Value of drain in reduction of seroma and wound infection in Lichtenstein repair of inguinal hernia

Original Article

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ABSTRACT

Background: In Egypt, open Lichtenstein mesh repair is the standard management option for symptomatic unilateral inguinal hernia. The use of drains is routinely done by many surgeons after such procedures with no proven evidence of their benefits and complications. That motivated us to conduct the present study to evaluate the value of drain insertion in such patients.

Patients and Methods: The data of 60 consecutive patients (30 patients in the drain group and another 30 patients in the drainless group) diagnosed with unliteral inguinal hernia and underwent open Lichtenstein hernioplasty were retrospectively reviewed. The main outcome was the incidence of postoperative adverse events, mainly seroma, hematoma, and wound infection.

Results: Our analysis revealed no notable differences between the drain and drainless groups regarding patient and hernia characteristics. The operative time and hospitalization period were also statistically comparable. The incidence of postoperative complications did not show noteworthy differences between the two approaches. The incidence of wound infection was similar in both groups (3.3%). Seroma occurred in only one (3.3%) patient in the drainless group. Hematoma occurred in 3.3% of drain cases and 6.7% of drainless cases. Moreover, wound edema was encountered in 6.7 and 13.3% of cases in the same groups, respectively. No patients developed recurrence during the 1-year follow-up period.

Conclusion: The use of drains is not associated with significant protective effects against posthernioplasty complications. Its use should be individualized to decrease the impact of drain-associated complications.

Key Words: Drain, inguinal hernia, Lichenstein repair, no drain.

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INTRODUCTION

A ‘hernia’ is defined as an abnormal protrusion of a certain viscus (or a part of it) through a defect in the abdominal wall. Inguinal hernia is the most common type of hernias affecting the human body[1], with a prevalence rate of 3.15–9.4% in the African population[2,3]. That condition mainly affects men, especially elderly ones[4].

Surgical intervention is the mainstay option for inguinal hernias, and it is one of the most commonly performed procedures in general surgery[5]. The highest level of evidence recommends Lichtenstein hernioplasty, a tension-free repair, for symptomatic unilateral primary inguinal hernia repair because of its favorable outcomes compared to both Bassini and Shouldice repairs[6–8]. However, the repair procedure has some reported complications, including postoperative bleeding, hematoma formation, seroma, and surgical site infection. The previous compilations are frequently encountered after inguinal hernioplasty[9,10].

Many surgeons routinely use drains after mesh placement during hernia repair[11]. The insertion of drains after such an operation has many advantages, including early detection of bleeding and drainage of postoperative fluid collections. Nonetheless, its placement may lead to some complications, including foreign body reactions and surgical site infections[10,12].

Till now, the beneficial role of drain insertion has not been elucidated in open inguinal hernia repairs[1,11]. Only three previous studies have highlighted the benefits of drain placement in reducing postoperative seroma rates after laparoscopic extraperitoneal hernioplasty[13–15].

In Egypt, open inguinal hernia repair is more commonly performed than laparoscopic repair, as the latter is associated with high cost and needs certain surgical instruments. We did not find any previous Egyptian studies evaluating the role of drain placement in open inguinal hernioplasty, and the international literature contains only a few studies that evaluate the same concept[4,10,16,17].

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We decided to conduct the present study to evaluate if drain placement after Lichtenstein hernioplasty could significantly decrease postoperative complications, mainly seroma, hematoma, and wound infection.

PATIENTS AND METHODS:

This retrospective study was designed for adult male patients diagnosed with symptomatic noncomplicated direct, indirect, or pantaloon inguinal hernia and underwent elective open Lichenstein repair at Mansoura University, General Surgery Department between January 2022 and October 2022. We started data collection of patients meeting the previous criteria after gaining ethical approval from the Institutional Review Board of our university (IRB code:R.22.08.1785).

We excluded patients with the following criteria from data collection: women with inguinal hernia, complicated hernias (irreducibility, bowel obstruction, or strangulation), bilateral hernias, recurrent hernias, severe cardiovascular comorbidity, liver cirrhosis, or bleeding disorders.

According to our center protocol, preoperative patient evaluation included history taking (focusing on the main symptom, its duration, and associated medical diseases), clinical assessment (focusing on patient BMI and local inguinal examination), routine preoperative laboratory workup (focusing on hemoglobin and albumin levels as the main determinants of tissue healing), and pelviabdominal ultrasonography (to confirm the diagnosis and to exclude the presence of intraabdominal space-occupying lesion as a precipitating factor for hernia). Before the procedure, a written consent was signed by all cases explaining the benefits and possible complications of the procedure.

