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General Surgery

A COMPARATIVE STUDY BETWEEN LAPAROSCOPIC VARICOCELECTOMY AND OPEN VARICOCELECTOMY

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ABSTRACT **Background:** Varicocele is by far the most commonly performed operation for the treatment of male infertility. Animal and human studies have demonstrated that varicocele is associated with a progressive and duration-dependent decrease in testicular function. Repair of varicocele will stop any further damage to testicular function and, in a large percentage of men, result in improved spermatogenesis and also increased Leydig cell function.

Objectives:

To compare Laparoscopic versus Open Varicocelectomy in terms of

1. Duration of Operation
2. Surgical site infections
3. Improvement in Semen Analysis after Surgery
4. Postoperative analgesia
5. Length of post-operative hospital stay

Methods: Data was collected with meticulous history taking, clinical examination and appropriate radiological, semen analysis and follow up during the period of March 2021 to August 2022 **Results:** A total of 36 patients with Symptomatic Varicocele were studied who presented to K.R. Hospital for this study. Mean duration of operation was 21.6667 minutes in Laparoscopic group and 64.8333 minutes for Open group with p-value of 0.001. Surgical site infections 66.7% in Open group and 5.6% in Laparoscopic group with p-value of 0.001. Post operative Analgesia required for Laparoscopic group was in 5.6% and 88.9% in Open group with p-value of 0.001. Post operative hospital stay in Laparoscopic group was 1.55 days . Whereas in open group it was 2.72 days with p-value of 0.05. **Conclusion:** The present study concludes that the Laparoscopic Varicocelectomy is better than Open Varicocelectomy in terms of significantly less Operative Time, Less Surgical site infections and post operative complications, significantly less requirement for post operative analgesia and significantly less length of stay in hospital.

KEYWORDS : Varicocele, Laparoscopic Varicocelectomy, Open varicocelectomy.

INTRODUCTION

Varicocele is by far the most commonly performed operation for the treatment of male infertility. It is found in approximately 15% of the general population, 35% of men with primary infertility, and 75% to 81% of men with secondary infertility. [1]

This association was first noted in the late 1800s by Barfield, a British surgeon, and was subsequently confirmed by others in the early 1900s. [2] Animal and human studies have demonstrated that varicocele is associated with a progressive and duration-dependent decrease in testicular function. A testicular varicocele represents an abnormal degree of venous dilatation of the pampiniform plexus.[3]

Varicocele is caused by dysfunction of the valves in the spermatic vein. Anatomically, varicoceles present as dilatation of the internal spermatic vein and pampiniform plexus of the testis, which may lead to testicular injury via several mechanisms.[4]

Over the last decade, research into pathophysiology of varicoceles has focused on three main areas. These are oxidative stress-related damage, tissue hypoxia- and hormonal imbalances. Oxidative stress in turn may result in damage to sperm membrane and DNA.[5]

While most varicocoeles are asymptomatic, those that are symptomatic tend to present in adolescence or early adulthood, when there may be an annoying dragging discomfort that is worse on standing at the end of the day. This presumably reflects distension of the testicular veins.[6]When examined in the erect position, the scrotum on the affected side hangs lower than normal on palpation, with the patient standing, the varicose plexus feels like a bag of worms. There may be a cough impulse. If the patient lies down the veins empty by gravity and this provides an opportunity to ensure that the underlying testis is normal to palpation. In long-standing cases the affected testis is smaller and softer than its fellow, owing to a minor degree of atrophy, histological changes within the testes, changes in Leydig and Sertoli cell function and their seminal parameters, and endocrine abnormalities. [7]

Ultrasonography can be helpful in the diagnosis of small varicocoeles and in older men with an apparently recent onset of varicocele, ultrasonography of the kidneys is important in excluding a left renal tumour. Grading of the varicocele is possible, with a Grade I varicocele being impalpable (i.e., observed only on ultrasound), Grade II being palpable and Grade III being visible. [7]

Repair of varicocele will stop any further damage to testicular function and, in a large percentage of men, result in improved spermatogenesis and also increased Leydig cell function.

