

Transabdominal Preperitoneal (TAPP) Hernia Repair with and without Mesh Fixation with Tacks

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Submitted for Publication: 15-06-2023
Accepted for Publication 11-12-2023

How to Cite: Riaz T, Farrukh U, Anwaar H, Ali N. Transabdominal Preperitoneal (TAPP) Hernia Repair with and without Mesh Fixation with Tacks. APMC 2023;17(4):593-596. DOI: 10.29054/APMC/2023.1464

ABSTRACT

Background: Laparoscopic inguinal hernia (IH) repair is now the recommended way of treatment for inguinal hernias. Transabdominal preperitoneal (TAPP) entails access to the peritoneal cavity and implantation of a mesh into the preperitoneal space after the hernia sac has been reduced. Mesh placement is accomplished using either spiral tack fixation or non-fixation. **Objective:** To compare the mean pain scores using visual analogue scale (VAS) in patients undergoing TAPP hernia repair with and without mesh fixation using spiral tacks. **Study Design:** Randomized controlled trial. **Settings:** Department of General Surgery, Allied Hospital, Faisalabad, Pakistan. **Duration:** June 2019 to November 2019. **Methods:** Research participants were divided into two groups. All operations were performed under general anesthesia by an experienced laparoscopic surgical team. In Group A patients, mesh was anchored and in Group B patients mesh was not anchored. After confirming satisfactory placement of mesh, peritoneum was closed using Vicryl 2/0 suture. Patients in both groups were compared for the degree of pain experienced by them using visual analogue score (VAS) 24 hours after surgery then followed up after 1 month. **Results:** Comparison of mean pain scores using VAS between patients undergoing TAPP hernia repair with and without mesh fixation with tacks at 24 hours was calculated as 3.57 ± 1.04 in Group-A and 2.07 ± 0.74 in Group-B, p-value was 0.0001, while after 1 month of the procedure, it was 2.17 ± 0.70 in Group-A and 0.93 ± 0.87 in Group-B, p-value was 0.0001. **Conclusion:** It is observed that patients undergoing TAPP hernia repair without mesh fixation had significantly lower post-operative pain when compared to those with mesh fixation using spiral tacks.

Keywords: Transabdominal preperitoneal (TAPP) hernia repair, Mesh fixation, Post operative pain.

INTRODUCTION

One of the most often performed surgeries in the world is the surgical repair of a hernia. The surgical treatments for hernia repair have advanced over time, and the results have greatly improved. Use of a synthetic mesh to strengthen posterior inguinal wall is now the standard procedure.¹ When analyzing the outcomes of any surgical treatment of inguinal hernia, the essential elements to keep in mind are post-operative complications and the likelihood of recurrence. Seroma, hematoma, nerve injury, and persistent discomfort in the inguinal area are the most common sequelae after operational hernia repair.²

Ralph Ger pioneered laparoscopy for repair of hernia in 1990, and this treatment has now achieved widespread recognition. Laparoscopic totally extraperitoneal (TEP)

and Transabdominal preperitoneal (TAPP) are two laparoscopic techniques used. Both treatments work on a similar idea of inserting a Prolene mesh into the preperitoneal area in the inguinal region.³ The variation is in the route taken to access this area. The peritoneum is not opened in TEP repair, and the dissection is extraperitoneal.⁴ TAPP repair entails opening the peritoneal cavity, cutting the peritoneum to reach the preperitoneal area, and placing the mesh there. The peritoneum is then either closed or repeatedly fastened with titanium spiral tacks. By keeping the mesh in place and avoiding mesh slippage or folding, anchoring lowers the likelihood of recurrence.⁵

