

Role of Body Mass Index on Postoperative Complications of Inguinal Hernioplasty.

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Abstract:

Aim: To study the various postoperative complications of hernioplasty in respect to individuals with various Body mass index (BMI)

Background: Conflicting report has been shown in literature stating the relationship between body mass index and postoperative complications after inguinal hernia surgery stating that there were higher complication rates in both obese and underweight (1). The theory in support of protective factor for obesity is that the pre peritoneal fat can act as a plug and thereby prevent the herniation (2). Diagnosis of inguinal hernia could be a problem due to their body habitus. The literature has shown that though obesity could act as a protective factor for inguinal hernia could cause postoperative complication after the hernia surgery (3). Hence, this study is conducted on individuals having various Body mass index undergoing open hernioplasty.

Materials and methods: The study was conducted on patients presented with inguinal hernia, willing to undergo open surgery, at the department of general surgery, Sri Manakula Vinayagar Medical college and Hospital, Pondicherry from March 2019 to March 2020. All male patients with inguinal hernia of age above 20 years and below 70 years were included in the study. A total of 63 patients were included in this study.

All these 63 patients were divided into four groups, according to the Body mass index (BMI) of the individuals as underweight (BMI - >18.5), Normal (BMI – 18.5 – 24.9), Pre obesity (BMI – 25.0- 29.9), Obese (BMI > 30.0). The patients having primary direct or indirect inguinal hernia without any complications alone were included for the study. They were investigated appropriately for exclusion of diabetes mellitus type II or brought to euglycaemic state, cardiac fitness obtained and all underwent open hernioplasty – Lichtenstein tension free hernioplasty. The following complications were monitored in these patients in the first thirty days after surgery – surgical site infection, haematoma, seroma, scrotal swelling and pain also late postoperative complications such as post herniorrhaphy hydrocele, persistent pain over groin, testicular atrophy and recurrence were recorded at the end of 12 months after surgery.

Results: Early or immediate postoperative complications were observed in 8 patients (12.68%) and late postoperative complications were seen in 3 patients (4.74%). Early postoperative complications were observed in 3 normal BMI patients, 2 pre obese patients and 3 obese patients. Late complications were seen in 1 under weight patient and 2 obese patients.

Conclusion: The early and late postoperative complications after hernioplasty in respect to the Body mass index (BMI) were studied in a group of 63 patients. 12.5% of the underweight patients, 12% of the normal BMI patients, 13.3% of the pre obese patients and 33.3% of the obese patients developed complications. Our study though it is in a very small group of 63 patients done indicates that obese persons are more prone for complications after hernioplasty and hence, further research is to be done to reduce the complication rate in obese individuals undergoing hernioplasty.

Keywords: Body mass index (BMI), hernioplasty, obese, postoperative complications

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I. Introduction:

The gold standard surgery for inguinal hernia is 'Lichtenstein's tension free hernioplasty' (4). The postoperative complications arising from this surgery are early pain, haematoma, seroma, wound infection and late complications as chronic pain, testicular atrophy and recurrence of hernia. According to literature, any surgery in obese individuals will have complications in both elective surgery and emergency surgery. The well accepted measure of nutritional status of an individual is by the Body mass index (BMI). BMI formerly called the Quetelet index, is a measure for indicating nutritional status in adults. It is defined as the person's weight in Kilograms divided by the square of person's height in metre (Kg/ M²). (Table 1). The postoperative

complications are also classified as in ‘Clavien Dindo classification’ (Table 2). The various postoperative complications occurring in the different BMI patients are recorded and analysed in this study.

