while female was 1. Table (10)

Table 10: gender association with clinical feature: Pain

Gender * Pain Cross tabulation

		Pain		
		no	yes	Total
Gender	male	2	7	9
	female	6	1	7
Total		8	8	16



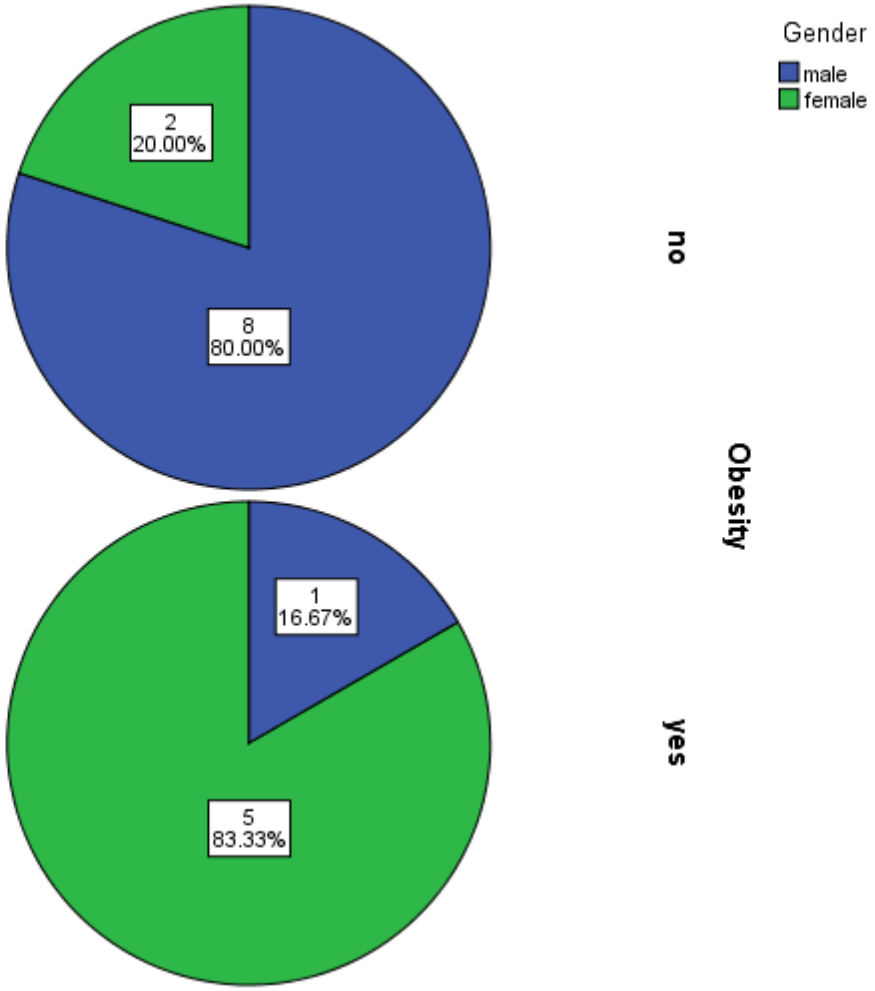
Graph 3: gender association with clinical feature: Pain

Regarding the gender association with Obesity : female was 5 and male was 1. Table (11)

Table 11: gender association with hernia cause: Obesity

Gender * Obesity Cross tabulation

		Obesity		
		no	yes	Total
Gender	male	8	1	9
	female	2	5	7
Total		10	6	16



Graph 4: gender association with hernia cause: Obesity

Discussion

More than 50% of the patients in this study were male, which corresponds to another study conducted by Guerron A D et al. [1] which also shows male predominance in similar study

Right sided unilateral inguinal hernia is the most common encountered type of hernia in this study, and bilateral inguinal hernia is the least one encountered. This result does not corresponds to the study conducted by Guerron A D et al. which found right sided inguinal hernia to be the least encountered in his study, but this result corresponds to the literature [2] which states that 55% of indirect hernias are right sided.