Postoperative pain can be caused by a variety of factors, such as irritation of the inguinal nerve by the mesh, tacks or inflammatory processes in the region, an inflammatory

response to the foreign material of the mesh or bio-incompatibility, and a decrease in the compliance of the abdominal wall. It is believed that spiral tacks exacerbate post-operative discomfort because of the inflammatory reaction. Sometimes, alternatives to titanium tacks are utilized, such as tacks composed of absorbable materials, absorbable sutures, and tissue sticky glue.^{6,7} Research has been carried out to determine whether installing a mesh without anchoring it is feasible.⁸ This may have the benefit of reducing complications related to post-operative tacks. Darwish *et al.* showed that patients who did not have their mesh fixed experienced significantly less pain following surgery than those who had their mesh fixed with tacks. The mean pain score for these patients was 7.96 ± 0.76 as opposed to 4.067 ± 1.11 after 12 hours and 0.4 ± 0.563 as opposed to 2.633 ± 1.520 after a month, respectively.⁹

At our hospital too, laparoscopic hernia repair has been the standard technique. Up until now, mesh fixation with spiral tacks has been the most popular technique, and we continue to take the occurrence of persistent pain following surgery very seriously. If we are successful in observing a decrease in the mean post-operative pain score without anchoring the mesh with spiral tacks, we shall be able to further integrate it into our regular practice and not only benefit patients in the early and late post-operative periods but also provide them with the added benefit of cost effectiveness and fewer follow-up visits.

METHODS

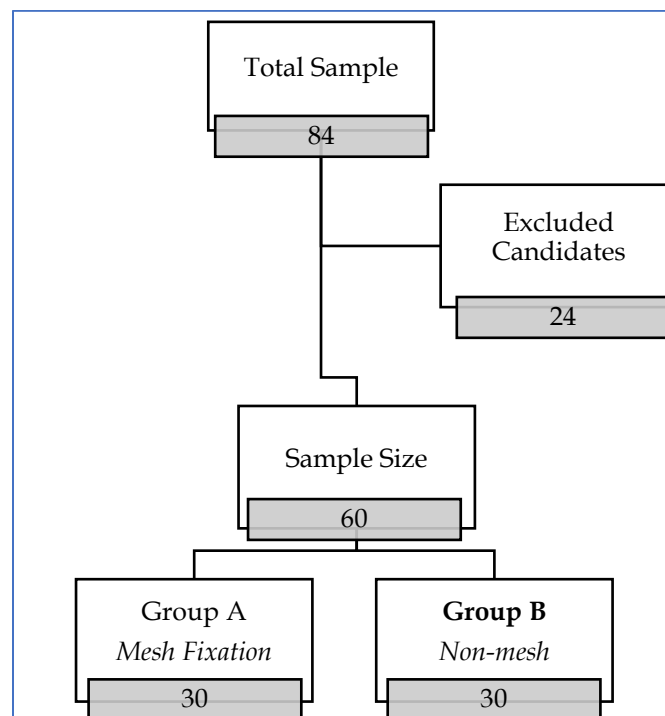
This randomized controlled trial was conducted at the General Surgery Department, Allied Hospital, Faisalabad which is affiliated with Faisalabad Medical University. The duration of the study was 6 months from: June 2019 to November 2019.

By using the WHO sample size calculator for calculating two populations' mean, the total sample size came out to be 60 (30 in each group). The power of study was 90%; level of significance 5%; anticipated population mean 2.633(2), test value of population means 0.4(2) and the pooled standard deviation 1.15. Non-probability consecutive sampling technique was used.

A total of 84 male patients >20 years of age who were clinically diagnosed with a unilateral direct or indirect inguinal hernia and fit for general anesthesia and laparoscopic surgery were included in the study.

24 candidates who had recurrent or bilateral inguinal hernia, patients unfit for general anesthesia or laparoscopic surgery due to comorbidities, patients with previous abdominopelvic surgeries and all diabetic patients were excluded from the study.