All procedures were performed by consultant general surgeons experienced in hernia repair procedures. The repair procedures were performed under spinal anesthesia when the patient was supine. A small (6–10 cm) oblique or transverse+inguinal incision was made in all cases. Dissection of the subcutaneous fatty and fascial layers was done till reaching the external oblique aponeurosis that was divided to expose the underlying spermatic cord. That was carefully dissected till we identified the hernial sac that was dissected and excised after reducing its contents to the abdominal cavity. No herniotomy was done for direct inguinal hernias. Plication of the posterior wall was performed using interrupted 2/0 prolene suture in all cases. Aprolene mesh 6×11 cm was inserted to reinforce the posterior wall of the inguinal canal. It was fixed to the pubic tubercle, leaving 2 cm of the mesh medial to it, conjoined tendon using prolene 2/0 interrupted sutures, and fixation to the inguinal ligament by continuous prolene 2/0 suture started medially till 2 cm lateral to the internal inguinal ring.

A negative suction drain was inserted over the mesh reaching the neck of the scrotum in 30 cases (the drain group), while that step was omitted in the other 30 cases (the drainless group). The choice to insert or not to insert the drain was dependent on the surgeon's experience and preference. After that, the external oblique aponeurosis was closed by vicryl sutures, followed by the closure of the superficial layers and, finally, the skin.

After the procedure, oral intake was usually allowed after 6 h, and most patients were discharged on the first or second postoperative days. All patients were commenced on oral antibiotics (amoxicillin-clavulanic 1 g twice daily for 6 days), analgesics (paracetamol 1 g every 8 h), trypsin, and chymotrypsin (300 mg every 8 h before meals for 1 week). The drains were removed after 3–5 days in the drain group. The patients were then asked about their satisfaction level with their surgical procedure according to a five-point Likert scale ranging from very satisfied to very unsatisfied[18]. A follow-up visit was scheduled after 2 weeks for removal of skin stitches and to monitor the incidence of early postoperative complications. The patients were asked to return to our outpatient clinic if they developed any complaints or complications related to our surgical intervention.

Data collection

Demographic data included age, BMI, smoking status, and medical comorbidities, while hernia-related data included its type, size, and duration. Preoperative laboratory parameters included hemoglobin and albumin levels, whereas operative data included operative time and intraoperative complications. Furthermore, postoperative data included the hospitalization period, patient satisfaction, the incidence of complications (seroma, hematoma, edema, and wound infection), and the 1-year recurrence rate.

Definition of outcomes

Seroma was established when there was an abnormal accumulation of serous fluid related to the operative bed[19], whereas hematoma was diagnosed when there was a collection of blood in the dead space related to the surgical bed at least three cm in diameter[20]. Additionally, wound infection was diagnosed by the presence of purulent discharge from the surgical wound, not only peri-incisional hyperemia[21]. Wound edema was a subjective diagnosis made by the examining surgeon that was dependent on the asymmetry between the two sides in the presence of pitting tissue edema on the operation side. Furthermore, recurrence was diagnosed when there was a clinically detectable groin swelling and defect at the previous repair site, assessed by two surgeons[22].

Sample size

The G*Power 3 sample size calculator was used to calculate our proper sample size. Hagbevor *et al*.[17] reported that the incidence of seroma/hematoma was 21% in the drainless group versus 0% in the drain group. We needed to enroll 30 patients in each group in the current study to reach a 5% significance level and to achieve 80% study power.

Statistical analysis

The SPSS software program was used to (Statistical analysis was done using IBM SPSS statistics for windows, Version 23.0. Armonk, NY: IBM Corp) analyze the previously collected parameters. Three statistical tests were applied to compare the drain and drainless groups: the χ^2 test (for categorical parameters), the Student t test (for means and SDs), and the Mann-Whitney test (for medians and ranges). The obtained *P values* were considered significant when less than 0.05.

RESULTS:

The collected patients' demographic data showed no notable differences according to our statistical analysis (Table 1). Patients in the drain group had a mean age of 48.8 years compared to a mean of 45.97 years in the drainless group. Their BMI had mean values of 32.37 and 33.43 kg/m^2 in the same groups, respectively. Hypertension was the most common medical comorbidity, followed by diabetes mellitus type II. Additionally, smokers represented 43.3 and 50% of cases in the study groups, respectively.

