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Closed Suction Drain to Prevent Postoperative Seroma after Lichtenstein Hernioplasty in Complete Inguinal Hernia: A Comparative Study

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Abstract:

Background: There is 5-12% chance of postoperative scrotal hematoma and seroma formation after Lichtenstein hernioplasty, which is attributed to complete hernia sacs, extensive dissection, and the foreign body reaction due to polypropylene mesh.

Objective: The aim of the study is to evaluate the efficacy of closed suction drain to prevent postoperative seroma after Lichtenstein Hernioplasty.

Methods: This prospective study was conducted in 80 patients of complete inguino-scrotal hernia. We compared incidence of post-operative seroma/hematoma and surgical site infection in drain vs. drainless group.

Results: Incidence of hematoma, seroma and surgical site infection in drain and drainless group was 2.5% vs 17.5%, 2.5% vs 22.5% and 2.5% vs 17.5% respectively.

Conclusion: Closed suction drain placement in the distal sac prevents formation of seroma/hematoma after Lichtenstein hernioplasty of complete inguino-scrotal hernia.

Keywords: Complete inguinal hernia, Lichtenstein's hernioplasty, Closed suction drain

Introduction

Inguinal hernia repair is one of the most commonly performed surgeries by general surgeons. The Lichtenstein hernioplasty (LH) is considered as the gold standard repair and the most commonly used mesh is the polypropylene mesh to achieve a tension-free repair.[1] However, there is 5-12% chance of postoperative scrotal hematoma and seroma formation after LH, which is attributed to complete hernia sacs, extensive dissection, and the foreign body reaction due to polypropylene mesh.[2] In most instances, small seromas resolve spontaneously but large seromas require percutaneous aspirations or the insertion of drains however, the acceptance for suction drainage differs among investigators.[3-5] We studied

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the efficacy of the closed suction drain to prevent seroma and hematoma in complete inguino-scrotal hernia.

Patients and methods

This prospective study was conducted between Jan 2017 and December 2019 in the Department of Surgery in a tertiary referral teaching hospital in Central India. Institutional ethics committee's approval and written informed consent by the patients were duly obtained. The complete inguinal hernia was defined as an inguinal hernia that extends up to the base of the scrotum. Obstructed, strangulated, incomplete inguinal hernias and other hernias (femoral, female, and sliding) were excluded.

All patients underwent LH using polypropylene mesh fixed by 2-0 Prolene sutures (both by Johnson & Johnson Private Limited, 501 Arena Space, Behind Majas Bus Depot, Off Jogeshwari Vikhroli Link Road, Jogeshwari (E), Mumbai 400060 India) under spinal/ general anaesthesia. As per pre-decided protocol for this study, all the patients were operated by Consultants and received the same antibiotic – 3rd generation Cephalosporin (intravenously at the time of induction of anaesthesia and then orally for 5 days).

The allotment of the patients was done alternately in two groups (Drain group and Drainless group) and in the drain group, a negative pressure closed suction drain (Romovac, Romsons® Romsons Scientific & Surgical Pvt. Ltd, 63 Taj Expressway Link Rd, Nunhai Rd, Industrial Estate, Agra, Uttar Pradesh India 282006) was inserted over the mesh and extending through the residual distal hernial sac, was brought out through the scrotum (Figure 1). The drain was kept for a minimum of 48 hours and removed after the drainage was <10 mL. The patients were sent home after 48 hours with the drain if the drain was kept for a longer period due to ongoing drainage. Results were assessed by a consultant surgeon by clinical examination for the presence of hematoma and seroma in both groups using Morales-Conde classification for seroma by laparoscopic ventral hernia repair.[6] The severity (Morales-Conde type), consequences (surgical site infection, extrusion of mesh and hernia recurrence), and outcome (spontaneous resolution, need of aspiration, and open drainage) were documented. Statistical analysis was performed using Medcalc® online software. Chi-square test using 2x2 contingency tables was used to compare frequencies between two groups and the 't' test was used to compare means while a value of $p < 0.05$ was considered as statistically significant.

Results

During the study period 142 inguinal hernia patients were operated in the department and 80 fulfilled inclusion criteria for this study, all men with age ranged from 18-60 years (mean: 44.98 years). They were divided into two groups and patients in each group were assigned alternately. The two groups were comparable, their demographic details and outcome are shown in Table 1.

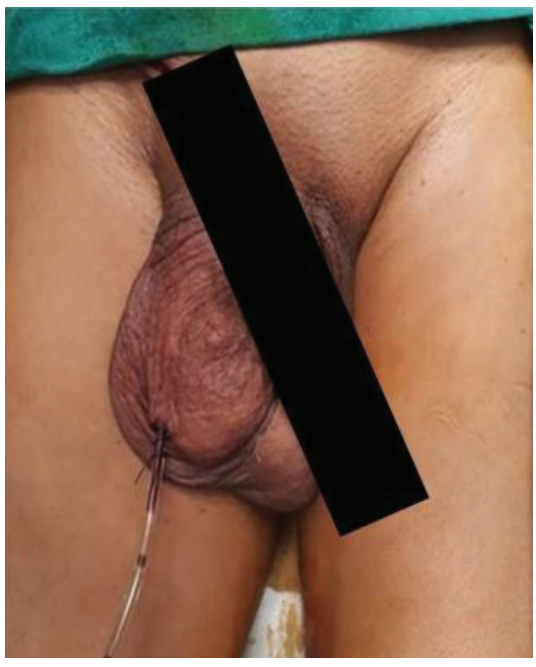

Figure 1 Closed suction drain

Table 1 Demographic and outcome parameters in Drain and Drainless groups

Parameter	Drain (n=40)	Drainless (n=40)	P-Value
Age (years)	45 ± 15	47 ± 14	0.5394
BMI (kg/m^2)	22.36 ± 11	22.72 ± 12	0.9060
Right: Left	26:14	25:15	0.7440
Pre-op albumin (g/dL)	3.69 ± 0.3	3.76 ± 0.3	0.2999
Pre-op Hb (g/dL)	11.2 ± 1.1	11.1 ± 1.3	0.7114
Incarcerated hernia	6	7	0.6773
Operating time (minutes)	60 ± 10	60 ± 11	0.0366
Hematoma formation	1 (2.5%)	7 (17.5%)	0.0125
Seroma formation	1 (2.5%)	9 (22.5%)	0.0025
Severity of Seroma	Type I-1	Type II- 6 Type III- 3	-
Surgical site infection	1 (2.5%) (All superficial)	7 (17.5%) (All superficial)	0.0125