Figure 1: Selection criteria



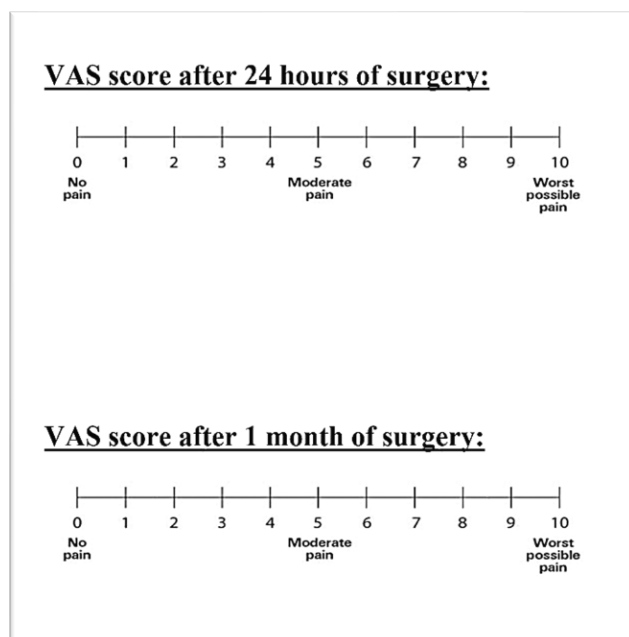
Following the hospital ethical review committee's approval, all patients who attended Allied Hospital's outpatient department complaining of swelling in the inguinoscrotal area were selected to be potential candidates. The diagnosis was verified with patient's physical examination and medical history. In order to determine the patient's suitability for hernia surgery, any further pertinent complaints were also evaluated and thoroughly probed. Every research participant received comprehensive information on the study and the surgical process. Consent was obtained in writing, after being informed. Each patient's contact information, including their address and phone number, was obtained and entered into their Performa for the purpose of documentation. Utilizing computer-generated random number tables, research participants were randomized into two groups. All procedures were carried out by a skilled laparoscopic surgical team under general anesthesia.

One hour before the surgery, a single intravenous dosage of Ceftriaxone, a third-generation cephalosporin, was administered. The TAPP procedure was used to manage the hernia in every patient. A 10 mm port was inserted at infra-umbilical crease to create pneumoperitoneum. On the same side as the hernia, 8 cm lateral, and at the umbilicus level, a second 10 mm port was inserted. At the umbilical level, the third 5 mm port was put on the opposite side. The pre-peritoneal area was accessed and the peritoneum flap was raised using a cautery hook. To locate, reduce or divide the hernia sac, dissection was done first around the spermatic cord and then medially

to reveal Cooper's ligament. Anteriorly inferior epigastric vessels were preserved. After that, a 12-by-15-cm Prolene mesh was stretched out and placed, making sure to cover the medial space and the region between the superficial and deep inguinal rings. The mesh was secured with Cooper's ligament, medially and lateral to inferior epigastric vessels, using spiral tacks sparing the triangles of pain and doom in Group A patients. Mesh in Group B patients was not anchored, and peritoneum was closed with a Vicryl 2/0 suture once the mesh placement was shown to be adequate. At the conclusion of the surgery, ports were removed and the incisions at the port sites were stitched.

Post-operative care: Patients in both groups were kept in recovery room initially and transferred to wards or rooms later on. Third-generation cephalosporin antibiotics were administered intravenously to the patients. Only patients who complained of discomfort were administered intramuscular injections of 75 mg of diclofenac sodium as an analgesic. For every patient, mobilization on first post-operative day was advised. On second or third post-operative day, once they were mobilized, consuming an oral diet, and showing no signs of acute complications, the patients were evaluated for discharge.

Figure 2: The Visual Analogue Score (VAS)



We compared the patients in the two groups regarding their level of discomfort 24 hours post-surgery, and then followed up with them after 1 month. A visual analogue scale with a range of 0 to 10, with 10 being the worst potential discomfort and 0 being the least, as shown in figure 2, was used to collect this data. Data analysis was done using SPSS v18. Pain in the two groups was

compared using the unpaired t-test, while a p-value of less than or equal to 0.05 was considered significant.