II. Materials And Methods:

The study was conducted on patients presented with inguinal hernia and willing to undergo open surgery at Sri Manakula Vinayagar Medical College and hospital, Pondicherry from March 2019 to March 2020. All male patients with inguinal hernia above 20 years and below 70 years having uncomplicated inguinal hernia were included in this study. All the patients were clinically examined thoroughly. The Body mass index of every individual was calculated and recorded. A total of 63 patients were included in the study. according to BMI they were divided into four groups as underweight, Normal BMI, pre obese and obese. A single dose of 1 gram Cephazolin was administered intra venously 30 minutes to 60 minutes before surgery. All the patients underwent Lichtenstein’s hernioplasty by four designated surgeons. The immediate postoperative complications such as surgical site infection, haematoma, seroma, scrotal swelling and pain were recorded within the first thirty days after surgery. Also late postoperative complications such as post herniorrhaphy hydrocele, persistent pain over groin, testicular atrophy and recurrence were recorded at the end of 12 months after surgery.

Exclusion criteria: Patients having complications of inguinal hernia such as irreducibility, obstruction/strangulation. Patients with very large inguino scrotal hernia. Patients having bilateral inguinal hernia or any other additional hernia. Patients below 20 years of age. Patients not willing to be a part of this study. Female patients.

III. Results:

A total of 63 patients were included in this study. The youngest patient in this study was 21 years and the oldest patient was 68 years. Six patients were in the age group of 20-25 years, eight patients were between 26 – 35 years, nine patients in 36 – 45 years, sixteen patients in 46-55 years and twenty four patients in 56 – 70 years (Table 3). The patients were divided into four groups according to their BMI, underweight (BMI < 18.5) 8 patients, normal (BMI 18.5 – 24.9) 25 patients, Pre obese (BMI 25.0 – 29.9) 15 patients and obese (BMI > 30)15 patients (Table 4).

In the immediate postoperative period one patient in the obese group developed haematoma in the operated site, two patients developed seroma (one in normal BMI group and one in obese group), three patients developed scrotal swelling (one in normal BMI group, one in pre obese and one in obese group), surgical site infection seen in two patients (one in normal BMI group and one in obese group) (Table 5). All these patients were treated symptomatically and recovered within 30th postoperative day. The late postoperative complications were recorded after 12 months of surgery. One patient in underweight group and one patient in obese group had post herniorrhaphy hydrocele, one patient in obese group complaint of persistent pain (mild nagging type) over the groin region. None of our patients at the end of 12 months after surgery had recurrence of hernia or had atrophy of the testis (Table 6).

The postoperative complications were observed in 1 underweight individual, 3 normal BMI individuals, 2 pre obese individuals and 5 obese individuals. This indicates that more complications are common in obese individuals after hernioplasty (Chart 1). Of the eleven patients who had postoperative complications nine were of Grade1 (14.28%) and two (post herniorrhaphy hydrocele) were of Grade 3a (3.17%) of Clavien Dindo classification of postoperative complications.

Table: 1

Description.	BMI – Kg/ M ²
Underweight	< 18.5
Normal	18.5 – 24.9
Pre obese	25 – 29.9
Obese	30 and above

Table: 2 – Clavien Dindo classification of postoperative complications.

Grade	
1	Any deviation from the normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions. Acceptable therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside.
2	Requiring pharmacologic treatment with drugs other than such allowed for grade 1 complications. Blood transfusions, antibiotics and total parenteral nutrition are also included.
3	Requiring surgical, endoscopic or radiological intervention.
3a	Intervention under regional/local anaesthesia

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3b	Intervention under general anaesthesia
4	Life threatening complications requiring intensive care/intensive care unit management
4a	Single organ dysfunction
4b	Multi organ dysfunction
5	Patient demise
Suffix 'd'	If the patient suffers from a complication at the time of discharge, the suffix 'd' (for disability) is added to the respective grade of complication. This label indicates the need for a follow up to fully evaluate the complication.

Table: 3 – Age distribution of patients – Total Patients - 63

S.No	Age group	No. of Patients	Percentage
1.	20 - 25	6	9.48%
2.	26 - 35	8	12.69%
3.	36 - 45	9	14.28%
4.	46 - 55	16	25.39%
5.	56 - 70	24	38.16%

Table: 4 Number of patients in various BMI groups.

