

An Effective Approach to Reduce Postoperative Seroma Collection in Laparoscopic Inguinal Hernia Repair

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Abstract:

Background: Total extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) techniques are the two most commonly used laparoscopic procedures for inguinal hernia repair. These two techniques are preferred for favorable clinical outcomes, such as shorter hospital stay, lesser postoperative pain, and decreased incidence of surgical site infection. Still, seroma formation is the most common complication encountered after laparoscopic repair. Based on this aim of our study is to present a new technique to manage the distal sac and to avoid the clinical significant seroma formation after laparoscopic inguinoscrotal hernia repair.

Material and Methods: This study was done as prospective observational study in patients undergoing Laparoscopic Inguinal Hernia Repair. Clinical History, Physical examination and other relevant details of the patient's was collected and noted in the record. The TAPP or TEP repairs were performed using a standardized technique. Post-operatively patient followed with ultra-sonogram 3rd, 7th POD up to 4 weeks for any Seroma collection.

Results: Among the study population, majority 68 (93.2%) of the study population had no complications after the surgery. About 4.1% (3) of the study population developed seroma and 2.7% (2) of the study population developed wound complications. The mean duration of surgery (in min) among the 67 study subjects who underwent TAPP is 59.32 and among the 6 study subjects who underwent TEP is 52.00. The Duration of hospital stay (in hrs) among the 67 study subjects who underwent TAPP is 50.09 and among the 6 study subjects who underwent TEP is 46.5.

Conclusion: Considering the low prevalence of complications, shorter duration of surgery and less duration of hospital stay from our study results, we postulate that TEP can be preferred over TAPP assuming the other factors influencing the choice of surgery to be equal among two groups.

Keywords: Inguinal Hernia, Seroma, Laparoscopy.

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Introduction

Total extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) techniques are the two most commonly used laparoscopic procedures for inguinal hernia repair. These two techniques are preferred for favorable clinical outcomes, such as shorter hospital stay, lesser postoperative pain, and decreased incidence of surgical site infection. Still, seroma formation is the most common complication encountered after laparoscopic repair. [1,2]

The placement of the mesh can be accomplished either via the trans peritoneal route (transabdominal preperitoneal repair - TAPP) or the extraperitoneal route (totally extraperitoneal repair - TEP; the mesh is fixed in place with fixation devices such as tacks or with sutures). Seroma formation is the most frequent complication after laparoscopic repair. Seroma is considered as a concern as it mimics the

postoperative recurrence of hernia. [3] Many reasons have been attributed to the development of seroma formation after laparoscopic inguinal hernia repair, including the dissection of preperitoneal space for mesh placement, the existence of dead space after hernia sac reduction, and the irrigation of prosthetic materials implanted in preperitoneal space. [4] Several perioperative measures have been described in literature to minimize seroma formation, including the use of a drainage, pressure dressing, and obliteration of the dead space by suture and fibrin glue, while not all of these measures were with conclusive results. [5-7]

Various studies have shown that the seroma formation rates have been reported in literature following the laparoscopic inguinoscrotal hernia repair is ranging between 0.5%–15%. [8,9] If no

measures are taken for prevention of seroma after TEP or TAPP repair for direct inguinal hernia, the incidence reported is 4–5%. Significant clinical factors associated with seroma formation include old age, a large hernia defect, an extension of the hernia sac into the scrotum, and the presence of a residual distal indirect sac. [10–14]

The frequency and volume of seroma significantly more in large and scrotal inguinal hernias. To manage the distal sac technique is a reasonable, safe, reproducible, and cost effective method to address the problem of seroma formation in large inguinoscrotal hernia repair. [15,16]. Based on this aim of our study is to present a new technique to manage the distal sac and to avoid the clinical significant seroma formation after laparoscopic inguinoscrotal hernia repair.

Material and Methodology:

This study was done as prospective observational study in patients undergoing Laparoscopic Inguinal Hernia Repair in Government Omandurar Medical College, Chennai. Patient with a diagnosis of inguinal hernia with age more than 18 years, indirect inguino scrotal hernia, congenital hernia with no co-morbidities were included in study, whereas patients with age more than 70 years who are not suitable for general anesthesia and patients with femoral hernia, obturator hernia and recurrent hernia were excluded. Based on the study conducted by Junsheng Li et al, sample size required for the study is 73

Clinical History, Physical examination and other relevant details of the patient's was collected and noted in the record. Baseline laboratory parameters including Complete Blood count, renal and liver function tests, X-ray Chest, ECG, USG Abdomen, Prostate size, PVR were done. Patients were selected as per the criteria mentioned below and they were subjected to surgery after explaining the same in the language of their understanding about the study and obtaining the consent to participate in the study.

