



Does Drain in Open Mesh Hernioplasty Changes Outcome? Chandra Praksh Sharma*, Pankaj Kumar Gogoi and Satyajit Mishra

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ABSTRACT

Background and Aims: In this study, we aimed to observe the postoperative outcomes of open hernia repair compared with and without drain during admission, at discharge, and after 3 months. **Material and Methods:** We retrospectively analyzed the outcomes of inguinal hernias repairs with suction drains, compared to the inguinal hernia repairs without drains from August 2016 till December 2019. Postoperative outcomes (Induration, tenderness, and discomfort) amount of drain, the character of drain any recurrence of open hernia repair compared with and without drain during admission, at discharge, and after 3 months. **Results:** During the above-mentioned period, 150 with drain and 150 without a drain were observed. In the group with drain, 38.67% had direct inguinal hernias, 38% had indirect inguinal hernias and 22.67% had both types of inguinal hernias. The average drain observed on day-1 was 37.43 ml and 9.75 ml on day-3. In the group without drain, the direct inguinal hernia was observed in 46.66%, indirect in 44% and both types of inguinal hernias were observed in 9.33%. There was no recurrence in either group. All patients were followed for 3 months. Length of stay compared was insignificant with 3.37 days with drain while 4.86 days without a drain ($p < 0.05$). **Conclusions:** Placing drains in open mesh repair routinely does not significantly alter outcomes including pain, tenderness, or discomfort but patients with drain had a feeling of well-being at discharge and after 3 months which couldn't be quantified.

Keywords: Drain, Hernia repair, Groin hernia, Lichtenstein hernioplasty, Hematoma, Seroma, Complications

INTRODUCTION

An inguinal hernia is one of the most common presentations at the surgery department and its repairs are the commonest elective procedures carried out by surgeons and residents across the globe. Although elective hernia repairs usually do not have unfavourable outcomes, yet there may be few common but grave complications such as seroma, hematoma, ecchymosis, and wound dehiscence. These complications are taught and repeatedly discussed in the literature. It was preferred to put drain to avoid seroma, hepatoma, or edema formation postoperatively in an inguinoscrotal surgery. Surgeons preferred putting drains in these repairs to avoid unnecessary morbidities, but recent studies do not suggest the advantage of regular use of drains. Therefore the usage of drains and their association with complications are not well documented. Furthermore, there is no consensus among surgeons on the need for drains for all types of hernias; whereas some use drains indiscriminately and others rarely [1]. Generally, it is well-accepted fact not to use drains in open repair routinely. A seroma and hematoma developed postoperatively are managed by percutaneous puncture and drainage [2,3]. However where dissection is difficult or when other complicating factors are present the usage of suction drainage is recommended [4].

In this retrospective observational study, we aimed to observe the post-operative outcomes (induration, tenderness, and discomfort) of open hernia repair compared with and without drain during admission, at discharge, and after 3 months.

MATERIALS AND METHODS

We retrospectively analysed the outcomes of inguinal hernias repairs with suction drains used, compared to the inguinal hernia repairs without drains from August 2016 till December 2019 in a government teaching hospital.

The standard repair technique followed for inguinal hernia was Lichtenstein tension-free mesh hernioplasty which was

previously described [5]. The repairs using other techniques were excluded from the study to avoid the introduction of bias. Patients under the age of 18 and above the age of 80, patients with large inguinal hernia, inguinoscrotal or complete inguinal hernia were also excluded. Patients on anticoagulants or bleeding tendencies or surgeries done in emergencies were also excluded from the study.

All patients received a bolus dose of a third-generation cephalosporin (cefotaxime) half an hour before incision. Standard tension-free Lichtenstein mesh hernioplasty was done. All patients were given injectable antibiotics for one day postoperatively followed by oral antibiotics till the 5th postoperative day or till the drain was removed. All the repairs were performed by the same surgical unit. The closed suction drain was placed under the external oblique aponeurosis and was taken out from another site. Patients have been given scrotal support for the next 48 hrs. The drain was placed *in situ* and was removed when it was serous and below 25 ml in the last 24 hrs. The patient was discharged when he was comfortable and there were no signs of infection locally, a collection with tolerable discomfort or pain. Patients were re-evaluated after 3 months of surgery for pain, tenderness, or any discomfort at the operated site. Data were collected from the record holder with this department.