Mean operative duration was comparable ($p > 0.05$) in both the groups. The incidence of hematoma, seroma and surgical site infection was significantly higher ($p = 0.0125$, 0.0025 and 0.0125 respectively) in the Drainless group (Table 1). The severity of seroma was higher in all the nine patients in the Drainless group, and three of them required open drainage while the other six required repeated aspiration. One patient each developed type I seroma and small hematoma in the Drain group which subsided with conservative treatment. The mean drain output was 70 mL (range: 50-100 mL); and drain was kept for a mean 3 days (range: 2-5 days). None of the patients in either group developed deep or organ space SSI or extrusion of mesh. Long term complications like chronic pain and recurrence were not seen in any of the patient during 6 months follow up.

Discussion

LH is currently the gold standard for inguinal hernia and polypropylene mesh is most commonly used due to its low cost and easy availability.[1] Furthermore, the use of polypropylene mesh for contaminated and dirty strangulated hernias as well as for repair of abdominal wall following perforation peritonitis is effective and safe, with acceptable morbidity and good short-term results.[7,8] However, inguinal mesh hernioplasty is associated with a different set of complications including postoperative scrotal hematoma and seroma formation in 5-12% cases after LH, which is attributed to complete hernia sacs, extensive dissection, disruption of lymphatic, foreign body reaction due to polypropylene mesh and when the mesh is placed in contaminated hernia.[2, 9-11] The seroma or the hematoma in dead space surrounding the mesh and, in the scrotum becomes an excellent media for surgical site infection which may lead to mesh extrusion, visceral complications, and recurrence.[6] The scrotal hematoma or

seroma can be a distressful situation for the patients which may result in longstanding swelling, discomfort, pain, cellulitis, and multiple visits to the hospital.[12] The seroma requires either repeated aspirations or surgical drainage if it is deep-seated.[13] Therefore, the main focus of researchers has been to identify the existing issues with the time-tested surgery like LH and further minimize its complications.

The inherent foreign-body nature of polypropylene mesh has been debated but changing the type of mesh has not reduced the mesh or dissection related complications.[14] However, few reports show that the use of the Prolene Hernia System reduces such complications.[11] The resource-poor settings are faced by their own challenges where many patients present late when the hernia is complete i.e., has reached the bottom of scrotum.[15] Moreover, in the teaching centers, most of these surgeries are done by general surgery residents and the prevention of complications in a difficult hernia is another challenge.[16]

The opinion on keeping a closed suction drain after Lichtenstein hernioplasty in inguinal hernia differs among investigators.[3-5] The suction drain has been used for various extra-peritoneal and laparoscopic repairs, but their efficacy has always fallen short of a high level of evidence.[17-19] There has been limited research on the therapeutic utility of a closed suction drain in a complete inguinal hernia which is known to be associated with a large redundant sac, extensive dissection, and higher incidence of seroma and hematoma.[20,21] The concerns associated with drain include fear of introducing infection in the presence of prosthetic material, questionable efficacy and a principle against the philosophy of day-care procedure; however, suction drains are useful in a similar type of settings in many other fields of surgery.[17, 22-24]

In the present study, the overall incidence of postoperative seroma and hematoma formation was significantly higher if a closed suction drain was not used. This can be explained by our focussed observation which otherwise may have gone unnoticed. Moreover, if the closed suction drain is not deployed in a complete hernia, the complications like deeper infection, need for repeated aspiration/open drainage, are likely to be significantly increased for a gold standard procedure like LH. Contrary to popular belief, there was no iatrogenic mesh infection in the drain group. Suction drain is a closed system drain which would drain the collecting fluid and its negative pressure would facilitate the collapse of the potential space and prevent entry of infection from atmosphere.[24]

There are certain alternatives proposed for prevention of seroma such as leaving the distal sac undissected, medical talc powder (hydrated magnesium silicate), Triamcinolone acetonide, fibrin sealant or use of quilting sutures.[13,25-28] However, their efficacy is questionable and there is fear of introducing infection and foreign body granuloma. In the present study, no dissection of distal sac was done in either of the groups; however seromas could not be avoided completely, because of other factors like foreign body reaction of mesh and dead space in the left out sac may be responsible for post-operative seromas.

The frequency and severity of the problem and the efficacy of our intervention make us believe that the philosophy of postoperative drainage using closed suction drain is advantageous to minimize complications, patient discomfort, and hospital visits. However, the limitations of the present study include a smaller number of patients for comparison and performance of surgery by the trainees in a significant number of cases.

Conclusion

The closed suction drain is an effective intervention in Lichtenstein hernioplasty for complete inguinal hernia for the prevention of postoperative seroma, hematoma and surgical site infections. Drain placement does not increase the chances of surgical site infections and there is no added economic burden or added skill required for performing this maneuver.

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Conflicts of interest/Competing interests
None

Availability of additional data and material
NA

Code availability NA

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