During the surgery, all patients were operated under general anesthesia. The TAPP or TEP repairs were performed using a standardized technique. During hernia sac dissection; we were not completely dissect the distal part of the sac; only the proximal hernia sac was dissected from the spermatic cord structures. The distal hernia sac was divided without the need of hernia sac ligation. Then, the lower edge of the divided distal sac was grasped and fixed cranially and laterally to the posterior aspect of the anterior abdominal wall. At

least 2 cm lateral and cranial to the internal ring; thus, the important nerves not to be trapped by the sutures and difficulties if any are encountered. Post-operatively patient followed with ultrasonogram 3rd, 7th POD up to 4 weeks for any Seroma collection. Institutional Ethical Committee approval was obtained before the start of the study. Informed written consent was obtained from each participant.

Numerical variables like age are represented in mean, median, mode and standard deviation. Categorical variables like gender are represented in frequencies and percentages. Pie-charts and bar diagrams are used as appropriate. For test of significance, chi-square test is used. P-values less than 0.05 were considered statistically significant.

Results

Among our study population comprised of 73. Out of which 67 undergone TAPP, and 6 undergone TEP. The mean and median age of the study population is 45.04 and 48 respectively; with the mode and standard deviation are 61 and 12.98 respectively. The minimum and maximum age of the study population is 22 and 70 respectively. In the study population, all of them are males.

In the study population, majority were have unilateral hernia with right inguinoscrotal hernia present in 30 (41.1%) and left inguinoscrotal hernia present in 25 (34.2%) followed by 18 (24.6%) were having bilateral inguinal hernia. Among the study population, 67 underwent TAPP Surgery and the remaining 6 underwent TEP surgery, this is represented in the following pie chart,

Complications/Seroma:

Among the study population, majority 68 (93.2%) of the study population had no complications after the surgery. About 4.1% (n=3) of the study population developed seroma and 2.7% (n=2) of the study population developed wound complications. Among our study population the mean duration of hospital stay was 49.79 hours and mean operating time was 58.72 minutes.

Among the study population, 67 underwent TAPP Surgery and the remaining six underwent TEP surgery. Among the study population, majority 68 (93.2%) of the study population had no complications after the surgery. About 4.1% (n=3) of the study population developed seroma and 2.7% (n=2) of the study population developed wound complications. Out of the study subjects developed complications (both seroma and wound complications), were from TAPP group. P value was 0.786.

Table 1: Comparison between type of surgery and post op complications

Type	Post op complications			Total
	NIL	Seroma	Wound complications	
TAPP	62	3	2	67
	92.5%	4.5%	3.0%	100.0%
TEP	6	0	0	6
	100.0%	.0%	.0%	100.0%

The mean duration of surgery (in min) among the 67 study subjects who underwent TAPP is 59.32 and among the 6 study subjects who underwent TEP is 52.00. This difference is statistically significant with a p-value of 0.013 (<0.05).

Table 2: Mean differences of the duration of surgery

	Type of surgery	N	Mean	SD	P- value
Operating time (in min)	TAPP	67	59.32	18.68	0.013
	TEP	6	52.00	4.00	

The Duration of hospital stay (in hrs) among the 67 study subjects who underwent TAPP is 50.09 and among the 6 study subjects who underwent TEP is 46.5. This difference is just not statistically significant with a p-value of 0.057 (>0.05).

Table 3: Mean differences of the Duration of hospital stay

	Type of surgery	N	Mean	SD	P- value
Duration of hospital stay (in hrs)	TAPP	67	50.08	11.12	.057
	TEP	6	46.50	2.88	

Discussion

The main objective of the study is to study the reduction of clinical significant seroma formation through a new technique to manage the distal sac after inguinoscrotal hernia repair. The total study population comprised of 73. Out of which 67 undergone TAPP, and 6 undergone TEP. The mean and median age of the study population is 45.04 and 48 respectively; with the mode and standard deviation are 61 and 12.98 respectively. The minimum and maximum age of the study population is 22 and 70 respectively. In the study population, majority were have unilateral hernia with right inguinoscrotal hernia present in 30 (41.1%) and left inguinoscrotal hernia present in 25 (34.2%) followed by 18 (24.6%) were having bilateral inguinal hernia. majority 68 (93.2%) of the study population had no complications after the surgery.

About 4.1% (3) of the study population developed seroma and 2.7% (n=2) of the study population developed wound complications. Out of the study subjects developed complications (both seroma and wound complications), were from TAPP group. This is in contrast to the study by F. Köckerling et al, Seroma incidence among TEP group was 0.51 %, whereas among the TAPP group it is 3.06 %. This difference is statistically significant with a p-value of <0.0001. [12] Girish Bakhshi et al, in their study observed that the Seroma incidence among TEP group was 3.12 %, whereas among the TAPP group it is 4.25 %. (18)Lau et al. reported overall incidence of seroma formation was 7.2% with a seroma rate of 5.7% in non-scrotal hernias and increased to 22.9% in scrotal hernias following TEP. [14] Furthermore, Misra et al reported seroma development rate as high as 70% in massive scrotal hernias after TEP procedure; [15] similarly, Cihan

revealed an overall incidence of seroma formation was 7.2%. 56.7% of seroma rate on the 1st operative day in large hernias after TEP repair on physical examination, and the rate increased to 66.7% as the USG was used They further concluded that the superficial USG is a beneficial tool in differentiating early recurrence or seroma in patients. It should not be intervened with as a complication until the patient has complaints attributable to seroma. [17]