All patients were ambulated on the same day of surgery and their wounds were inspected on postoperative day 2 and then daily till discharge. The daily output, the character of drain, tenderness, and discomfort were recorded. For the first two postoperative days, similar non-steroidal anti-inflammatory analgesics were given thrice a day. Thereafter analgesics were given as and when required. Pain and tenderness without analgesia were recorded at discharge.

The results were analysed statistically using SPSS for Windows program (SPSS, Chicago, Illinois). Comparisons of categorical variables between the two groups were performed by using the chi-square test. Student t-test and Mann Whitney U tests were used to comparing the parametric and nonparametric variables between the two groups. Binary logistic regression was performed with the backward conditional method to analyse the significant independent predictors of the drain used as the dependent variable. Linear logistic regression was performed to analyse the significant independent predictors of the duration of the hospital stay as the dependent variable. p-values less than 0.05 were considered significant. Data are presented as the number of patients (%), mean standard deviation, or median (minimum-maximum) where appropriate.

RESULTS

During the above-mentioned period, a total of 300 groin hernia repairs were observed which included 150 with drain and another 150 without a drain.

In the group in whom drain was put, the mean age of the patient was 47.40 years (22-76 years). 59 (38.67%) had direct inguinal hernias, 57 (38%) had indirect inguinal hernias and 34 (22.67%) had both types of inguinal hernias. The average drain observed on day-1 was 37.43 ml and 9.75 ml on day-3. The drain was serous in 69 (46%), serosanguinous in 05 (3.33%), and nil in 76 (50.67%) by day 3. The average length of hospital stay was 3.37 days as summarised in Table 1.

Table 1 Outcome of open inguinal repair with drain

Age	47.41 years	22-76 years
Direct Hernia	59	38.67%
Indirect Hernia	57	38%
Both	34	22.67%
Drain on Day 1 (Mean)	37.43 ml	
Drain on Day 3 (Mean)	9.75	
Serous	71	47.30%
Serosanguinous	5	3.30%
Nil	74	49.40%
At Discharge		
Tenderness	37	24.67%

Induration	8	5.33%
Discomfort	18	12%
At 3 Months		
Tenderness	Nil	
Induration	Nil	
Discomfort	Nil	
Recurrence	Nil	
The average length of hospital stay	3.37 days	

In the group without drain, the mean age of the patient was 51.25 years (23-73 years). The direct inguinal hernia was observed in 70 (46.66%), Indirect inguinal hernia was observed in 66 (44%) and both types of inguinal hernias were observed in 14 (9.34%). The average length of hospital admission in this group was 4.86 days as summarised in Table 2.

Table 2 Outcome of open inguinal repair without drain

Age (mean)	51.27 years	23-73 years
Direct Hernia	70	46.66%
Indirect Hernia	66	44%
Both	14	9.34%
At Discharge		
Tenderness	58	38.67%
Induration	48	32.00%
Discomfort	46	30.67%
At 3 Months		
Tenderness	11	7.33%
Induration	7	4.67%
Discomfort	26	17%
Recurrence	Nil	
The average length of hospital stay	4.86 days	

