

## Research Article

# A comparative study of use of negative drain in lichenstein repair for large inguinal hernia repair

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**Received:** 28 March 2016

**Revised:** 11 April 2016

**Accepted:** 09 May 2016

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## ABSTRACT

**Background:** Recently, with more attention to patient outcomes, post-operative seroma has noted as complication after open inguinal hernia repair. The main aim of the study was to compare and correlate the therapeutic effectiveness of negative suction drain versus no drain in large inguinal hernia repair.

**Methods:** The present study is a randomized study of 400 cases of inguinal hernias admitted in PDU Government Medical College and Hospital, Rajkot, during the study period of April 2012 to March 2015. The cases for the purpose of the study were selected on the basis of the random sampling method and after taking valid informed consent.

**Results:** The drains were used in 120 of 280 open mesh repairs of inguinal hernias. The patients who had drains were older, had cardiovascular disease, higher ASA class, and received anticoagulant regimens more often, had indirect type hernia more often, more commonly had emergency operations, had complicated presentations such as incarceration and strangulation, therefore had resections more often, had local complication such as hematoma, had longer duration of operation.

**Conclusion:** Drain is more commonly used in patient who had more dissection and longer duration of operation. Drain used in selected patients seems to not increase infection risk but associated with longer hospital stay.

**Key words:** Hernia repair, Drain, Groin hernia, Hematoma, Infection, Anticoagulant

## INTRODUCTION

Inguinal hernia is the commonest of all hernias and their repairs are the most common elective procedures performed by surgeons. Although elective hernia repairs have favourable outcomes, as they can be associated with certain complications such as Seroma, Ecchymosis, hematoma and wound infection. These complications have been well discussed in the literature however the usage of drains in these repairs and their association with complications has not been documented very well. Furthermore there is no consensus among surgeons on need of drains for all type of hernias; whereas some use drains indiscriminately and other rarely.<sup>1</sup> A seroma and

hematoma that develops afterward can be treated by postoperative percutaneous puncture and drainage.<sup>2,3</sup> However where dissection is difficult or when other complicating factors are present the usage of suction drainage is recommended.<sup>4</sup> In this prospective observational study we aimed to investigate the factors that are associated with drain usage by comparing the clinical characteristics of patients who had drains with the patients without drains in the repair of groin hernias.

## METHODS

We prospectively analyzed the groin hernias repairs in which suction drains were used and compared them with

other groin repairs without drains from April 2012 till March 2015 in the General surgery department of P.D.U medical college and civil hospital Rajkot. The repair technique for inguinal hernia was Lichtenstein operation which was previously described.<sup>5</sup> The rest of the repairs by using all other techniques were excluded. Patient's age from 18 to 80 were included.

Before the operation generally a bolus dose of a first generation cephalosporin was given intravenously at the induction of anaesthesia. No patients were given any additional antibiotic postoperatively unless he or she developed a proven surgical site infection. Oral anticoagulants were discontinued 7 days before an elective surgery peri-operatively. All the repairs were performed by a surgeon or by a resident under supervision of a surgeon. The preference of placing a drain in-situ was only the surgeons' intra-operative decision. Two members of the study team (A, B) were chosen as the independent monitors of the research.

They collected the data from patients' files and operation reports and recorded on a prospective protocol form. The on-duty surgeons recorded the reason of the drain use in every single case. Only closed system suction drains with a silicon line were used. Drain was removed when its daily drainage was less than 30 ml. All the patients were mobilized on the day of operation and their wounds were inspected daily till discharge day.

The daily output and duration of drain, discomfort and pain due to the drain on the first postoperative day were analyzed in the drain group. On the first postoperative day non-steroidal anti-inflammatory drugs were given twice a day. The pain and discomfort due to the drain was classified as severe (pain or discomfort requiring additional analgesia) or mild (mild pain or discomfort but do not need any analgesic) or none (no pain or discomfort due to the drain).

Outpatient controls were also performed with clinical examination by the same researchers on day-7 and day-30. Surgical site infection as deep or superficial was confirmed with microbial culture for identification of the microorganism and therapeutic antibiotic regimen were given according to antibiogram results.

