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ORIGINAL RESEARCH ARTICLE

A Comparative Study of Inguinal Mesh Hernioplasty With Suction Drain and Without Suction Drain at Tertiary Care Hospital

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ABSTRACT

Background: An inguinal hernia will affect nearly 25% of men and less than 2% of women over their lifetime.All symptomatic Inguinal hernia needs surgical treatment. Among various surgical options, Lichtenstein tension free openmesh repair is still the most commonly performed procedure. However, debate is still going on regarding use of drain in hernia surgery.

Objectives: To compare the results of using suction drain in open inguinal mesh hernioplasty with no drain use.

Methods: This is a prospective comparative study, comprising of 116 patients of inguinal hernia undergoing Lichtenstein mesh hernioplasty over a period of 4 years from 1st January 2019 to 31stDecember 2022. Patients were randomized into two groups – one with active suction drain (56) and one without any drain (60). Results were compared in two groups regarding hematoma/ seroma formation, wound infection, analgesic requirement duration and return to work duration.

Results: In this study, 2 patients (3.57%) in drain group developed one of the complications (hematoma/seroma/wound infection), while 10 patients (16.67%) in non-drain group develop such complication. Analgesic requirement duration was average 3.51 days in drain group, while 5.45 days in non-drain group. Return to work duration was average 25.07 days in drain group and 28.85 days in non-drain group.

Conclusion: Use of suction drain significantly reduced the wound complication rate ($p<0.05$). Analgesic requirement duration and return to work duration were also decreased, but were not found to be statistically significant.

KEY WORDS: Hernioplasty, Inguinal Hernias, Seroma and Lichtenstein

Introduction: A hernia is an abnormal protrusion of a viscous through an opening in the wall of the cavity in which it is contained. Various types of abdominal hernia surgery are among the commonest surgical procedures performed by surgeons. Among them inguinal hernia is the commonest type of hernia, as inguinal area is naturally the weakest region of the abdominal wall. Abdominal wall hernias occur only in the body areas where aponeurosis and fascia are devoid of the protecting support of the striated muscles. Without a countering force, the bare aponeurotic areas are subjected to the ravages of increased intra-abdominal pressure and give way to produce hernias.

Much research has been made in the past for abdominal hernia repair. The hernia operation is being done since very early times. William S. Halsted in 1892 from John Hopkins School of medicine read his classic paper 'The cure of hernia in the males'. Astley Cooper of Norfloka described for the first time the superior pubic ligament now called the `` Cooper`s ligament". In the 19th and 20th century EdwardoBassini revolutionized the repair of inguinal hernia by introducing herniorrhaphy. Then came the Shouldice repair resulting in lesser recurrence of a hernia. The concept of hernia repair with synthetic mesh was introduced by Lichtenstein and colleagues in 1989 and nowadays this procedure is the gold standard in open hernia surgery [1,2]

Despite recent increase in use of laparoscopy for inguinal hernia mesh repair, still the Lichtenstein open tension free mesh repair is by and large, the commonest way to deal with inguinal hernias. One question still remains here that whether use of drain is helping the procedure or not. Drains are usually used in the surgery, where we expect some fluid to be continuously accumulating into the potential or real surgical space, causing seroma or hematoma formation and attract some infection, which may trouble healing significantly.

In Lichtenstein mesh hernioplasty, we use a foreign body, the mesh, to reinforce the posterior wall of inguinal canal. Mostly synthetic meshes are used, which include polypropylene (Prolene, Marlex), expanded PTFE (Gore-tex) and polyester. Polypropylene is the most commonly used material. Most of the hernia surgery including Lichtenstein repair require dissection through the tissue planes to create space for mesh placement. Thistype of surgical technique may cause accumulation of haemorrhagic fluid within the created space for mesh, causing haematoma formation. Divided lymphatics may result in accumulation of lymph in the surgical space and also placement of a foreign body, i.e., a synthetic mesh, may stimulate a variable amount of tissue reaction with accumulation of serous fluid, which can cause seroma formation. These haematoma or seroma can also result in wound infection. As the amount of fluid accumulation can be variable, its impact on wound healing can also be variable. Here comes the theoretical concept of closed suction drain to remove this fluid and prevent seroma, haematoma and resultant wound infection. Also, suction drain helps in early coaptation of posterior and anterior wall across the mesh and rapid ingrowth of granulation tissue through the mesh, causing its rapid incorporation into the body tissue.Active suction drains work on the principle of negative pressure wound therapy. NPWT is a type of closed, active drain system that uses subatmospheric pressures. It has been shown to improve wound perfusion [10, 11]. NPWT deceases interstitial edema, stimulates fibroplasia, and enhances angiogenesis, although the exact mechanisms of these actions are not completely understood [12]. NPWT leads to earlier wound closure because of accelerated granulation tissue formation, reduced bacterial colonization, and reduced wound edema and exudate [10-12]. However, still it is another foreign body, the drain catheter itself. And if surgical technique can be bettered to secure perfect haemostasis and minimize tissue trauma, fluid accumulation and resultant wound infection can be minimized to obviate this need of drain. So, how much these aims are achievable and ultimately whether to use drain or not in a standard practice, question still remains, as various studies in this regard have produced conflicting results. So, still there is no consensus among surgeons regarding the use of drains in hernia surgery. Some surgeons use it indiscriminately and others occasionally. If seroma or haematoma are formed these are managed by aspiration, compression and surgical drainage [3]. If dissection was difficult, old age patients, patients on blood thinners, the use of negative suction drain is recommended [2,4].

