

BALLOON VS TELESCOPIC DISSECTION FOR TOTAL EXTRA PERITONEAL (TEP) INGUINAL HERNIA REPAIR: ANALYSIS OF SURGICAL OUTCOME

General Surgery

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ABSTRACT

Introduction- Inguinal hernia repair is one of the most common operations done by a general surgeon, approaches including both open and laparoscopic methods. The rapid changes that have been witnessed in open surgeries, prosthetic materials and laparoscopic surgeries have made hernia surgery, an interesting field of endeavour that demands renewed discipline and dedication. **Methodology-** This was a prospective study consisting of 60 patients of inguinal hernia treated with laparoscopic Total Extra-Peritoneal (TEP) mesh repair. Balloon dissection (Group A) was carried out in 30 patients and in the remaining 30 patients telescopic dissection (Group B) was done. Surgical outcomes were compared between the two groups in terms of complications (intra-operative, immediate post-operative), operative time and mean hospital stay. **Results-** The mean operative time required for Group A was 78.70 minutes and that for Group B was 95.16 minutes. Most common intra-operative complication was peritoneal breach, significantly higher in Group B. Incidence of subcutaneous emphysema was equal in both the groups. Bleeding was almost equal in the both groups. Total four cases converted to TAPP, due to large peritoneal breach, one from group A and three from group B. Pain was significantly high in group B, 6 hours following surgery but later it was comparable and less in both the groups. The hospital stay in Group A (1.43 days) was more than that of Group B (1.20 days), but was not statistically significant. Among immediate post-operative complications urinary retention was most commonly encountered in both groups. There was one case of recurrence in each group. **Conclusion-** Worldwide, more than 20 million patients undergo groin hernia repair annually. This descriptive study aims to delineate the difference in the surgical outcome in creation of extraperitoneal space by telescopic and balloon dissection in TEP mesh repair.

KEYWORDS

Groin hernia, TEP, Mesh Repair, Balloon dissection, Telescopic Dissection

INTRODUCTION

Inguinal hernia repair is one of the most common operations done by a general surgeon, with approaches including both open and laparoscopic methods. Inguinal hernia surgery, therefore, becomes significantly more relevant and puts small changes within this field into a whole other perspective. The rapid changes that have been witnessed in open surgeries and laparoscopic surgeries have made hernia surgery, an exciting field of endeavor that demands renewed discipline and dedication.¹ Ger and associates pioneered the use of laparoscopic techniques for hernia repair in 1990², the initial techniques included high ligation of the peritoneum and intraperitoneal onlay mesh technique which were associated with high recurrences.

Currently, there are two techniques for laparoscopically hernia repair, TEP, and TAPP. Total extraperitoneal (TEP) inguinal hernia repair is the preferred approach³.

The major advantage of TEP is the non-violation of the peritoneal cavity, which minimizes the risk of clinically significant adhesions or visceral organ injury. The first crucial step is extraperitoneal space creation in TEP, which can be achieved by direct telescopic dissection or balloon dissection.

This study consisting of 60 patients of inguinal hernia treated with laparoscopic Total Extra-Peritoneal (TEP) mesh repair aims to compare surgical outcomes in terms of complications (intra-operative, immediate post-operative), operative time and mean hospital stay, with a 3-month follow-up between balloon vs telescopic dissection carried out for the creation of extraperitoneal space in TEP inguinal hernia repair.

AIMS AND OBJECTIVES

This was a prospective study consisting of 60 patients of inguinal hernia treated with laparoscopic Total Extra-Peritoneal (TEP) mesh repair included for the following aims and objectives:

Aim:

To compare extraperitoneal space creation by balloon and direct telescopic dissection for Totally Extra Peritoneal (TEP) inguinal hernia repair.

Objectives-

Primary Objectives:

To compare postoperative pain (VAS) after 6 hours, 24 hours, and 1 week

in the creation of extraperitoneal space by balloon and direct telescopic dissection for Totally Extra Peritoneal (TEP) inguinal hernia repair.

Secondary Objectives:

To compare complications (Intraoperative complications i.e. peritoneal breach, subcutaneous emphysema, bleeding, conversion to TAPP, post-operative analgesia used; Immediate postoperative complications i.e., urinary retention, scrotal edema, skin ecchymosis, scrotal hematoma, testicular pain, follow-up, recurrence, wound infection), operative time and mean hospital stay in the balloon and direct telescopic dissection for Totally Extra Peritoneal (TEP) inguinal hernia repair.

Patients and Method

The study consisted of 60 patients with inguinal hernia treated with laparoscopic Total Extra-Peritoneal (TEP) mesh repair, plain telescopic dissection was carried out in 30 patients and in the remaining 30 patients, balloon dissection was done in a single surgical unit of the department of general surgery at SMS Medical College and attached hospitals from June 2019 to June 2020 which included a minimum of three months of follow-up.

