

Original Research Article

Study of testicular vascularity after totally extraperitoneal repair in inguinal hernia

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ABSTRACT

Background: Totally extra-peritoneal repair is one of the commonly used method for repair of inguinal hernia which is gaining popularity in recent days. Its effect on testicular vascularity has not been well established. The objective of this study was to study testicular vascularity following totally extra-peritoneal repair [TEP] in inguinal hernia.

Methods: This study was prospective observational study performed on patients with inguinal hernia undergoing TEP where testicular USG doppler parameters like peak systolic velocity (PSV), end diastolic velocity (EDV), resistivity index (RI) and pulsatility index (PI) were measured on pre-operative day, on 3rd postoperative day and 90th postoperative day, and serum values of FSH, LH and Testosterone were measured preoperatively and 90th postoperative day and these values were compared.

Results: 42 patients were included in this study. There was no statistically significant difference in the values of PSV ($p=0.497$), EDV ($p=0.981$), RI ($p=0.290$) and PI ($p=0.733$) between preoperative value, 3rd postoperative day, and 90th postoperative day. There was no statistically significant difference in the serum values of FSH ($p=0.376$), LH ($p=0.101$) and Testosterone ($p=0.506$) between preoperative and 90th postoperative day level.

Conclusions: It was concluded that totally extra-peritoneal repair (TEP) do not affect testicular perfusion. However large scale multi-institute trails with bigger sample size is required to find out effect of TEP on testicular vascularity.

Keywords: Testicular vascularity, TEP, PSV, EDV, RI

INTRODUCTION

Inguinal hernia is one of the commonest presentation in surgical OPD. It can be defined as protrusion of abdominal viscera through inguinal canal.¹

Various treatment options are available for inguinal hernia like conservative management in the form of TRUSS belt to surgical options like tissues repairs and mesh hernioplasty. Mesh hernioplasty can be performed by open lichtenstien repair or by laparoscopic repairs like TAPP and TEP. Current trend is towards laparoscopic techniques as they have smaller incisions, resulting in

less bleeding, less infection, faster recovery, reduced hospitalization, and reduced chronic pain.²

With the TEP technique, the pre-peritoneal dissection is faster, and the potential risk for intra-peritoneal visceral injury is minimum. However, the use of dissection balloons is expensive, the working space is more restricted, and it is not be possible to create a working space if the patient has had a previous pre-peritoneal operation. Also, if a large tear occurs in the peritoneum during a TEP approach; the potential working space may become obliterated, often requiring conversion to a TAPP approach.³ The trans-abdominal approach (TAPP)

permits easier identification of the groin anatomy before extensive dissection and disruption of natural tissue planes. The larger working space inside the peritoneal cavity allows initial experience with the laparoscopic approach easier.⁴

Complications following mesh repair are seroma, hematoma formation, neuralgia, urinary retention, testicular pain and swelling, mesh infection and recurrence. There are multiple studies comparing testicular vascularity pre and post mesh hernioplasty. Our prospective observational study was aimed to study testicular vascularity after totally extraperitoneal repair (TEP) with respect to testicular Doppler parameters namely PSV, EDV, RI, PI and serum hormones namely FSH, LH, and testosterone.⁵

METHODS

The present study was a randomized controlled study conducted in the Department of General Surgery, Vardhaman Mahavir Medical College and Safdarjung Hospital, New Delhi, India from October 2018 to April 2020. The Ethical clearance was obtained before commencement of the study.

Inclusion criteria

Male aged between 18 years and 60 years with primary reducible unilateral or bilateral inguinal hernia and eligible for general anesthesia.

Exclusion criteria

Recurrent inguinal hernias, hernia with hydrocele and varicocele, incarcerated hernia, complete and irreducible hernia, cryptorchidism, previous medical history of testicular infection and torsion, past inguinal scrotal testicular or prostate surgery, vasectomy, radiotherapy of pelvic region, inflammatory condition of testis like epididymitis, orchitis.

Sample size calculation

The sample size was calculated by using the Peak Systolic Velocity (PSV) to compare the effectiveness by assuming a difference of 1 in PSV at subsequent time points from baseline as clinically significant taking study by Middleton 6 et al as a reference. Taking power of 90% and alpha error of 5% minimum 42 patients will be taken. Sample size of this study came out to be 42. All the 42 patients that matched eligibility criteria were subjected to Totally Extra-peritoneal Repair (TEP). Testicular artery Doppler was performed a day before surgery, postoperative day 3 and postoperative day 90. and serum FSH, LH, Testosterone levels were measured a day before surgery and postoperative day 90.

Outcomes studied

Peak systolic velocity (PSV), End diastolic velocity (EDV), Resistivity index (RI), and pulsatility index (PI) on preoperative day, postoperative day 3 and postoperative day 90. Serum hormones FSH, LH, and testosterone on preoperative day and postoperative day 90. PSV, EDV, RI and PI were considered as outcome variables. Time (day 0, 3rd postoperative day and 90th post-operative day) was considered as explanatory variable.

