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A comparative study of minivac suction drain in Lichtenstein tension-free mesh inguinal hernioplasty at Basaweshwar teaching and general hospital, Kalaburagi, Karnataka

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ABSTRACT

Background: Despite the high prevalence of inguinal hernias worldwide, intraoperative drain placement remains a controversial topic. The benefit of reducing post-operative complications has not yet been clearly demonstrated. This study investigates whether a drain prevents post-operative complications after the Lichtenstein tension-free mesh hernioplasty technique. **Aims and Objectives:** The study is to compare minivac suction drain in Lichtenstein tension-free mesh hernioplasty in inguinal hernia repair at Basaweshwar teaching and general hospital, Gulbarga. To study the merits and demerits of minivac suction drain in inguinal hernia repairs. **Materials and Methods:** This study is a retrospective comparative study to compare 50 patients with inguinal hernia undergoing Lichtenstein tension-free mesh hernioplasty over a period of 2 years. Patients were randomized into two groups, one group containing 25 patients with a minivac drain and one group containing 25 patients without a drain. Results were compared in two groups for hematoma, seroma, wound infection, pain, and duration of hospital stay. **Results:** From the study, it is concluded that keeping a drain in Lichtenstein tension-free mesh hernioplasty is beneficial in complications associated with Seroma and Hematoma formation and reduction in hospital stay, but no significant difference in pain post-surgery. In our study, three patients in the drain group had wound infection, whereas in the non-drain group six patients had infection, but it was not statistically significant. At the end of the study, we can conclude that the patients with a drain benefited in the form of less chances of seroma and hematoma. **Conclusion:** From the study, it is concluded that the use of suction drain in Lichtenstein tension-free mesh hernioplasty is beneficial in complications associated with Seroma and Hematoma formation and reduction in hospital stay, but no significant difference in post-operative pain.

Key words: Lichtenstein tension-free mesh repair; Drain, Seroma; Infection

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INTRODUCTION

Inguinal hernias, because of their frequency, remain an important surgical problem. The estimated lifetime risk for inguinal hernia is 27% for males and 3% for females. The annual mortality ranges from 100 to 300/100,000 in inguinal hernia patients.[1] In the European Hernia Society guidelines, mesh-based techniques, Lichtenstein's technique, in particular, are recommended for the treatment of symptomatic primary inguinal hernia.

The concept of hernia repair with synthetic mesh was introduced by Lichtenstein et al., 1989; nowadays, this procedure is the gold standard in open hernia surgery.[2,3]

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The outcome of hernia operations is generally favorable. However, the operation can have complications such as seroma formation, hematoma, infection, wound dehiscence, and recurrences.

There is no consensus among surgeons regarding the use of drains in hernia surgery. Some surgeons use drains indiscriminately, whereas others use them selectively. If seroma or hematoma forms, it is managed by aspiration, compression, or surgical drainage.[4]

The negative suction drain is recommended in cases of difficult dissection, elderly patients, and patients on blood thinners.[5]

Aims and objectives

To compare the outcome of minivac drain placement versus no drain in Lichtenstein mesh repair of an inguinal hernia.

MATERIALS AND METHODS

It is a retrospective observation study with purposive sampling done in patients coming to the Department of General Surgery, Basaweshwar Teaching and General Hospital, Kalaburagi. The patients coming to the outpatient department with inguinal hernia who underwent Lichtenstein tension-free mesh hernioplasty on an elective basis were selected based on inclusion and exclusion criteria by purposive sampling.

Study duration

Two years.

Sample size

Fifty patients (purposive sampling).

Inclusion criteria

Patients undergoing inguinal hernia repair with an age ranging from 18 to 60 years were included.

Exclusion criteria

The patient with the following conditions was excluded.

1) Patient with uncontrolled diabetes mellitus, congestive cardiac failure, hypertension, chronic liver disease, kidney disease, and immunocompromised disease
2) Patient with irreducible hernia
3) Patient undergoing operation for strangulation and obstruction
4) Patient undergoing recurrent hernia surgery.

Operative procedure

All surgeries were done under regional anesthesia (spinal anesthesia). Injection of ceftriaxone 1 g IV STAT was given 30 min before taking the incision.