Inclusion Criteria:

1. 18 years of age or older
2. Eligible to undergo minimally invasive inguinal hernia repair.
3. Willing to undergo mesh-based repair.
4. Patients who will give informed and written consent.

Exclusion Criteria:

1. Emergency inguinal hernia repairs (Obstructed/Strangulated Hernia)
2. Recurrent inguinal hernia.
3. Patient unfit for surgery as per A.S.A(American Society of Anesthesiologists) guidelines.

Preoperatively the patients were randomised into two groups, Group A: Balloon dissection, and Group B: Plain telescopic dissection.

Statistical Methods

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean $\pm$ SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at a 5 % level of significance.,

Student t-test (two-tailed, independent) has been used to find the significance of study parameters on a continuous scale between two groups. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on a categorical scale between two or more groups.

Statistical software: The Statistical software namely SPSS 15.0, Stata 8.0, MedCalc 9.0.1, and Systat 11.0 were used for the analysis of the data, and Microsoft word and Excel have been used to generate graphs, tables, etc.

RESULTS

The present prospective study was undertaken in a single surgical unit of the department of general surgery at SMS Medical College and attached hospitals between June 2019 to June 2020. 60 patients were included in the study and 30 patients each were assigned to two groups: Group A with balloon dissection and Group B with plain telescopic dissection.

Age And Sex Distribution

In this study, Patients in Group A were aged between 21-72 years, with the mean age being 52.9 years and in Group B patients were aged between 26-76 years, with the mean age being 49.8 years. In this study, all participants were males in both groups. There was no statistically significant difference between the two groups in terms of age (p-value=0.409) and sex distribution (p-value=1.0).

Type Of Inguinal Hernia

In this study, the majority of the inguinal hernias were right-sided, accounting for about 53.3% in Group A and 60% in group B. There were 11 (36.7%) cases of left sided hernia in group A and 9 (30%) cases of left sided hernia in Group B. 3 (10%) cases of bilateral inguinal hernia in both group A and B. There was no statistically significant difference between the two groups (p-value=1.0).

In Group A, 9 (30%) cases were direct inguinal hernias and 21 (70%) cases were indirect inguinal hernias. In Group B, 8 (26.7%) cases were direct inguinal hernia and 22 (73.3%) cases were indirect inguinal hernia. There was no statistically significant difference between the two groups (p-value=0.794).

Operative Time

In this study, the mean operative time for Group B was 95.16 ±24.44 minutes ranging between 60 minutes to 140 minutes. In contrast to Group A, the mean time was 78.7 ±27.32 minutes, ranging from 40 minutes to 130 minutes, suggestive of significantly less time with the balloon dissection group with a p-value of 0.0169.

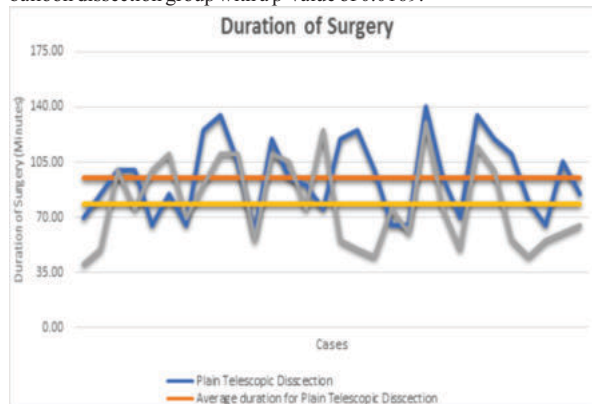


Fig 1: Comparison of operative time in Group A vs Group B

Postoperative Pain

- Post-operative pain was assessed using a visual analogue scale (SCORE 1 to 10) at 6 hours, 24 hours, and 1 week.
- At 6 hours the mean pain score was 2.53 ± 1.5 in Group A. In Group B, the mean pain score was 4.1 ± 1.29 , which was significantly higher (p-value=0.0001).
- After 24 hours mean pain score in Group A was 0.9 ± 1.09 and in Group B was 1.43 ± 1.07 , which was not significantly different (p-value=0.0623).
- After 1 week mean pain score in Group A was 0.4 ± 0.72 and in Group B was 0.3 ± 0.53 , which was not significantly different (p-value=0.5425).