The type of presentation, age, gender, presence of coexisting diseases, type of hernia, American Society of Anesthesiologists (ASA) class, type of anesthesia, postoperative general complications, local wound complications, duration of operation, and length of hospitalization, recurrence and mortality was analyzed in both groups and compared with each other.

The results were analyzed statically using SPSS for Window program. Comparison of categorical variables between the two groups were performed by using the chi-square test with yate's correction. P value less than 0.005 were considered as significant. Data is presented as

number of patients (%), mean, standard deviation or median (minimum-maximum) where appropriate.

## RESULTS

During the above mentioned we had carried out total no of 400 patients hernia repair. Among which were 120 patients had drain and 280 patients without drain. This group 120 daily output and duration of drains, discomfort and pain on first post-operative day due to their drain summarized in Table 1. The median duration of drain was 2.<sup>1-5</sup>

**Table 1: The daily output and duration of the drains, discomfort and pain on the 1<sup>st</sup> postoperative day.**

Daily main drain output	Pain and discomfort		Post-operative 1 <sup>st</sup> day, n	
	n*	ml		
Post-operative				
1 <sup>st</sup>	120	50±30	Severe	4
2 <sup>nd</sup>	56	30±20	Mild	46
3 <sup>rd</sup>	24	20±10	None	70

\*Number of drain retained due to high output on postoperative 2<sup>nd</sup> and 3<sup>rd</sup> day.

The clinical characteristics of 120 patients with inguinal hernias in whom drains were used are presented in Table 2. The frequency of recurrence, large inguinoscrotal hernias and complicated presentation (incarceration, strangulation) were cross-tabulated with the hernia types in table 2. The comparison of the two groups (repair withdrawn versus without drains) regarding demographics, clinical characteristics and the patients' outcome is shown in table 2. There was no mortality in both groups.

**Table 2: The characteristics of 120 patients with drains according to the type of hernia (n is no of patients).**

Clinical characteristics	Type, n		
	Direct	Indirect	Mixed
Recurrent hernia	3	6	2
Anti-coagulant use	1	0	1
Large inguino-scrotal hernia	22	62	17
Complicated presentation*	4	2	0
No specific clinical characteristics	0	0	0
Total	30	70	20

\* Incarceration / strangulation

The patients who had drains were older, had cardiovascular disease, higher ASA class, had indirect hernia more often, more recurrent, more commonly had emergency operations, had complicated presentations such as incarceration and strangulation, therefore had resection more often with drain, had longer duration of the operations and stayed longer in the hospital when compared the patients without drains ( $p < 0.05$ ) (Table 3).

When age, type of hernia, American Society of Anesthesiologists (ASA) class, recurrence, duration of operation and cardiovascular disease were accepted as covariates and drains were the dependent variable in binary logistic regression analysis by backward condition

method; duration of the operation, recurrent hernias and ASA class were statically significant independent variables predicting drain use in inguinal hernias ( $p < 0.05$ ).