Table 1: Age distribution of patients in the study

Age group	Number of patients
18–30	3
30–40	6
40–50	7
50–60	13
60–70	11

Table 2: Average drain output over five days

Post-operative day	Drain output
Day 1	25–30 mL
Day 2	10–20 mL
Day 3	5–10 mL
Day 4	<5 mL
Day 5	Nil

Table 3: Study outcome based on pain

Variable	Complaint of pain	No significant pain	P-value
Drain group	9	16	0.0955
Non-drain group	3	22	

Table 4: Study outcome based on seroma collection

Variable	Seroma	No seroma	P-value
Drain group	1	24	0.0232
Non-drain group	8	17	

Table 5: Study outcome based on hematoma

Variable	Hematoma	No hematoma	P-value
Drain group	1	24	
Non-drain group	7	18	0.0488

Table 6: Table showing surgical site infection in drain vs no drain

Variable	Infective	Non-infective	P-value
Drain group	2	23	
Non-drain group	8	17	0.0738

Table 7: Table depicting length of hospital stay

Variable	Infective	Non-infective
Average hospital stay	8.9	6.5

Incision of about 6 cm taken 2 cm above the line joining the pubic tubercle to the mid-point of the inguinal ligament, incision deepened in layers. External oblique aponeurosis incised till the superficial inguinal ring, the ilioinguinal nerve identified and preserved, cord structures were hooked and dissected up to the deep ring.

In indirect hernia, the cremasteric and internal spermatic fascia was identified and incised, the sac was identified and cord structures were separated, the sac was opened and

contents reduced, purse string sutures were taken, and the sac was transfixed close to the deep ring. Posterior wall repair was done using Prolene No. 1 sutures.

For direct hernias, the sac was reduced, and the posterior wall repair was done using Prolene No. 1 sutures. A 7×11 cm Polypropylene mesh was used for posterior wall repair. Mesh sutured to pubic tubercle, reflected part of inguinal ligament, conjoint tendon using 2.0 polypropylene sutures, and hemostasis achieved. A minivac drain is placed below the external oblique aponeurosis and fixed to the skin. External oblique aponeurosis is closed with Vicryl 2.0 sutures. Skin is sutured with 2.0 Ethilon. The wound and the drain dressing were done separately.

Post-operative period

All patients were given diclofenac 75 mg aqueous twice daily for 2 days. Then, it is converted to oral analgesics containing aceclofenac with paracetamol combination. In patients for whom pain was not relieved by oral analgesics, they were given injectables. The patient was discharged after opening dressing on the 5th post-operative day, who was tolerating orally and became self-ambulatory. In patients in whom drain was kept, proper functioning of the drain was checked regularly, and emptying at regular intervals was noted. When the output is <20 mL/day for 3 consecutive days drain was removed. Patients who had the complication of wound infection, sutures were removed at the most dependent position, and pus/seroma fluid was drained and sent for culture and sensitivity, and based on culture and sensitivity, treatment was given.

Statistical analysis

The variables were analysed with Student's t-test. A P-value smaller than 0.05 was considered statistically significant.

RESULTS

Type of hernia

Demographics

All 50 patients included in the study were male, reflecting the higher incidence of inguinal hernia in men. Age distribution ranged from 18 to 70 years, with the majority of patients falling in the 50–70 years age group (Table 1).

Sex

All the patients were male patients as inguinal hernia is rare in females.

Drain output progressively decreased over 5 days (Table 2).

Distribution based on pain

It is seen in the study that nine patients in the drain group experienced pain, whereas only three patients in the non-drain group experienced pain, but the P-value was not significant (Table 3). Here, pain is described in patients as not reducing despite the analgesic regimen followed in the study, who required additional doses of analgesic injectables/oral.

Seroma

It is seen that seroma formation was reduced in the drain group with a significant P-value (Table 4).

Hematoma

It was seen that complication of hematoma was significant less in patients with drain with significant p value (Table 5).

Distribution of post-operative complications

It was seen that surgical site infection rates were less in the drain group, but this was not statistically significant (Table 6).

Average hospital stay

It was noted that the average length of hospital stay in patients without infection was comparatively low. This suggests a potential benefit of drain use in reducing the length of stay when complications are minimized (Table 7).