OBJECTIVES OF THE STUDY

To compare Laparoscopic versus Open Varicocelectomy in terms of

1. Duration of Operation
2. Surgical site infections
3. Improvement in Semen Analysis after Surgery
4. Postoperative analgesia
5. Length of post-operative hospital stay

MATERIALS AND METHODS

Source of data:

All the patients coming to General Surgical OPD and Urology OPD, K. R. Hospital, attached to Mysore medical college and research Institute, Mysuru with Varicocele

Method of collection of data:

- Study Design- A Comparative study
- Study Period- a period between March 2021 to August 2022.
- Sample Size: 36

Sample size calculation

Using 2 mean – SD formula,

n =

2α = 2.576 for 99% confidence interval

2β= 1.645 for 95% power

From parent article, return to N activity in:

L – SVL = 1.8 ±0.9 à µ1 ± σ1

OI – SVL = 3.2 ±1.4 à μ2 ± σ2
Therefore, σ = = 1.15
n =
= 17.46 = 18
Minimum sample size required in each group is 18.
Total sample size = 36

Inclusion Criteria:
1. Patients presenting with symptomatic Varicocele
2. Patients presenting with Infertility secondary to Varicocele

Exclusion Criteria:
Patients not willing to participate in the study

Ethical consideration
Institutional ethics committee approval was obtained.
All subjects included in the study were explained about the procedure and valid informed written consent was taken.

Statistical analysis
- SPSS (Statistical Package For Social Sciences) version 20. (IBM SPASS statistics [IBM corp. released 2011] was used to perform the statistical analysis
- Data was entered in the excel spread sheet.
- Descriptive statistics of the explanatory and outcome variables were calculated by mean, Standard deviation for quantitative variables, frequency and proportions for qualitative variables.
- Inferential statistics like
- Chi-square test was applied for qualitative variables.
- Pearson's correlation test was applied to correlate the severity of toxicity and in-hospital mortality with TLC.
- The level of significance is set at 5%.

RESULTS

Table 1 : Duration of Operation

	Surgery	Number	Mean	Standard Deviation	Standard Error Mean
DURATION_OF_OPERATION	Laparoscopic	18	21.6667	9.80396	2.31082
	Open	18	64.8333	20.79098	4.90048

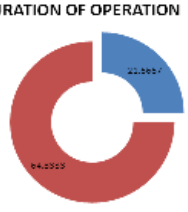

Figure 1 - Duration of Operation

Observations-
In the above Chart and Graph, in group I i.e., in Laparoscopic Varicocelectomy patients group the operative duration starting after Port entry till ligation of veins ranged from 11mins to 55mins with mean of 21.6667 and Standard deviation of 9.80396 and Standard error mean of 2.31082. This group included both Unilateral and Bilateral Varicocelectomies. Duration of operation was less in Unilateral varicocelectomy and more in Bilateral varicocelectomy.

In Group II i.e., in Open Varicocelectomy patients group the operative duration from Incision till ligation of veins ranged from 38minutes to 103 minutes with mean of 64.8333 minutes and Standard deviation of 20.79098 and Standard error mean of 4.90048. This group included both Unilateral and Bilateral Varicocelectomies. Duration of operation was less in Unilateral varicocelectomy and more in Bilateral varicocelectomy.

p-value was 0.001 when duration of operation between Laparoscopic vs Open Varicocelectomy was considered.

Table 2: Surgical site infection

	Surgery		Total
	Laparoscopic	Open	

SURGICAL_SITE_INFECTION	Yes	Count	1	12	13
		% within Surgery	5.6%	66.7%	36.1%
	No	Count	17	6	23
		% within Surgery	94.4%	33.3%	63.9%
Total	Count		18	18	36
	% within Surgery		100.0%	100.0%	100.0%

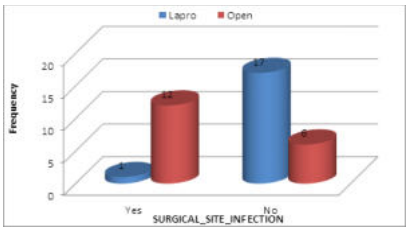

Figure 2- Surgical site infection

Observations
In the above Chart and Graph, in Group I i.e., in Laparoscopic Varicocelectomy group, the surgical site infection was noted in only 1 patient among 18 patients at 10mm Camera port site which accounts to 5.6% which responded to systemic antibiotics.

In Group II, i.e., in Open Varicocelectomy group, the surgical site infection was noted in 12 patients among 18 patients which accounts to 66.7%. Almost all responded well to Systemic antibiotics and later on oral antibiotics.

