

A Randomised Prospective Comparative Study of Spinal Versus General Anesthesia In Total Extraperitoneal Inguinal Hernia Repair

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Abstract

Introduction: Laparoscopic inguinal hernia repair is performed more and more nowadays because of its mini-invasive nature and demonstrated good results. Laparoscopic procedures are especially suitable for recurrent and bilateral inguinal hernia. Total extraperitoneal (TEP) inguinal hernia repair is the preferred method among the existing laparoscopic techniques.

Aim and Objective: To compare spinal versus general anesthesia in total extraperitoneal inguinal hernia repair.

Material and Methods: This was hospital based prospective interventional study conducted during September 2020 to till sample size is achieved at Department of General Surgery SMS Medical College and Hospital, Jaipur. All patients were admitted in wards of SMS Hospital Jaipur for management of inguinal hernia. Patients were taken divided in two groups 35 each, who went through inclusion and exclusion criteria are included in this study.

Result: We found that 82 patients underwent TEP inguinal hernia repair, of whom 10 were excluded (4 were complicated inguinal hernia, 1 was scheduled for TEP inguinal hernia repair on both sides but had multiple previous abdominal surgeries, and 5 declined to participate). Two patients in Group II were excluded because of spinal block failure and so the surgery was converted to GA. Finally, 35 patients from each group were included in the final analysis. There was no difference in mean surgery time between the two groups ($P=0.063$). In Group I (GA), the surgery time was 36.16 ± 8.21 min (range Results Page 55 =24–52 min), and in Group II (SA), it was 40.16 ± 6.54 min (range =30–54 min). In Group I (GA), the total surgery time was 52.6 ± 8.82 min (range =39–71 min), and in Group II (SA), it was 59.12 ± 7.95 min (range =50–69 min), which was significant ($P=0.008$).

Conclusion: we conclude that total extraperitoneal surgery performed under SA provides adequate muscle relaxation and a suitable work environment, as seen under GA. It also protects the patient from possible risks of GA. TEP inguinal hernia repair can be safely performed under SA, and SA was associated with less postoperative pain, better recovery, and better patient satisfaction than GA.

Keywords: spinal anesthesia, general anesthesia, total extraperitoneal, inguinal hernia.

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I. Introduction

Incidence of inguinal hernia has been increasing, with 500,000 new cases every year.¹ Most surgeons prefer open hernia repair techniques²; however, more recently, both surgeons and patients have begun to prefer minimally invasive techniques, which result in less pain, early work return, less incidence of infection, better cosmetic results, and better patient satisfaction.² Laparoscopic inguinal hernia repair is performed more and more nowadays because of its mini-invasive nature and demonstrated good results. Laparoscopic procedures are especially suitable for recurrent and bilateral inguinal hernia.^{3,4} The major procedures include intraperitoneal onlay mesh (IPOM) repair, transabdominal preperitoneal (TAPP) repair and total extraperitoneal (TEP) repair. The anatomy of these procedures is totally different from traditional open procedures because they are performed from different direction. Total extraperitoneal (TEP) inguinal hernia repair is the preferred method among the existing laparoscopic techniques. Unlike other techniques, TEP does not require the intraperitoneal cavity to be entered, meaning that intra-abdominal complications such as organ injury and postoperative ileus can be avoided. Most surgeons prefer GA for the procedure because it provides complete muscle relaxation in laparoscopic hernia repair.^{5,6,7} Only few studies reported the use of local, epidural, or spinal anesthesia (SA) in TEP inguinal hernia repair.