S. No.	Group	BMI	No. of Patients	Percentage
1.	Underweight	< 18.5	8	12.69%
2.	Normal	18.5 – 24.9	25	39.67%
3.	Pre obese	25.0 – 29.9	15	23.80%
4.	Obese	>30	15	23.80%

Table: 5 Early Postoperative complications

S. No	complication	Number.	Percentage.
1.	Haematoma	1	1.58%
2.	Seroma	2	3.17%
3.	Infection.	2	3.17%
4.	Scrotal swelling	3	4.76%

Table: 6 Late Postoperative complications.

S. No	Complication	Number	Percentage
1.	Post herniorrhaphy hydrocele	2	3.17%
2.	Chronic groin pain	1	1.58%
3.	Recurrence	Nil.	---
4.	Testicular atrophy.	Nil.	---

Chart: 1

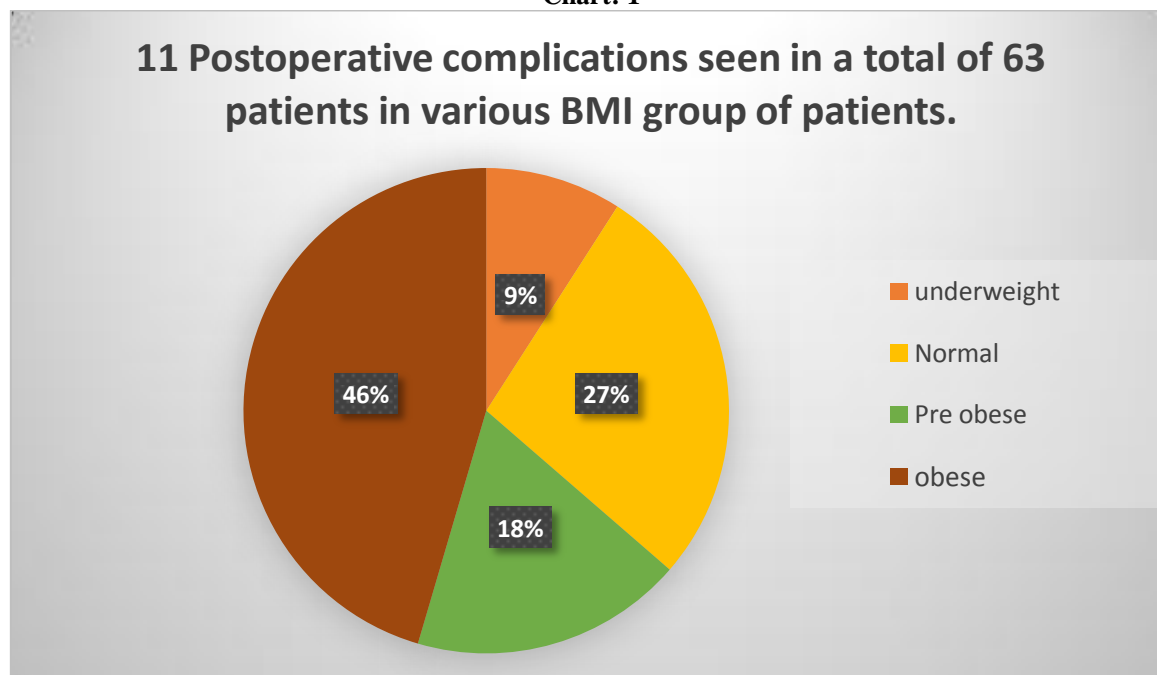


Table: 7 Postoperative complications encountered in patients in each BMI category

Category	No. of patients	Complication encountered	Percentage of patients encountered complications
Underweight	8	1	12.5%
Normal.	25	3	12%
Pre obese	15	2	13.3%
Obese.	15	5	33.3%