AIMS AND OBJECTIVE: To assess and compare the outcome of drain placement vs. no drain, in patients undergoing Lichtenstein mesh repair ofinguinal hernias.

METHODS AND MATERIALS:

Study design: Comparative prospective study.

Study Location: Department of General Surgery, IQ CITY Medical College & Hospital.

Study Population: Patients admitted in the department of General surgery, IQ CITY Medical College & Hospital and undergone Lichtenstein Open mesh hernioplasty on elective basis as per inclusion and exclusion criteria, during the study period.

Study Period: 4 years from 1st January 2019 to 31stDecember 2022.

Sample Size: 116 patients of inguinal hernia undergoing Lichtenstein mesh hernioplasty over a period of 4 years from January 2019 to December 2022. Patients were randomized into two groups – one with a suction drain (56) and one without any drain (60).

Inclusion Criteria:

- Patients of inguinal hernia within age range of 18-75 years.

Exclusion Criteria:

- Patients outside the age range of 18-75 years
- Patients with significant co-morbidities, like, uncontrolled diabetes, severe hypertension, congestive heart failure, recent myocardial infarction, chronic liver or kidney disease, patients suffered or suffering from malignancy, paralysis, bedridden for any other condition, significant immunocompromised state like HIV infection.
- Patients not given consent for participation in study
- Patients with irreducible inguinal hernia
- Patients, who undergone same surgery for emergency indications, significant pain, intestinal obstruction or strangulation etc.
- Patients undergoing bilateral inguinal hernia surgery at the same sitting
- Patients undergoing recurrent inguinal hernia surgery
- Patients, who did not turn up for follow up.
- Patients, who suffered other significant illnesses in the follow up period of 2 months.

Operative procedure:

- All operations were done under spinal anaesthesia.
- Injection Ceftriaxone 1000 mg was also given before the surgery in the operation theatre.
- Inguinal skin crease incision.

- External oblique aponeurosis incised open, medially up to the superficial ring and laterally beyond the deep ring.
- Ilioinguinal nerve identified and protected.
- Cord picked up at the pubic crest and dissected up to the deep ring,
- For indirect hernia, Cremasteric and internal spermatic fascia incised open and indirect sac identified, separated from the rest of the cord contents and dissected upto the deep ring. Sac was incised open, contents reduced and sac ligated doubly at its base with Polyglactin 2-0 suture, divided distally and discarded. Posterior wall darning repair was done using Polypropylene 1-0 suture.
- For direct hernia, after dissecting the cord up to the deep ring, direct sac was plicated in darning repair of posterior wall using Polypropylene 1-0 suture.
- A 6 inch x 3 inch macroporousPolypropylene mesh was used for subsequent posterior wall repair.
- Inferior edge of mesh was sutured to the upturned edge of inguinal ligament using Polypropylene 3-0 continuous suture.
- Lateral edge of the mesh was slit to incorporate cord and resewn together beyond.
- Rest of the edges of mesh were secured to conjoint muscles using interrupted Polypropylene 3-0 sutures.
- In the drain group, a 16 F suction drain (Romovac) was placed over the mesh.
- External oblique aponeurosis was closed with Polyglactin 2-0 continuous suture.
- Subcutaneous fat was closed with Polyglactin 2-0 continuous suture.
- Skin was closed with Nylon 3-0 interrupted suture.

Post-operative Period:

- All patients were given inj. Tramadol 100 mg thrice daily for 2 days. Then they were given analgesics orally only on demand as Tramadol-Paracetamol combination (37.5 mg-325 mg respectively). Patients, who were not relieved on oral painkillers, were again given Inj. Tramadol.
- All patients of both the groups were subjected to USG groin and scrotum for any collection on 7-10th post-operative day and subsequently if required.
- Patients in both groups were discharged, when they were able to maintain on oral nutrition and became self-ambulatory.
- In the drain group, patients were discharged as above, with drain and instruction to maintain the drain suction functioning and emptying the drain at regular intervals with measurement of daily drain output. When the daily drain output was reduced to less than 20 ml per day for consecutive 3 days, they were advised to show up in the OPD to get the drain removed.