Table 1: Baseline demographic data

	Drain group (*N*=30) [*n* (%)]	Drainless group (*N*=30) [*n* (%)]	*P* value
Age (years)	48.80±11.24	45.97±13.01	0.370
BMI (kg/m^2)	32.37±5.68	33.43±5.19	0.451
Medical comorbidities			
Diabetes	4 (13.3)	4 (13.3)	1
Hypertension	8 (26.7)	4 (13.3)	0.197
Smoking	13 (43.3)	15 (50)	0.605

Regarding hernia characteristics, the indirect type was the most common (70% of cases in the drain group and 73.3% in the drainless group). Other types included direct and pantaloon hernias. The left side was affected in 63.3% of cases in the drain group and 70% in the other group. The right side was affected in the remaining cases. The duration of hernia ranged between 1 and 4 years in the two groups (median=3 and 2 years in the two groups, respectively) (Table 2).

Preoperative hemoglobin levels had mean values of 13.39 and 13.02 g/dl, while serum albumin had mean values of 4.24 and 4.21 g/dl in the study groups, respectively (Table 3).

Table 2: Hernia characteristics

	Drain group (*N*=30) [*n* (%)]	Drainless group (*N*=30) [*n* (%)]	*P* value
Hernia type			
Direct	8 (26.7)	6 (20)	
Indirect	21 (70)	22 (73.3)	0.725
Pantaloon	1 (3.3)	2 (6.7)	
Hernia side			
Right	11 (36.7)	9 (30)	0.584
Left	19 (63.3)	21 (70)	
Duration (years)	3 (1–4)	2 (1–4)	0.337

Table 3: Laboratory analysis in the study groups

	Drain group (*N*=30)	Drainless group (*N*=30)	*P* value
Hemoglobin (g/dl)	13.39±1.17	13.02±1.21	0.237
Albumin (g/dl)	4.24±0.37	4.21±0.35	0.774

The surgical process took 45–70 min on average (median=56 min) in the drain group and 45–65 min (median=55 min) in the drainless group. No intraoperative complications were encountered. Most patients were discharged on the first postoperative days in both groups (range, 1–2) (Table 4). The previous parameters showed no crucial differences between the two groups.

Table 4: Operative findings and hospitalization period

	Drain group (*N*=30) [*n* (%)]	Drainless group (*N*=30) [*n* (%)]	*P* value
Duration of surgery (min)	56 (45–70)	55 (45–65)	0.976
Intraoperative complications	0	0	–
Hospitalization period (day)	1 (1–2)	1 (1–2)	0.690

No notable differences were noted between the two approaches regarding the incidence of complications. Wound infection occurred in only one case in each group (3.3%), and it was superficial in nature. Both patients were managed by frequent dressing and local and systemic antibiotics. Seroma occurred in only one (3.3%) case in the drainless group. It was small in size and managed conservatively with complete resolution after 2 weeks. Wound hematoma was encountered in 3.3 and 6.7% of cases in the drain and drainless groups, respectively. These cases were managed conservatively with bed rest, ice compression, topical antibiotics, and topical r-hirudin. Wound edema occurred in 6.7% of cases in the drain group and 13.3% of cases in the other group. That complication spontaneously improved with time with no further intervention. At 1-year follow-up, no patients developed recurrence (Table 5).

Table 5: Postoperative complications

	Drain group (*N*=30) [*n* (%)]	Drainless group (*N*=30) [*n* (%)]	*P* value
Wound infection	1 (3.3)	1 (3.3)	1
Seroma	0	1 (3.3)	0.313
Hematoma	1 (3.3)	2 (6.7)	0.554
Wound edema	2 (6.7)	4 (13.3)	0.389
Recurrence	0	0	–

Patient satisfaction was significantly better in the drainless group (*P=0.0013*), and drain placement was the main etiology of dissatisfaction in the drain group regarding limitation of movement and pain at the drain site (Table 6).

Table 6: Patient satisfaction

	Drain group (*N*=30) [*n* (%)]	Drainless group (*N*=30) [*n* (%)]	*P* value
Satisfaction			
Very satisfied	6 (20)	20 (66.67)	
Satisfied	5 (16.67)	5 (16.67)	
Neutral	15 (50)	2 (6.67)	0.0013
Dissatisfied	2 (6.67)	2 (6.67)	
Very dissatisfied	2 (6.67)	1 (3.33)	

DISCUSSION

Some surgeons believe that drain placement might be protective against posthernioplasty complications like seroma and hematoma. Their belief is explained by the drainage of any collected discharge and eliminating the created dead space with drain insertion[23]. In fact, the prevention of these complications is crucial in surgical practice as they are associated with impaired patient satisfaction[24] and an increased risk of surgical site infection that may result in mesh extrusion and recurrence[17,25].