There are 3 reports of Bilateral inguinal hernia in this study which constitutes 18% of the cases, this percentage is incomparable to the study results conducted by Guerron A D et al. which is 50%, but slightly corresponds to the literature [2]

Most of the cases in this study (80%) had primary inguinal hernia and this is comparable to Guerron A D et al. study paper which had primary inguinal hernia incidence of 85%, but according to the literature [2] which states that the incidence of recurrence is 2%, this ratio is still inacceptable for which this error shall be attributed to small sample size in this study.

Almost all cases of inguinal hernia presented as swelling in the groin in this study except for one case, and half of cases suffered pain.

Causes of inguinal hernia in this study group are reported as following:

Chronic coughing: 44%, obesity: 37%, intra-abdominal malignancy: 44%, straining: 37%.

Concerning complications only postoperative complications has been screened in this study and it occurred to half of the patients in this study.

Mesh plug is the type of repair associated in all cases of inguinal hernia caused by intra-abdominal malignancy in the sample of this study.

Sublay mesh associated with greater post-operative complication profile than onlay mesh in the sample of this study, and this result can be attributed to small sample size error because according to Raghuveer M. N. [10] sublay mesh is associated with less post-operative complications.

Females are less likely to experience pain in the setting of inguinal hernia according to the sample of this study.

Obesity contributes a considerable cause of inguinal hernia in females according to the sample analyzed in this study.

Post-operative infection is absent in females and minimal in males according to the sample of this study.

Conclusion

- Inguinal hernia is more common in males rather than females among the patients attending imamain alkadhimain medical city.

- Primary cases outnumber the recurrent cases among these patients.

- Sublay mesh has greater post-operative complication profile than onlay mesh

Recommendations

- Public education about the causes of inguinal hernia and how to overcome them before settlement of inguinal hernia.

- Complication profile urges the implementation of advanced techniques in the operative management of inguinal hernias.

References

1- Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. Lancet. 2003;362:1561–1571.

2- Bailey, H., Love, R. J. M. N., Mann, C. V., & Russell, R. C. G. (1992). Bailey and Love's short practice of surgery. London: Chapman & Hall Medical.

3- Schwartz, Seymour I.,Brunicardi, F. Charles. (Eds.) (2011) Schwartz's principles of surgery: ABSITE and board review New York : McGraw-Hill Medical, chapter 37, inguinal hernias p.1505, p.1507.

4- The Egyptian Journal of Hospital Medicine (January 2018) Vol. 70 (3), Page 392-396.

5- Minilaparoscopic technique for inguinal hernia repair combining transabdominal pre-peritoneal and totally extraperitoneal approaches. Carvalho GL1, Loureiro MP, Bonin EA, Claus CP, Silva FW, Cury AM, Fernandes FA Jr.

6- Schwartz, Seymour I.,Brunicardi, F. Charles. (Eds.) (2011) Schwartz's principles of surgery :ABSITE and board review New York : McGraw-Hill Medical, Chapter 37: Inguinal Hernias p.1510 , p.1540.

7- John T Jenkins, Patrick J. Inguinal hernias. O'Dwyer BMJ. 2008 Feb 2; 336(7638): 269–272.

8- R. Bittner, M. E. Arregui, T. Bisgaard, M. Dudai, G. S. Ferzli, R. J. Fitzgibbons. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal Hernia [International Endohernia Society (IEHS)] Surg Endosc. 2011 Sep; 25(9): 2773–2843.

9- Bailey, H., Love, R. J. M. N., Mann, C. V., & Russell, R. C. G. (1992). Bailey and Love's short practice of surgery. London: Chapman & Hall Medical. summary box 19.1 , 19.2 , 19.3

10- Raghuveer M. N., Suraj Muralidhar*, Harshvardhan Shetty, Veena V. Onlay versus sublay mesh repair for ventral hernia. Int Surg J. 2018 Mar;5(3):823-826