DISCUSSION

Open surgeries for inguinal hernias are the most common procedures performed by surgeons. It is the simplest operation to be done by surgeons in the beginning of their career. The standardized anatomical landmarks, reproducible technique, and relatively low complication rates make it an ideal initial procedure for surgical trainees. Advancement in the field of hernia surgeries ranges from open to laparoscopic approaches and robotic surgeries, but Lichtenstein tension-free hernioplasty is routinely done worldwide due to its low recurrence rate, ease of performance under local anesthesia, and minimal post-operative pain. Despite the evolution of minimally invasive techniques, the Lichtenstein repair remains the benchmark against which other methods are compared, especially in resource-limited settings.

Using drains in surgical practice depends on the preference of the operating surgeon. The most common complications after open mesh incisional hernia repairs are surgical site infections and collections.[6] These complications not only delay recovery but also increase healthcare costs and the risk of long-term recurrence. The phrase "When in doubt, drain" is often used, but the decision ultimately lies with the surgeon.[7] In open ventral hernia repair, drains are traditionally placed to avoid seroma and hematoma

formation by facilitating fluid drainage.[8] Drains can also be considered in cases with extensive dissection, obesity, immunosuppression, or anticoagulant use, all of which are risk factors for fluid collection. In addition, in patients with large hernia defects or prior mesh infections, the prophylactic use of drains may help detect early complications and reduce the need for reoperation.

The literature does not provide clear evidence of a protective effect of drains on seroma formation.[9] If seroma or hematoma develops, it is treated either by aspiration or by post-operative puncture and drainage.[10] Recent studies suggest that routine drain placement does not significantly reduce seroma incidence compared to selective use, especially when meticulous hemostasis and layered closure techniques are followed. Some authors advocate for the use of fibrin sealants or suture plication techniques as alternatives to drainage for managing dead space and preventing fluid accumulation.

However, surgeons remain skeptical about using drains when dealing with prosthetic material due to the risk of infection, as drains can act as foreign bodies and increase the likelihood of infection.[11] This is especially critical in mesh repairs, where infections often necessitate mesh removal, leading to increased morbidity and reoperation rates. The decision to place a drain should, therefore, be based on intraoperative findings such as bleeding, tissue dissection extent, and patient comorbidities, rather than routine use.

Since collected seroma or hematoma in the surgical site provides a medium for infection, negative suction drainage is advisable over the mesh and under the external oblique sheath to drain accumulating fluid.[12] This technique creates a closed, sterile environment that reduces bacterial colonization risk. It is particularly beneficial in large hernia repairs, where extensive dead space exists. Negative suction drains also promote tissue apposition, enhance local perfusion, and reduce inflammatory response, thereby potentially improving wound healing outcomes.

Negative pressure helps collapse potential dead space, particularly in elderly or debilitated patients, reducing wound infection and dehiscence and, consequently, lowering the risk of hernia recurrence. Moreover, vacuum-assisted closure systems have shown promising outcomes in managing complex or contaminated hernia repairs, enhancing granulation tissue formation and reducing hospitalization time. The use of intrawound vacuum drains during the first 24 h post-surgery significantly decreases seroma formation, with a lesser effect on hematoma occurrence.[5] Early drain removal within 24–48 h, when appropriate, may also reduce infection risk without compromising drainage efficacy. Future studies with large randomized trials are needed to define standardized criteria for drain use, optimal duration, and their impact on long-term hernia recurrence and quality of life.

Limitations of the study

As this is a study done with a small number of subjects, routine drain placement after elective hernia repair cannot be advocated, and studies with a larger sample size have to be conducted to prove this efficacy.

Another limitation of this study is that it did not include patients with comorbidities, and only elective cases were included.

CONCLUSION

From the study, it is concluded that keeping a drain in Lichtenstein tension-free mesh hernioplasty is beneficial in complications associated with Seroma and Hematoma formation and reduction in hospital stay, but no significant difference in pain post-surgery. In our study, three patients in the drain group had wound infection, whereas in the non-drain group, six patients had infection, but it was not statistically significant.

At the end of the study, we can conclude that the patients with a drain benefited in the form of less chances of seroma and hematoma.

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