Statistical analysis

IBM Statistical package for social sciences (SPSS) version 21 was used for statistical analysis. Descriptive statistics of the background characteristics was carried out by frequency and percentage. Shapiro-Wilk test was used to determine the normality of outcome variables. Since the data was not found to be normal, Friedman test was used to compare outcome variables at different time period (day 0, day 3 and day 90). Paired samples Wilcoxon test with Bonferroni adjustment was used as post-hoc test to compare outcome variables of each time period with one another. $P < 0.05$ was considered statistically significant.

RESULTS

A total of 42 males were included in the study. The mean age of the study population was 40.83 (± 11.80) years among which majority (54.8%) were above 40 years and 45.2% were between 20 to 40 years.

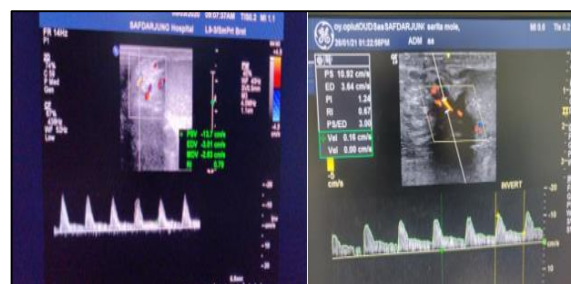


Figure 1: Testicular USG doppler.



Figure 2: Intraoperative images of TEP.

Inguinal hernia was found common in right side than left side; similar results were obtained in study by Fatima et al.⁷

Table 1: Comparison of basic characteristics.

Background characteristics		Frequency	%
Age (years)	20-40	19	45.2
	>40	23	54.8
Diagnosis	Right inguinal hernia	25	59.5
	Left inguinal hernia	17	40.5

Table 2: Comparison of secondary outcomes at different time period using paired samples Wilcoxon test.

Secondary outcomes	Time	Median (IQR)	P value (paired samples Wilcoxon test)
FSH	Day 0	6.56 (5.84, 8.28)	0.376
	Day 90	6.42 (5.62, 8.32)	
LH	Day 0	4.25 (4.01, 5.11)	0.101
	Day 90	4.26 (4.03, 5.12)	
Testosterone	Day 0	675.19 (585.65, 703.07)	0.506
	Day 90	675.20 (585.66, 703.07)	

There was no statistically significant difference in the values of PSV, EDV, RI, PI, preoperatively, 3 days after surgery and 90 days postoperatively after surgery. Similarly there was no significant difference in values of serum FSH, LH, testosterone level between preoperative and postoperative day 90.

DISCUSSION

It was observed that there was no statistically significant difference in values of PSV ($p=0.497$), EDV ($p=0.981$), RI ($p=0.290$) and PI ($p=0.733$) between preoperative day, postoperative day 3 and postoperative day 90. Similar results were observed in study conducted by Roos et al.⁸

There was no significant difference in values of serum FSH ($p=0.293$), serum LH ($p=0.120$) and serum testosterone 90 ($p=0.377$) preoperatively and at postoperative day 90. Similar results were obtained in a study conducted by Akbulut et al.⁹

Table 3: Comparison of primary outcomes at different time period using Friedman test.

Primary outcomes	Time	Median (IQR)	P value (Friedman test)
PSV	Day 0	13.07 (11.98, 14.02)	0.497
	Day 3	13.09 (11.93, 14.07)	
	Day 90	13.04 (12.08, 14.03)	
EDV	Day 0	2.03 (1.86, 2.20)	0.981
	Day 3	2.05 (1.82, 2.24)	
	Day 90	2.02 (1.81, 2.20)	
RI	Day 0	0.84 (0.82, 0.87)	0.290
	Day 3	0.84 (0.81, 0.87)	
	Day 90	0.84 (0.82, 0.87)	
PI	Day 0	3.07 (2.83, 3.45)	0.733
	Day 3	3.09 (2.85, 3.52)	
	Day 90	3.10 (2.84, 3.51)	

In a study conducted by Stuta et al statistically significant increase in values of PSV, EDV, RI, PI, was reported in early postoperative period as compared to preoperative levels, however, they returned to the baseline preoperative levels in late postoperative period.

This transient increase in vascularity of testis in early preoperative period could be attributed due to hyper-vascularity and oedema of testes and epididymis which are known to occur in early postoperative period. However, there was no statistically significant difference in values of PSV, RI, PI.¹⁰ Majority of patient in our study were discharged at post-operative day 2 in a study conducted by Gangopadhyay et al the average duration of hospital stay was 2.6 days which is similar to our study.¹¹

In a study conducted by Peter et al which compared heavy weight mesh and lightweight mesh for TEP, it was found that use of lightweight mesh in males undergoing TEP can decrease sperm motility at 1 year. This was attributed by fact that light weight mesh can contract after surgery and may cause trapping of spermatic cord structures.¹²

Limitations

We could not find any bilateral hernia in our study, we followed up our patients only for 3 months, our sample size was only 42, we did not follow-up the complications of the procedure like pain, seroma formation, cord oedema, surgical site infections, and quality of life, no comparison were made with other techniques of hernia surgeries like TAPP and Lichtenstein's mesh hernioplasty and study was single institution study.

CONCLUSION

Hence it can be concluded from our study that totally extra-peritoneal repair do not affect testicular vascularity however a large multi-institute trial is required to further evaluate testicular vascularity after TEP.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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