- All patients, who developed wound haematoma or seroma, they were assessed with USG examination for quantification of the fluid. If it was more than 50 ml, it was aspirated under aseptic precautions under USG guidance.
- All patients were followed up on OPD basis, until satisfactory wound healing was ensured and they were able to return to their usual non-strenuous activities.
- Patients, who developed wound infection, were treated with removal of affected suture areas and simple wound dilation to drain the pus pockets or inflammatory fluid. Wound swab was taken for gram staining and culture sensitivity testing and antibiotics given accordingly.
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Statistical Analysis: The null hypothesis was the absence of difference between both groups and the alternative hypothesis was a decrease of complications without drain. The normal distribution of the variables was assessed with a Kolmogorov–Smirnov test. Continuous variables were analysed with a Student's t-test and categorial binary variables with a Pearson's chisquare test or a Fisher's exact test. A p-value smaller than 0.05 was considered statistically significant

Observation and Results:

Table 1: Distribution based on age group

Age group	No. of patients	No. of pts Drain gp	No. of pts non-drain gp	Percentage
16-25	4	2	2	3.45
26-35	8	3	5	6.90
36-45	27	14	13	23.27
46-55	34	15	19	29.31
56-65	28	13	15	24.14
66-75	15	9	6	12.93

Most of the patients were between the age group 36-65 years.

Table 2: Pain medication requirement days:

Surgery groups	Pain medication requirement days (Mean)	P value
Drainage group	3.51	0.063
Non-drainage group	5.45	

It seems here that pain medication requirement days in drainage group was less as compared to Non-drainage group. However, this difference was not statistically significant.

Table 3: Haematoma/Seroma formation

Surgery groups	Haematoma/Seroma formation	Percentage	P value
Drainage group	2	3.57	0.019
Non-drainage group	10	16.67	

In this study, haematoma and seroma formation were significantly low in the drainage group 3.57% vs 16.67 %).

Table 4: Wound Infection

Surgery groups	Wound infection	Percentage	P value
Drainage group	1	3.57	0.014
Non-drainage group	7	11.67	

In this study, wound infection was significantly low in the drainage group (3.57 % vs 11.67%).

Table 5: Return to Usual activity duration

Surgery groups	Return to usual activity duration (Days) - Median	P value
Drainage group	25.07	0.098
Non-drainage group	28.85	

In this study, the return to usual activity duration was less in the drain group (Median 25.07 days), compared to non-drain group (28.85 days), although this was also not statistically significant.

In this study, all the parameters studied showed a favourable response with the drain group, though all were not statistically significant except hematoma/seroma formation and wound infection.

In the drain group patients, most have got their suction drain removed within 7-14 days, when it was consecutively less than 20 ml for consecutive 3 days.

Most of the patients in both groups were able to be discharged by 3-5 days, except a few, who developed incapacitating pain requiring injectable pain killers or developed some complications. All the patients were advised to report back if any discharge or discomfort occurs in the operative area.

DISCUSSION:

Inguinal hernia repair by open surgery is the most commonly done operation in the world. All general surgeons begin their carrier with open surgery. Much advancement has been done in hernia surgery from simple repair to mesh repair, laparoscopic and robotic repairs. Now the gold standard for open inguinal hernia repair is Lichtenstein mesh plasty. It is practiced all over

the world routinely. To use drains in open elective surgery is a matter of controversy. Some surgeons use drains frequently and others rarely [5]. If seroma or haematoma develops, it is treated either by aspiration or by post-operative puncture and drainage [6]. But when dissection is difficult or patients have other complicating factors, the usage of the negative suction drain is recommended [7]. This reduces the postoperative complications of seroma, haematoma and wound sepsis and so lessens the discomfort of the patients [8]. But surgeons fear putting drains when using prosthetic material i.e. because of fear of introducing infection. Because drains act as a foreign body and increase the chances of infection [9].However, in our study, to the contrary, use of active suction drain reduced the incidence of haematoma/seroma formation as well as wound infection. It also reduced the analgesic requirement days as well as return to usual activity durations, though these were not statistically significant. Patients with drain group, who developed wound haematoma/seroma/infection in our study, were those with blocked catheter and non-functioning suction drain. Poor results with drains in some other studies can be argued for the fact that probably, active suction was not actively monitored and catheter got blocked, forfeiting the very purpose of drain while providing a source of infection to the wound bed.

One idea which emerges out is that, possibly there can not be any sweeping statement like, to use or not to use the drain, but use it judiciously whenever required. Also, to carry and maintain drain in the post-operative period, is another burden on the patients. During surgery, at one end, there will be the cases in a perfectly healthy patients, where anatomy will be simple with easy dissection able to be carried out swiftly and perfect haemostasis achieved at the end with minimal tissue trauma and on the other end, there will be the anatomically difficult cases in morbid/obese patients with lot of bruising lengthy dissection. So, it seems drains will be un-necessary in the former group, while in the later, use of drains can possibly save from unwanted post-operative complications. However, nothing can save a theoretically wrong surgery.

CONCLUSION:

From the above study, it can be concluded that routine use of suction drain in inguinal hernia surgery should possibly not be advocated, but is definitely beneficial in potential risky patients with difficult and lengthy surgery. It convincingly lowers the chances of post-operative complications, if it is monitored and allowed to function well, at least in the high risk groups.

Limitations and Need for further Study:

Since this study was not targeted on difficult hernia cases, use of suction drain and its benefits can't be generalized on all inguinal hernia cases. Further study is required regarding use of drain in high risk inguinal hernia surgery, as in irreducible, obstructed or strangulated hernia cases and patients with significant morbidities, to see if use of active suction drain can significantly affect the outcome in those cases or not. So, there are chances for varying results in other set of persons. This may be a limitation of the study.

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