The comparison of the two groups (repairs with drains versus without drains) regarding demographics, clinical characteristics, and the patients' outcome is shown in Table 3. There was no recurrence in either group. Outcomes at discharge were compared and 37 (24.67%) showed tenderness, 8 (5.33%) showed induration and 18 (12%) showed discomfort in the drain group, whereas in the without drain group 58 (38.67%) showed tenderness, 48 (32%) showed induration and 46 (30.67%) showed discomfort. Outcomes at 3 months were compared and patients with drain had no tenderness, induration, or discomfort while patients without drain, 11 (7.33%) had tenderness, 7 (4.67%) had induration and 26 (17%) had discomfort. None of the groups showed recurrence. There was no mortality in both groups. All patients in both groups were followed up for 3 months and completed the follow-up period satisfactorily ($p < 0.001$). Patients in both groups had a similar profile in age and disease. They all were not taking any anticoagulants and were accepted in ASA I and ASA II due to older age with minimal risk. None of them were operated on for recurrence. The elderly patients had direct inguinal hernia commoner or both types of hernias and were accepted in higher ASA. All surgeries were elective surgeries to standardize and limit unnecessary dissection. Length of stay compared among both groups was comparable with 3.37 days for the group with drain while 4.86 days for the group without a drain ($p < 0.05$).

Table 3 Comparison between the outcome of open inguinal repair with and without drain

	With Drain	Without Drain
Age	47.41 (22-76 years)	51.27 (23-73 years)
Direct Hernia	59 (38.67%)	70 (46.66%)
Indirect Hernia	57 (38%)	66 (44%)
Both	34 (22.67%)	14 (9.34%)
Drain on Day 1 (Mean)	37.43ml	Not Applicable
Drain on Day 3 (Mean)	9.75	
Serous	71 (47.3%)	Not Applicable
Serosanguinous	5 (3.3%)	
Nil	74 (49.4%)	
At Discharge		
Tenderness	37 (24.67%)	58 (38.67%)
Induration	8 (5.33%)	48 (32.0%)
Discomfort	18 (12%)	46 (30.67%)
At 3 Months		
Tenderness	Nil	11 (7.33%)
Induration	Nil	7 (4.67%)
Discomfort	Nil	26 (17%)
Recurrence	Nil	Nil
The average length of hospital stay	3.37 days	4.86 days

The linear logistic regression, that was performed by using the hospital stay as the dependent variable and age, type of the hernia, drains, tenderness, discomfort, and induration as the independent variable by backward conditional method revealed that presence of drains, tenderness, induration, and discomfort were the independent statistically insignificant predictors of hospital stay ($p < 0.05$).

DISCUSSION

The operative repair of inguinal hernias is the most common surgical procedure in general surgery [6]. Until recently the standard procedure has been open musculoaponeurotic repair using sutures under tension to close the defect but 'tension-free repair using prosthetic mesh is becoming increasingly common in many countries [7]. In our study, we practiced openly tension-free mesh hernia repair in 100% of cases. Studies have also demonstrated the tension-free mesh repair to be superior over classical means of herniorrhaphy [8-10]. Despite being one of the commonest surgery worldwide, the use of various techniques and prostheses, there is very little information regarding the use of drains in mesh hernioplasty.

Operative repair remains to be the most successful treatment for inguinal hernia, it is also associated with some of the possible complications including hepatoma and serum formation. Hepatoma and seroma formation lead to postoperative infection, induration, discomfort, and wound dehiscence. Placing drain in the operated area, to decrease these complications, specifically after large dissections or patient on anticoagulants. The routine placing of the drain is not practiced routinely but has been practiced in earlier days to minimize complications.

However, several studies carried out the use of drain in posterior repair or repair of large hernia revealed that all seromas invariably resolve and have no impact on postoperative recovery after TEP, expectant treatment with observation is also recommended [11]. Besides in procedures with wide dissection of the subfascial preperitoneal space such as giant prosthetic reinforcement of visceral sac (Stoppa procedure) the use of drains does not provide any benefit [12]. In our studies, though results did not significantly differ from guidelines a better sense of well-being was observed in patients after 3 months period in whom drain was placed.