II. Materials & Methods

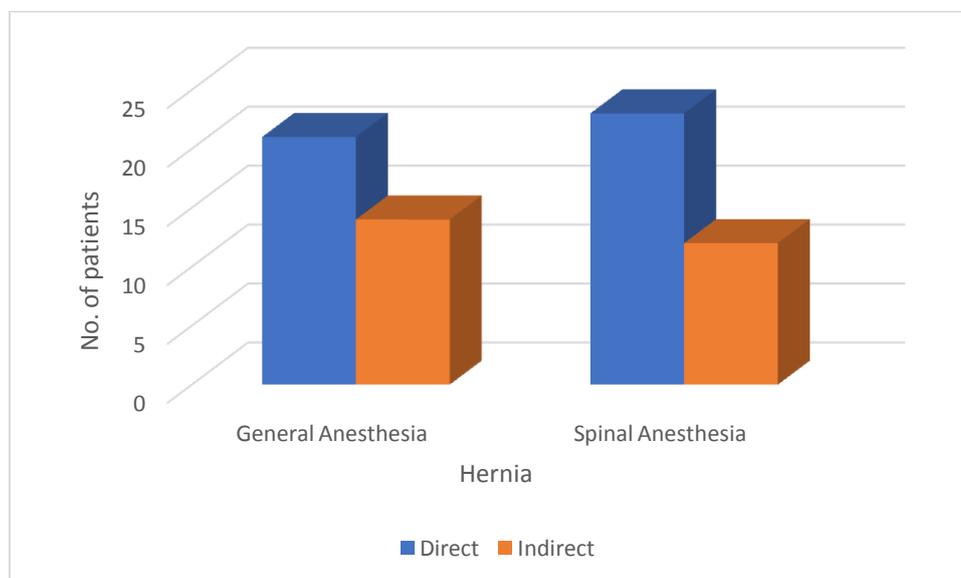
This was hospital based prospective interventional study conducted during September 2020 to till sample size is achieved at Department of General Surgery SMS Medical College and Hospital, Jaipur. All patients were admitted in wards of SMS Hospital Jaipur for management of inguinal hernia. Patients were taken divided in two groups 35 each, who went through inclusion and exclusion criteria are included in this study. **Inclusion criteria:** All the patients admitted to this hospital with a diagnosis of inguinal hernia irrespective of etiology. **Exclusion criteria :** **1.** Single or multiple previous lower abdominal surgeries. **2.** Patients with musculoskeletal system deformity. **3.** Complicated inguinal hernia.

III. Result

In this study we analysed 70 cases of inguinal hernia were admitted in surgical OPD of S.M.S. In total, 82 patients underwent TEP inguinal hernia repair, of whom 10 were excluded (4 were complicated inguinal hernia, 1 was scheduled for TEP inguinal hernia repair on both sides but had multiple previous abdominal surgery , and 5 declined to participate). Two patients in Group II were excluded because of spinal block failure and so the surgery was converted to GA. Finally, 35 patients from each group were included in the final analysis.

Here, mean age of our cases is 48.34 years. Majority of patients were in age group 46-60 years. Only 5.17% patients are present in >75 years age group. Here, Mean age of patients given General Anesthesia is 47.94 years and for Spinal anesthesia it is 48.74 years. The result is non-significant as p-value is >0.05.

In our study, 77.1% patients are of unilateral hernia and 22.8% patients are of bilateral hernia in general anesthesia group. In spinal anesthesia group. 31.4% patients are of bilateral hernia patients and 68.5% patients are unilateral hernia patients.



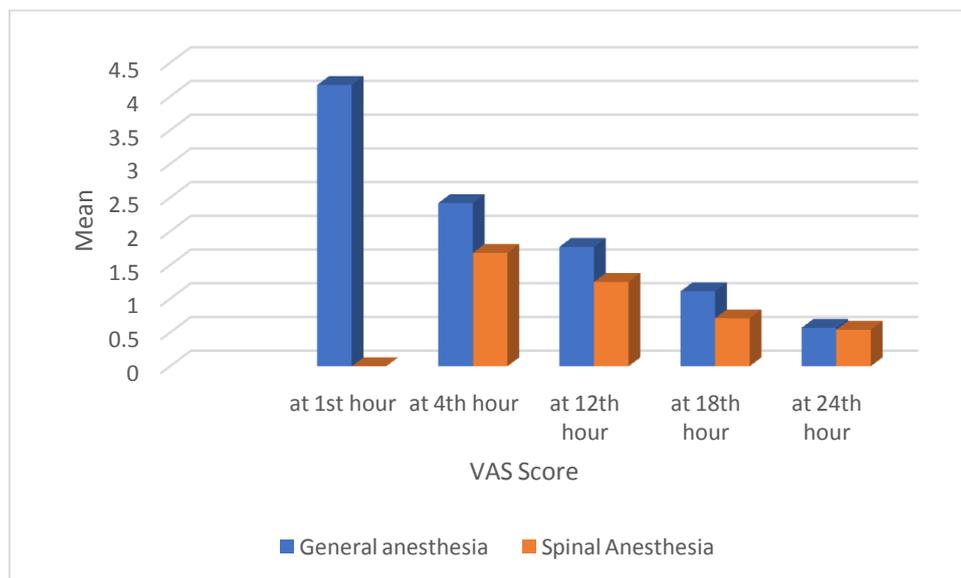
In the above graph, 60% patients are of direct hernia and 40% patients are of indirect hernia in general anesthesia group and in spinal anesthesia group 65.7% patients are of direct hernia and 34.2% patients are of indirect hernia.