IV. Discussion:

Postoperative complications after the 'gold standard' Lichtenstein hernioplasty for inguinal hernia are early pain, haematoma, seroma, wound infection and late complications such as chronic pain, recurrence and testicular atrophy (5). Obesity presents a unique challenge in caring for surgical patients and has been shown to adversely affect outcomes for several operative procedures. However, quantitative data on surgical resource utilization attributable to obesity are scarce. (6). BMI was found to be significantly associated with an increased risk of postoperative complications – $p= 0.04$ (3). The postoperative complications seen in individuals undergoing hernioplasty for inguinal hernia in obese persons is said to be higher than in normal BMI individuals. But it is surprising to note that the incidence of inguinal hernia is lower in obese individuals than persons of normal BMI. A Swedish study showed a protective effect in obese individuals in development of inguinal hernia (6).

Though tissue repair as Bassini repair and Shouldice repair was offered for inguinal hernia for more than two decades had a considerable recurrence rate. Mesh repair in many western countries rapidly becoming the most popular technique for repair of inguinal hernia (8-13). The Lichtenstein's technique is a tension free repair of the weakened inguinal floor using a polypropylene mesh (14). When a foreign body like a polypropylene mesh is involved, infection is anticipated. Surgeons at the Lichtenstein hernia institute sprinkled bacitracin and polymyxin powder into the wound to prevent infection, but now this strategy is abandoned (15). A Cochrane meta analysis (16) in 2003 concluded that 'antibiotic prophylaxis for elective inguinal hernia repair cannot be firmly recommended or discarded'. In the second week of surgery, seroma formation and wound infection may occur. Seroma is due to an excessive inflammatory response to sutures or mesh and cannot be prevented. In most cases fluid resolves spontaneously but may require aspiration (5)

Chronic pain is a significant problem following open inguinal hernia repair with a reported incidence ranging from 19% to 62.9% (17- 19). Although the pain is often mild in nature, quality of life studies has shown that chronic pain, irrespective of severity can significantly interfere with normal activities (20, 21). The ilio inguinal nerve is a sensory nerve that innervates the skin over the groin region, the medial aspect of thigh, the upper part of the scrotum and the penile root. Traditional teaching is that if the nerve is injured during surgery there would be cutaneous sensory loss and chronic groin pain. However, some reports suggest that elective excision of ilio inguinal nerve causes minimal morbidities and was considered incapacitating by most patients (22, 23). Rarely damage to the testicular artery can lead to testicular infarction, perhaps the most serious complication of inguinal hernia surgery (5). Delayed complication of inguinal hernia surgery includes an infected hydrocoele demonstrating a fluid debris level in ultrasonogram (24)

In our present study of postoperative complications after hernioplasty in 63 patients, who were grouped into four according to their BMI status and the early postoperative complications were recorded around thirty days after surgery and the late complications were recorded 12 months after surgery. The nine patients of Grade 1 postoperative complications were treated symptomatically and improved. Two patients (Post herniorrhaphy hydrocele) who had Grade 3a Clavien Dindo complication were advised surgery. The study indicates that the rate of postoperative complications after hernioplasty is high in obese individuals.

V. Conclusion:

The study of postoperative complications in 63 patients who underwent hernioplasty showed that 11 patients out of 63 had complications that is 17.46%, nine patients (14.28%) were in grade 1 and two patients (3.17%) were in Grade 3a of the Clavien Dindo classification (Table 2). Postoperative complications in respect to their BMI status has revealed that, postoperative complications were evident in 12.5% of the underweight, 12% of the normal BMI, 13.3% of the pre obese group and 33.3% of the obese group indicating high postoperative complications in obese patients. (Table 7). As this study has involved only a small group of patient further study in a large group is needed. Preventive measures to minimise the postoperative complications in obese persons undergoing inguinal hernioplasty has to be found out after further study.

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