The current study handled a rare surgical topic as it compared the value of drain insertion in patients undergoing open inguinal hernioplasty, which is rarely discussed either in Egyptian or international literature.

Despite the nonrandomized retrospective nature of our surgical research, our statistical analysis revealed no notable differences between the two groups regarding both patient and hernia characteristics. That should decrease the risk of bias, which could jeopardize our findings.

According to our findings, the operative time did not statistically differ between the two approaches. Of course, drain placement and its fixation would not take much time to create a significant difference between our two groups. Likewise, Sahu *et al*.[16] found a similar mean value for the operative time in the drain and drainless groups (60 min).

Our findings revealed a similar hospitalization period in the two groups. On the other hand, other authors reported that the hospitalization period increased significantly when drain placement was omitted. That duration ranged between 2 and 6 days in the drain group (mean=2.5), while it ranged between 1 and 34 days in the drainless group (mean=8.2). The increased complications in the drainless group could be attributed to that significant difference[17]. However, others noted an increased hospital stay in the drain group (4 vs. 1 day in the drainless group – *P<0.001*)[1].

Our findings revealed impaired patient satisfaction in the drain group and surgical drains were the most common cause of that dissatisfaction. That coincides with other previous studies that documented the association between surgical drain placement even in other surgical procedures[26,27].

In our study, postoperative seroma formation did not increase significantly without drain placement. Our findings coincide with those of Köckerling *et al*. [10], who reported that the incidence of postoperative seroma was the same in the drain and drainless groups (1.2%) (*P=0.758*). Jadav and Kotwal[4] also reported a low rate of seroma without drain placement after the same procedure (4%).

Contrarily, Sahu *et al*.[16] found a significant rise in postoperative seroma rates when drain placement was not done (22.5 vs. 2.5% in the drain group – *P=0.0025*). Hagbevor *et al*.[17] reported similar findings.

Our findings revealed that omitting drain placement did not lead to a significant rise in postoperative hematoma. Likewise, Aaudichya *et al*.[28] reported that the same complication occurred in 1.6% of cases in the drain group and 1.7% of cases in the drainless group, which is clinically comparable. In contrast to the previous findings, drainless inguinal hernioplasty was associated with a 17.5% incidence of postoperative hematoma, which was significantly higher than the drain group (2.5%) (*P=0.0125*)[16]. Other authors confirmed the previous findings[17]. Surprisingly, another study found an increased rate of the same complication in the drain group (7.6 vs. 0.3% in the drainless group – *P<0.001*)[1].

In our study, the incidence of wound infection was similar in the two groups, which denies any significant impact of drain placement on that adverse event. Hagbevor *et al*.[17] reported no wound infection in the drain group versus a 10.5% infection rate in the drainless group with no significant difference in the statistical analysis (*P=0.134*). Ergül *et al*.[1] also reported that the incidence of the same complication was statistically comparable between the two approaches (4.5 and 2.5% in the drain and drainless groups, respectively – *P=0.250*).

Sahu *et al*.[16] noted that omitting drain placement was associated with a significant rise in postoperative superficial surgical site infection (17.5 vs. 2.5% in the drain group – *P=0.0125*). However, in the study published by Köckerling *et al*.[10], the insertion of the drain led to a significant rise in the same complication (0.3%) compared to the drainless group (incidence=0.1% – *P<0.001*).

No patients developed recurrence during the scheduled follow-up period. Köckerling *et al*.[10] also found that omitting drain insertion in the same cases was not associated with increased recurrence rates, which was 0.9% in the drain group and 1% in the drainless group (*P=0.326*). Differences in recurrence rates could be explained by different patient characteristics and follow-up periods.

Based on our data, the routine use of surgical drains during inguinal hernioplasty is not recommended. However, it should be individualized for every patient according to his/her situation and the course of the operation (extensive tissue dissection, lymphatic disruption, large mesh placement)[29–31]. The drains should be inserted in patients with a higher risk for postoperative bleeding, seroma, hematoma formation, or wound infection[10]. The previous recommendation should not be taken as a reference, but it should be a potential motive to conduct prospective trials to elucidate the exact indications of drain use in patients undergoing inguinal hernioplasty.

Our study has some limitations. The retrospective nature, the limited number of patients, and reflecting the experience of one surgical institution are the main limitations. The upcoming studies should address the previous drawbacks.

CONCLUSION

The routine use of drains during Lichenstein inguinal hernioplasty is not associated with significant protective effects against the incidence of postoperative seroma, hematoma, or other adverse events. Therefore, it is recommended to only use drainage when indicated to decrease the risk of drain-associated adverse events.

CONFLICT OF INTEREST

There are no conflicts of interest.

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