**Table 3: Comparison of drained and untrained patients in repair of inguinal hernias.**

		Drain (120)	No drain (280)	P value
Age (years)		54±15	51±18	0.001
Gender (Male, Female)		118/2	264/16	0.355
Type	Direct	30 (25%)	65 (23%)	0.002
	Indirect	70 (58%)	166 (59%)	
	Mixed	20 (16%)	49 (17%)	
Recurrent hernia		11 (9%)	15 (5%)	<0.001
Emergency surgery		35 (29%)	5 (1.7%)	0.001
Coexisting Disease	Pulmonary disease	10 (83%)	21 (7%)	0.091
	Diabetes mellitus	6 (5%)	15 (5%)	0.32
	Cardiovascular	15 (12%)	28 (10%)	<0.001
	Others*	8 (6%)	22 (7%)	0.259
Complicated Presentation	Incarceration	2 (1%)	1 (1.03%)	0.001
	Strangulation	4 (3%)	3 (1%)	<0.001
Resection	Bowel	22 (18%)	5 (1%)	<0.001
	omentum	54 (4%)	2 (0.7%)	
	**others	1 (0.8%)	0	
Post-operative complication	Pulmonary	2 (1%)	1 (0.3%)	<0.001
	Cardiac	0	0	0.229
	cerebrovascular	0	0	0.229
Local (wound)	Hematoma	2 (1.6%)	5 (1.7%)	<0.001
	infection	1 (0.8%)	15 (5.3%)	0.25
Anticoagulant use		3(2.5%)	2(0.7%)	<0.001
Anaesthesia type	General	35 (29%)	5(1.7%)	0.367
	Regional	83 (69%)	265(94%)	
	Local	2 (1.6%)	10(3.5%)	
ASA class	I	83 (69%)	265(94%)	<0.001
	II	2 (1.6%)	10(3.5%)	
	III-IV	35 (29%)	5(1.7)	
Duration of operation(min)		70 (40-180)	60(37-140)	<0.001
No. of patients with follow-up		120 (100%)	260(92%)	0.032
Duration of hospital stay (Days)		3 (1-6)	1(1-4)	<0.001

The linear logistic regression, that was performed by using the hospital stay as the dependent variable and the age, type of the hernia, recurrence, presence of resection, drains, ASA class, anticoagulant use, emergency surgery, presence of strangulation were the independent statically significant predictors of hospital stay ( $p < 0.05$ ).

## DISCUSSION

The operative repair of inguinal hernias is the most common surgical procedure in general surgery.<sup>6</sup> Until recently introduction of The technique of tension free

repair” since few decades.<sup>7</sup> In above mentioned study we had done all the new case with open technique.

Studies have also demonstrated the superiority of the tension free method over the classical means of suture repair.<sup>8-10</sup> Despite the frequency of it, there is little information about the use of drains in this procedure when extensive dissection or complicating factors were present.

In order to decrease these complications putting a drain in dissection of inguinal area to prevent the collection is controversial. Operative technique with synthetic mesh

has revolutionized abdominal hernia repairs however their infections present a clinical problem. Surgeon tends to avoid putting drains especially when prosthetic material was used in because of fear of introducing infection.<sup>11</sup>

Expectant treatment of seroma is observation which is carried out post operatively.<sup>12</sup> Besides in procedures with wide dissection of subfacial preperitoneal space such as giant prosthetic enforcement of visceral sac the use of drains do not provide any benefit.<sup>13</sup> In our study we found that the hernia with more dissection during the operative intervention required drain such as large inguinoscrotal hernia, incarceration and strangulation. In general it was reported that drains act as a foreign body and increase the incidence of the infection.<sup>14-17</sup>

In our study, the rate of infection was not higher the difference was not statically significant. The relatively higher infection rate associated with the drains could be explained by the fact that the drains were more commonly in high ASA class patients with more complicated presentation, had emergency operation. In addition patient's discomfort, pain and long hospital stay were the other assumed disadvantage of drains.<sup>18-23</sup> In our study we found that only 4 patients had complained of severe pain related to drain.

However in our opinion serum or blood that accumulates in dead space surrounding any prosthesis becomes an excellent media for infection. Suction drainage is therefore advisable beneath the external oblique aponeurosis would drain the collecting fluid and as well as its negative pressure would facilitate the collapse of the potential space.<sup>24-25</sup>

The major limitation of our study is that although the data was collected prospectively, allocation into the study groups was not randomized. The usage of drains was according to the surgeon's preference and therefore selection bias cannot be excluded. Further randomized studies are required in order to clarify the role of drains in inguinal hernia repairs but it would hard to organize such studies.

## CONCLUSION

We conclude that drains are required in selected patients undergoing open mesh inguinal hernia repairs and are not associated with increased infection risk but are associated with longer hospital stay. Drains are more commonly used in patients who had longer duration of operation, dissection and high ASA.

## ACKNOWLEDGEMENTS

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Audichya AK, Vaishnani B, Juneja I, Rajyaguru A, Dandi P, Singh R. A comparative study of use of negative drain in lichenstein repair for large inguinal hernia repair *Int J Res Med Sci* 2016;4:2054-8.