RESULTS

60 candidates meeting selection criteria were included to compare mean pain scores between patients undergoing TAPP repair with and without mesh fixation with tacks. Mean age was 41.8 ± 9.05 years in Group-A and 39.67 ± 9.05 years in Group-B. Comparison of mean pain scores with and without mesh fixation with tacks at 24 hours was calculated as 3.57 ± 1.04 in Group-A and 2.07 ± 0.74 in Group-B, p-value was 0.0001, when pain was recorded after 1 month of the procedure, it was 2.17 ± 0.70 in Group-A and 0.93 ± 0.87 in Group-B, p-value was 0.0001.

Table 1: Mean Pain Scores between patients undergoing TAPP hernia

Pain	Group-A		Group-B		P-Value
	Mean	SD	Mean	SD	
At 24 hrs.	3.57	1.04	2.07	0.74	0.0001
After 1 months	2.17	0.70	0.93	0.87	0.0001

DISCUSSION

Laparoscopic repair of inguinal hernia may be done using either the TAPP or TEP technique. The TAPP technique can be performed either by using tacks to fixate the mesh or leaving the mesh as such. However, mesh fixation has been associated with postoperative discomfort and the likelihood of nerve damage.¹⁻⁵ Spiral tack fixation has been the most often used approach thus far, and hence post-operative pain remains a major drawback.

In our study of 60 patients (divided randomly into two groups), the mean age was calculated to be 41.8 ± 9.05 years in Group-A and 39.67 ± 9.05 years in Group-B. Comparison of mean pain scores was done using the visual analogue scale (VAS), as shown in figure 2, in patients undergoing TAPP hernia repair with and without mesh fixation with tacks, at 24 hours and after 1 month.

24 hours post-surgery, in Group-A the mean pain score was 3.57 with standard deviation of 1.04 and 2.07 with standard deviation of 0.74 in Group-B, with a p-value of 0.0001. This shows that mesh non fixation had a lower pain score and a p-value of 0.0001 shows that the results were significant.

Similarly, at follow-up after 1 month of the procedure, the mean pain score was 2.17 ± 0.70 in Group-A and 0.93 ± 0.87 in Group-B, with a p-value of 0.0001. This is in line with

the previous finding and shows that mesh non fixation has lower pain score.

Similar findings are documented in previous studies.⁹ Darwish *et al.*, like our study, had all male patients with a mean age of 37.133±9.558 years and in a similar fashion the post-operative pain experienced by patients with non-fixation of mesh was much less as compared to mesh fixation with tacks, as the mean pain score was 1.96±0.76 in comparison to 4.067±1.112 after 12 hours and 0.4±0.563 in comparison of 2.633±1.520 after 1 month.¹⁰

Parshad *et al*¹¹ was also in line with this trend. Consistent with the prevailing pattern, Koch *et al*¹² reported pain in the mesh fixation group to be 1.9±2.3 and in the mesh non-fixation group to be lower with a score of 1.1±1.6 in postoperative period. Another study which analyzed VAS 24 hours after surgery, had a mean score of 3.9 versus 1.6 in the mesh fixation and non-fixation groups respectively p<0.0001).¹³ Qureshi *et al* too observed that the VAS score at discharge was 2.43±0.54 in mesh fixation and 2.10±0.58 non-mesh fixation (p<0.005).¹⁶

Hence it can be seen that our findings are in line with the prevailing trend. Thus, we need to incorporate it in our surgical practice and by decreasing the post-op pain associated with hernia repair, improve quality of life of the patients, decrease the cost of the procedure and reduce follow-up visits.

CONCLUSION

Current study shows that patients undergoing Transabdominal Preperitoneal (TAPP) hernia repair without mesh fixation have significantly lower postoperative pain as compared to those with mesh fixation using spiral tacks.

LIMITATIONS

Our study had several limitations including a reduced sample size and a lack of statistical comparison of patient demographics and co-morbidities.

SUGGESTIONS / RECOMMENDATIONS

We recommend our readers to read previously published studies to get further insights on this topic.

CONFLICT OF INTEREST / DISCLOSURE

None.

ACKNOWLEDGEMENTS

We are grateful to Allah Almighty, for without his blessings, nothing is possible. Special thanks to all our friends and colleagues for their guidance and support.

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