This study is male dominant as 97.1% of general anesthesia given patients are male and 100% patients are male in spinal anesthesia group. The result is non-significant as p-value is >0.05.

Variable	General Anesthesia		Spinal Anesthesia		P-Value
	No. of Patients	Percentage	No. of Patients	Percentage	
Dissection of Extra peritoneal space: easy	35	100	34	97.1	0.31
Anatomical Delineation: satisfactory	35	100	34	97.1	0.31

The dissection of the extraperitoneal space was graded as easy in 100% of the patients in group I; it was graded as easy in all the patients from Group I and as difficult in 1 patient from Group II (97.1%) because of a large indirect hernia sac. Space was adequately created in all the patients, and it was achieved by using telescopic dissection. Anatomical delineation of the inguinal area was satisfactory in 100% of the patients in

group I and was unsatisfactory in only 1 patient in Group II due to excessive preperitoneal fat . The result is non-significant as pvalue is >0.05. There was no injury to the inferior epigastric vessels, vas deferens, other cord structures, or bladder and no major vascular or bowel injury during dissection or insertion of ports in either group. Bleeding was graded as minimal in all the patients in both the groups. There was no difference in mean surgery time between the two groups (P=0.063). In Group I (GA), the surgery time was 36.16±8.21 min (range Results Page 55 =24–52 min), and in Group II (SA), it was 40.16±6.54 min (range =30– 54 min). In Group I (GA), the total surgery time was 52.6±8.82 min (range =39–71 min), and in Group II (SA), it was 59.12±7.95 min (range =50–69 min), which was significant (P=0.008). None of the surgeries were converted into an open one. The mean postoperative hospital stay period was 24.8±4 h. In Group I, the postoperative stay was 28.16±4.30 h (range =22–38 h), and in Group II, it was 26.8±2.93 h (range =21–34 h). In Group II, 1 patient was kept for 36 h due to severe pain during the postoperative period. However, there was no statistically significant difference in the hospital stay between the two groups (P=0.396).



In the above graph, mean and standard deviation of VAS score is calculated and listed in above table. P-value for VAS score at 1st hour, 4th hour, 12th hour and at 18th hour is <0.0001,<0.0001,0.01 and 0.003 respectively. This show significant difference between these groups as p-value is <0.05. At 24th hour p-value is 0.8 this shows non-significant difference between this group as p-value is >0.05.

Here, 100% patients of general anesthesia required rescue analgesia at 1st hour whereas no patients required rescue analgesia in spinal anesthesia. There is significant difference between these two-group as p-value is <05. At 8th, 12th and 24 hour there is non-significant difference as pvalue is 0.32, 1, and 1 respectively which is >0.05.

post-op- adverse effects	General Anesthesia		Spinal Anesthesia		P- Value
	No. of patients	Percentage	No. of patients	Percentage	
Hypotension	1	2.8	4	11.4	0.16
vomiting	6	17.1	3	8.5	0.28
shoulder	1	2.8	2	5.7	0.5
headache	0	0	3	8.5	0.08

In the above table, vomiting is seen as most common post-operation adverse effect. Hypotension, shoulder ache, headache are seen in small proportion in both general and spinal anesthesia. The p-value is >0.05 in all the group. This shows non-significant difference between these group.