The recommendation of placing a drain in open mesh hernia repair regularly is not followed. However, in the case of extensive dissection, large or complicated hernia, anticoagulation therapy, and insufficient hemostasis use of drain have been recommended. Though placing drain without achieving significant homeostasis is not a criterion unless circumstances forbid achieving the same. To the best of our knowledge studies comparing regular use of drain in open mesh repair of inguinal hernia has not been carried. A probable reason why surgeons tend to avoid putting drains especially when prosthetic material is used is fear of introducing infection [13]. In general, it was reported that drains act as a foreign body and increase the incidence of infection [14-17]. In our study, the incidence of infection was the same with drains and no statistically significant difference was noted. The relatively higher infection rate reported by various studies associated with the use of drains in a complicated case or with large hernias, hernias operated in emergencies could be explained by the fact that the drains were used more commonly in high ASA class patients with a more complicated presentation, had an emergency operation. Several studies consider the patient's discomfort and long hospital stay disadvantage of drains and recommend not to put drain unless un-escapable [18-23]. In our study, 24% of patients complained of mild to moderate pain or discomfort related to drains while 56% had pain or discomfort in the postoperative period without a drain. In our study as per discharge criterion, i.e. once the patient feels comfortable to be discharged and not to discharge the patient at a fixed duration irrespective to patient's condition, statistically insignificant ($p < 0.05$) longer hospital stay was observed with the patient without drains as they had more pain or discomfort as compared to a patient with drain. Serum or blood accumulated in dead spaces in the vicinity of any prosthesis is potential media for infection. Suction drainage is therefore advisable to eliminate dead space as well as to remove serum collections [24,25]. Placing closed suction drain over prosthesis and beneath external oblique aponeurosis would reduce dead space by creating negative suction as well as will drain out any collection taking place at the operated site. It will also facilitate the collapse of potential space. Therefore it would lead to early adhesion of tissues and decrease seroma formation.

In the current study, routine placement of a drain in open mesh inguinal hernia repair to compare outcome in the immediate postoperative period and after 3 months was observed in respect to pain, discomfort, and tenderness were observed were statistically insignificant when compared with the patient without a drain.

Schmitz, et al. reported that in Bassini-Lotheissen inguinal hernia repair, patients receiving low dose subcutaneous heparin have a high rate of hemorrhagic complications, with 22% hematomas and 13.3% ecchymosis [26]. Similar results were also reported by Mumme, et al. including increased postoperative hematomas and subsequent increased surgical re-intervention with anticoagulation in inguinal hernia surgery [27]. Although Rodrigues et al. reported that the use of suction drainage with the Stoppa procedure does not provide any benefit; they propose the use of it in situations without good hemostasis [12]. We can conclude that the incidence of hematoma, serum, or collection would be higher in case drains are not used in patients on anticoagulant therapy.

Inguinal hernia repair is considered clean surgery with post-op complications in the form of surgical site infection not greater than 2% [28,29]. Antibiotic prophylaxis for elective open mesh inguinal hernia repair is recommended intra-operatively [28,29]. The outcomes of inguinal surgery in our study, when compared between the drain and without drains were similar. We do not have data regarding comparison with and without a drain.

CONCLUSION

We can conclude with the data from our study that though there was no statistically significant difference in postoperative pain, tenderness, discomfort even at 3 months patients had more satisfaction and comfort in the group with a drain placed. The use of drain in open hernia repair with prosthesis did not increase the risk of infection when antibiotic prophylaxis was provided.

Limitations

The major limitation of our study includes discharge policy which depended on patients' condition. This appeared to be the strength of study too and as it reflected the true length of hospital stay. Another limitation of the study appeared to be the use of drain including all types of inguinal hernia. Patients with both types of a hernia would have required more dissection, would have led to increased serum formation, in turn, and would have affected the outcome. Thirdly patients were not randomized based on the type of hernia, allowing all types of hernia may have led to mixed outcomes not attaining the motive of the study. This study excluded patients on anticoagulants which could have been used as a

control to access the level of dissection and hemostasis. Further RCTs would be required to further clarify the role of drains in a specific type of inguinal hernia repair. But such studies would not be easy as they may affect the monetary aspect and state budget and policies. Since this is a limited data study on the usage of a drain in open mesh hernia repairs, it needs to put a lot of effort to change surgeons' preference in the use of drain in open hernia repair as they have been trained in their training days. As the saying goes that drains are no substitute for good hemostasis.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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