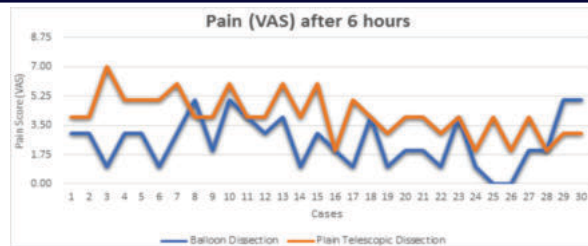


Fig 2: Comparison of Pain in between the two groups 6 hours post-op

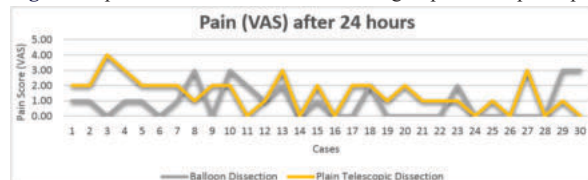


Fig 3: Comparison of Pain in between the two groups 24 hours post-op

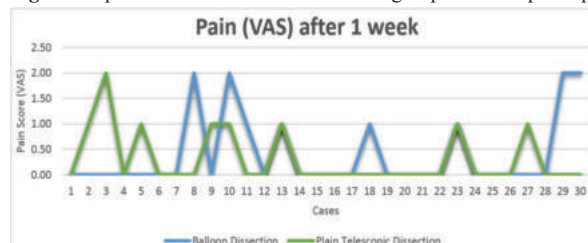


Fig 4: Comparison of Pain in between the two groups 1 week post-op

Intra-operative Complications

- Peritoneal breach was noticed in 23.34% of patients. It was more common in Group B in 11 (36.7%) cases, in comparison to only 3 (10%) cases in Group A. A p-value of 0.030 was suggestive of a significantly less peritoneal breach with balloon dissection.
- Subcutaneous emphysema was observed in 5 (16.7%) cases in Group A and 6 (20%) cases in Group B but was not significant statistically.
- Bleeding due to dissection was divided into four grades (Grade I, less than a quarter of the tissue in the screen stained with blood; Grade II, less than half of the tissue stained; Grade III, less than three-quarters of the tissue stained; and Grade IV, more than three-quarters of the tissue stained). In both Group A and Group B, 2 (6.7%) cases were jotted down under grade 2. There were 2 (6.7%) cases in Group A and 3 (10%) cases in Group B in grade 3. Lastly, 1 (3.3%) case of grade 4 in Group A and 2 (6.7%) cases of the same in Group B. These results were statistically insignificant.
- In Group A, one (3.3%) case and three (10%) cases in Group B were converted to TAPP (Trans abdominal pre-peritoneal) inguinal hernia repair surgery.

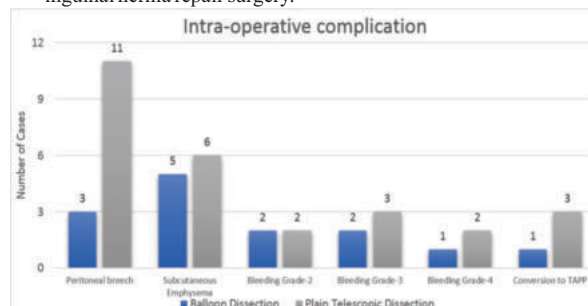


Fig 5: Comparison of intra-operative complications in between the two groups

Immediate post-operative complications

- Urinary retention was observed in 4 (13.3%) cases in group A and 5 (16.7%) cases in group B. With a p-value of 1.0, the relationship between both groups was insignificant.
- Scrotal edema was observed in 3 (10%) cases in both groups. Here also the p-value was 1.0, suggestive of an insignificant relationship between both groups.
- Skin ecchymosis was observed in 3 cases (10%) in each group. Similarly, the p-value was 1.0, insignificant to make any difference between both groups.

- Scrotal hematoma was not diagnosed in any case from group A and there was only one (3.3%) case in group B. p-value was also 1.0 in this analysis, suggestive of an insignificant relationship.
- Testicular pain was also not observed in any patient with group A and only one (3.3%) case in group B with a p-value of 1.0, an indicator of an insignificant relationship.

Hospital Stay

- The mean hospital stay in group A was 1.43 ± 0.5 days and 1.2 ± 0.4 days in group B, the difference being statistically insignificant (p-value=0.0539).

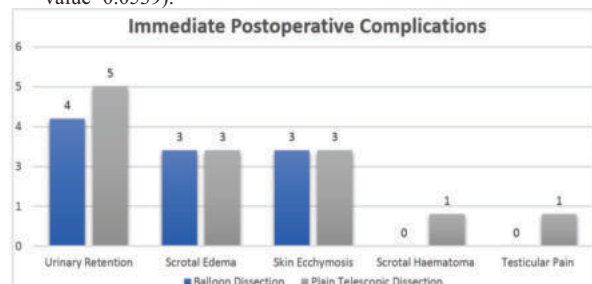


Fig 6: Comparison of immediate post-operative complications in between the two groups

Recurrence

- In this study, recurrence was observed and a total of 1 (3.3%) case was diagnosed after 3 months of follow-up in each group A and group B (p-value=1.0).
- Wound infection and other complications were not diagnosed in any case

DISCUSSION

The pre-peritoneal approach was first used in late 1700s for treatment of iliac artery aneurysms and the use of this space was popularised later by Rives, Stoppa, and Wantz for mesh placement in open approaches to hernia repair.