Here, seroma formation is most common post-op complications seen in both groups. 2.8% patients of wound infection in general anesthesia and 2.8% of patients faces scrotal edema in spinal anesthesia group. There is no-significant difference between these group as p-value is >0.05

IV. Discussion

We set out to discuss the feasibility of spinal anesthesia as an option for analgesia in a totally extraperitoneal laparoscopic hernia repair (TEP). Inguinal hernia repair is one of the most common surgeries in the world.⁸ The reported advantages of laparoscopic repair are as follows: less pain in the early postoperative period, fewer analgesics being necessary, better cosmetic results, and the ability to return to work earlier.⁹

Another study by Molinelli BM et al¹⁰ included 28 males and 2 females. There were 41 inguinal hernias, 2 umbilical hernias, and 1 femoral hernia. Three of the inguinal hernias were direct hernias that were found incidentally at the time of the planned contralateral repair. There were 28 (68%) direct hernias, 10 (24%) indirect hernias, and 3 (8%) recurrent direct hernias.

Donmez et al⁹ found The dissection of the extraperitoneal space was graded as easy in 98% of the patients; it was graded as easy in all the patients from Group II (S.A) and as difficult in 1 patient from Group I(G.A) because of a large indirect hernia sac. Space was adequately created in all the patients, and it was achieved by using telescopic dissection and Anatomical delineation of the inguinal area was satisfactory in 98% of the patients and was unsatisfactory in only 1 patient in Group I (P=0.896) due to excessive preperitoneal fat. There was no injury to the inferior epigastric vessels, vas deferens, other cord structures, or bladder and no major vascular or bowel injury during dissection or insertion of ports in either group. Bleeding was graded as minimal in all the patients in both the groups. There are very few published studies that compares these parameters between the two groups. However, Sung et al compared the drugs used in SA in TEP, reporting that SA provided a good muscle relaxation and operative field in both the groups.¹¹

We calculated mean and standard deviation of VAS score. P-value for VAS score at 1st hour, 4th hour, 12th hour and at 18th hour is 0.05. Pain is the most common complaint following hernia repairs.¹² Less studies comparing GA and SA in TEP repair were available. Donmez et al⁹ found that There were higher pain scores after the first hour in Group I than in Group II. Pain score at 1 h in Group I was 4.80±0.76 and in Group II 0.16±0.37. The difference between these two groups was statistically highly significant (P=0.001). There was a significant difference in VAS pain scores between these groups after 4 h: the mean pain score was 2.32±0.56 in Group I and 1.72±0.68 in Group II (P=0.002). Patients in Group I had higher VAS pain scores (1.48±0.59 and 0.84±0.55) and (1.28±0.46 and 0.76±0.44) than those in Group II (1.28±0.46 vs 0.76±0.44) at 12 h and 24 h after surgery. However, the difference between the two groups was not statistically significant (P=0.214 vs P=638).

Sarhan et al¹³ found that the laparoscopic group had lower VAS scores and patients returned to work earlier than did the patients of the open group and the difference was significant (P < 0.001). Krishna et al¹⁴ identified age, gender, mesh fixation, seroma development, and operation duration as the independent factors linked to pain occurrence in their study, where TEP and TAPP repairs were compared and pain scores at the 1st and 24th postoperative hours were both found to be lower in the TEP group (1.98 vs 2.79 and 1.09 vs 1.83, respectively) and statistically significant (P,0.0001 vs P=0.007).

Vomiting is seen as most common post-operation adverse effect. Hypotension, shoulder ache, headache are seen in small proportion in both general and spinal anesthesia. Seroma formation is most common post-op complications seen in both groups. 2.8% patients of wound infection in general anesthesia and 2.8% of patients faces scrotal edema in spinal anesthesia group. There is no-significant difference between these group as p-value is >0.05.

V. Conclusion

Total extraperitoneal surgery performed under SA provides adequate muscle relaxation and a suitable work environment, as seen under GA. It also protects the patient from possible risks of GA. TEP inguinal hernia repair can be safely performed under SA, and SA was associated with less postoperative pain, better recovery, and better patient satisfaction than GA. Spinal anesthesia is a feasible, and in our experience, the preferable method of anesthesia for total extraperitoneal laparoscopic hernia repair. Less number of patients (in total 70 patients) was the disadvantage of the present study. However, though this study was the first to compare the GA and SA in TEP surgery, the results will be valuable and a leading one for surgeons in laparoscopic hernia repairs. However, large series of randomized studies are required to fully determine its advantages and disadvantages.

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