Although seroma is a frequent minor morbidity after TEP, it has no impact on postoperative recovery. Because all seromas invariably resolve, expectant treatment with observation is recommended. TEP and TAPP have their own advantages. TEP repair reduces short-term postoperative pain more effectively than TAPP repair and results in shorter hospital stay of primary cases. [19] Direct defect closure has proven to be effective in reducing recurrence and seroma formation post-operatively in patients undergoing laparoscopic inguinal hernia repair. [20]

Since seroma is more or less a natural course after the laparoscopic surgical process, our aim was to prevent the seroma formation in the distal hernia sac, thus alleviating the signs and symptoms caused by seroma. Seroma formation is a natural process that cannot be completely prevented following laparoscopic inguinal hernioplasty, especially in patients with direct and large indirect inguinal hernias. Some intraoperative adjunctive techniques are effective in reducing clinically palpable seroma formation in select patients. [21] Defect wall suture for direct inguinal hernia had shorter operation time, faster recovery time, reduced pain, and an acceptable rate of recurrence and complication, comparatively TAPP surgery with hernia defect wall suture that requires smaller dissection area is

an effective method for treating direct inguinal hernia.[22]

In our study, the mean duration of surgery (in min) among the 67 study subjects who underwent TAPP is 59.3284 and among the 6 study subjects who underwent TEP is 52.0000. This difference is statistically significant with a p-value of 0.013 (<0.05). This is contrast to the findings of Beverly L Wake et al, in their Cochrane Database of Systematic Reviews for the outcomes of Transabdominal pre-peritoneal (TAPP) vs total extraperitoneal (TEP) laparoscopic techniques for inguinal hernia repair. They postulated that although it appears that, it may take between 30 and 100 procedures to become expert and that generally the operation time for TAPP is less for both experienced and inexperienced operators the data may be biased as it is possible that surgeons performing TEP are already experienced in TAPP. [23]

In the study by F. Köckerling et al, The mean duration of operation for the TAPP technique was 52.62 ± 23.58 min, and the median was 47 min (range 20–274 min). The mean duration of operation for the TEP technique at 48.58 ± 21.52 min and median at 45 min (range 20–275 min) was significantly lower. [12] The reports of seroma being mistaken for recurrences following laparoscopic hernia repair, with the correct diagnosis being made only after groin exploration. [9]

The Duration of hospital stay (in hrs) among the 67 study subjects who underwent TAPP is 50.09 and among the 6 study subjects who underwent TEP is 46.5. This difference is just not statistically significant with a p-value of 0.057 (>0.05). This is in line with the findings of review results of Beverly L Wake et al depicting that Length of stay was shorter in the TEP group (Comparison 03:11: WMD -0.70 days, 95% CI -1.33 to -0.07; p=0.03). In this review the difference of Duration of hospital stay between two groups was statistically significant and in the current study the difference of Duration of hospital stay between two groups was statistically just not significant. [23]

In the study by F. Köckerling et al, The mean length of hospital stay for the TAPP group patients was 1.93 ± 2.22 days, and for the TEP group patients, it was 1.88 ± 2.19 days. [12] From our study results, considering the low prevalence of complications, shorter duration of surgery and less duration of hospital stay from our study results, we postulate that TEP can be preferred over TAPP assuming the other factors influencing the choice of surgery to be equal among two groups. B J Leibl et al, when comparing the scrotal and inguinal repair, they concluded that, in scrotal hernia repair, TAPP is not associated with higher complication rates and can be performed with efficiency comparable with that in normal inguinal hernia repair. [16] Mo-

hamed Ismail et al, studied the Impact of Closed-Suction Drain in Preperitoneal Space on the Incidence of Seroma Formation after Laparoscopic Total Extraperitoneal Inguinal Hernia Repair. They concluded that Drain after TEP significantly reduces the incidence of seroma formation without increasing the risk of infection or recurrence. [23]

Conclusion

Considering the low prevalence of complications, shorter duration of surgery and less duration of hospital stay from our study results, we postulate that TEP can be preferred over TAPP assuming the other factors influencing the choice of surgery to be equal among two groups.

There is a need for choice of reasonable, safe, reproducible, and cost-effective method to address the problem of seroma formation in large inguinoscrotal hernia repair.

Further studies with increased sample size matched for confounding factors done also in other settings such as primary and secondary care will represent the true incidence of seroma among the two groups of TAPP and TEP.

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