The advent of laparoscopy for cholecystectomy translated to hernia repair with the description of TAPP in 1990 by Ger and TEP in 1991 by Dulucq.

Total extraperitoneal (TEP) inguinal hernia repair has gained popularity despite being technically challenging, owing to its advantages of being less invasive by avoiding an entry into the peritoneal cavity.

Postoperative Pain

- Pain is the most important concern after hernia surgery.^{9,15}
- Lau et al. reported significantly higher pain scores in young (< 65 years), female patients, as well as patients who underwent unilateral and day-care TEP.¹⁶
- Post-operative pain was assessed using a visual analogue scale (SCORE 1 to 10) at 6 hours, 24 hours, and 1 week. At 6 hours the mean pain score was significantly less in group A than group B. (2.53 vs 4.1, p-value=0.0001)
- There was no difference in score at 24 hours and at 1 week on VAS.

Intraoperative Complications

Peritoneal tear is the most common reason of conversion of TEP into TAPP, with incidence ranging from 10% to 64% in different series.^{4,5} Lau et al described that most peritoneal tears occurred during the blunt dissection of indirect hernia sac and the peritoneum from the spermatic cord.⁵ In our study, peritoneal tear/laceration occurred more frequently in group B than group A. There were 11 (36.7%) cases in group B with peritoneal laceration and only 3 (10%) cases within group A which was significantly less with p-value of 0.030. All lacerations were primarily managed with insertion of Verres needle or wide bore cannula. Cases which were difficult to perform after peritoneal tear were converted to TAPP. In Group A, only one (3.3%) case converted to TAPP, in contrast to 3 (10%) cases converted to TAPP. Although, these were not statistically significant.

Surgical emphysema is commonly caused by inadvertent insufflations of CO₂ in the subcutaneous tissue during hernia surgery. Incidence of subcutaneous emphysema is reported to be in the range 2.2–56%⁶⁻⁸. In the present study the incidence of subcutaneous emphysema was

16.7% in the balloon dissection group and 20% in the telescopic dissection group and the subcutaneous emphysema resolved without any complications. There was no significant statistical relation between both groups.

Bleeding was graded in our study and judged by a single surgeon. The bleeding was almost equal in each group and was not significant statistically. There was no major vessel (inferior epigastric vessel) injury and no bladder or bowel injury. Studies have reported intraoperative bowel injury up to 0.06% in laparoscopic hernia repair^{9,10}. Up to 50% of bowel injury occurs during the access phase of laparoscopy. Small bowel is the most frequently injured segment (56%). The injury can be repaired intraoperatively if the operator is experienced^{9,11}.

Postoperative Complications

The most common complain post-operatively after laparoscopic inguinal hernia surgery we encountered was urinary retention. The occurrence in group A was 4 (13.3%) cases and in group B was 5 (16.7%) with no statistically significant difference. Reported incidence of postoperative urinary retention varies from 1.5% to 4.2% in various studies.¹²⁻¹³ Patients suffering from urinary retention were promoted to urinate after wet sponging over groin and upper medial thigh or were catheterised with K-90 catheter.

Scrotal edema following laparoscopic hernia surgery is a common complication¹⁴. In this study there were equal cases, 3 (10%) in each group. Clinical factors associated with seroma and scrotal edema formation were old age, large hernia defect, extension of the hernia into scrotum, and presence of distal indirect sac. No further intervention was required to treat them, so they were managed conservatively.

In this study, skin ecchymosis was equal, 3 (10%) cases in each group. They were managed conservatively and antibiotics were given prophylactically. Skin ecchymosis were present around port site.

There was one (3.3%) case of scrotal hematoma and one (3.3%) case of testicular pain in Group B after surgery. There were no cases of these in group A. there was no significant statistical relationship between group. These complications were managed conservatively with oral prophylactic antibiotics and scrotal support.

Hospital Stay

The duration of postoperative hospital stay was 1.43 days in group A and 1.2 days in the group B in the present study and was not significantly different in the two groups. Yassar Hamaza et al and Palanivelu also reported similar hospital stay of 1 day for TEP.^{17,18}

Follow Up

Recurrence is the most important endpoint of any hernia surgery^{19,20}. All the patients were followed for at least 3 months post-operatively. There was one (3.3%) case of recurrence in each group. Similar recurrence rates were observed in study by Yassar Hamaza et al, Lee L Swanstorm et al and Renshaw et al.^{17,21}

There was no wound infection or any other complain in follow-up period.

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