Here the p-value was 0.001 when Surgical site infections were considered between Laparoscopic vs Open Varicocelectomy

Table 3 - Post Operative Analgesia

			Surgery		Total
			Laparoscopic	Open	
POSTOPERATIVE_ANALGESIA	Yes	Count	1	16	17
		% within Surgery	5.6%	88.9%	47.2%
	No	Count	17	2	19
		% within Surgery	94.4%	11.1%	52.8%
Total	Count		18	18	36
	% within Surgery		100.0%	100.0%	100.0%

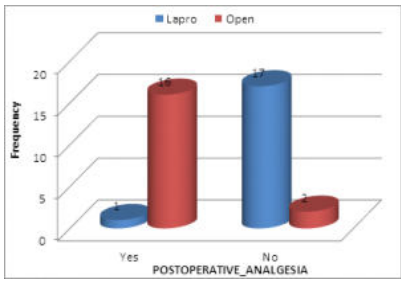

Figure 3-Post Operative Analgesia

Observations
In the above Chart and Graph, It was noticed that the post operative analgesia required for patients in Group I who underwent Laparoscopic Varicocelectomy was less . Only 1 among 18 patients which accounts to 5.6% had immense post operative pain on post operative Day 1 in the form of i.v Analgesics.

In Group II i.e., in patients who underwent Open Varicocelectomy, 16 out of 18 patients which accounts to 88.9% required i.v Analgesics till Post Operative Day 3 and later on discharged with oral analgesics for post operative pain.

p-value was 0.001 when post operative analgesia was considered between Laparoscopic vs Open Varicocelectomy

Table 4 -Length of post operative Hospital stay

	Surgery	N	Mean	Std. Deviation	Std. Error Mean
LENGTH_OF_POST_OPERATIVE_HOSPITAL STAY	Laparoscopic	18	1.5556	.85559	.20166
	Open	18	2.7222	1.01782	.23990

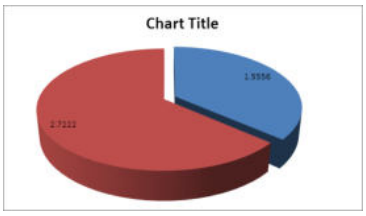

Figure 4 - Length of post operative Hospital stay

Observations

In Laparoscopic Varicocelectomy patients group, the length of Post Operative Hospital stay ranged from 1 day to 3 days with mean of 1.5556 days with Standard deviation of 0.85559 and Standard error mean of 0.20166 Whereas in Open Varicocelectomy group, the length of hospital stay ranged from 1 day to 6days with mean of 2.7222 days and with Standard deviation of 1.01782 and Standard error mean of 0.23990.

p-value is 0.001 when Length of Post operative hospital stay was compared between Laparoscopic vs Open Varicocelectomy.

Table 5 -Improvement in semen analysis

			Surgery		Total
			Laparoscopic	Open	
IMPROVEMENT_IN_SEMEN_ANALYSIS	Yes	Count	13	11	24
		% within Surgery	72.2%	61.1%	66.7%
	No follow-up	Count	5	7	12
		% within Surgery	27.8%	38.9%	33.3%
Total	Count		18	18	36
	% within Surgery		100.0%	100.0%	100.0%

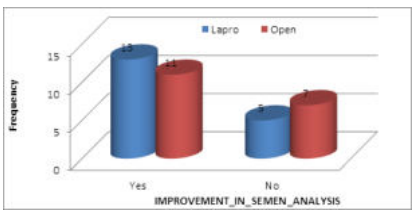

Figure 5 -Improvement in semen analysis

Observations

In Laparoscopic varicocelectomy group, 13 patients among 18 patients which accounts to 72.2% had improvement in semen analysis post surgery. But 5 patients among 18patients did not follow up post surgery.

In Open varicocelectomy group, 11 patients among 18 patients had improvement in semen analysis. Out of 18 patients, 7 patients did not follow up to hospital post operatively.

DISCUSSION

A total of 36 patients with Symptomatic Varicocele were studied who presented to K.R. Hospital for this study.

Out of which 18 patients were operated by Laparoscopic method and other 18 patients were operated by Open method Mean duration of operation was 21.6667 minutes in Laparoscopic group and 64.8333 minutes for Open group with p-value of 0.001. Significant co-relation was found for this. Surgical site infections 66.7% in Open group and 5.6% in Laparoscopic group with p-value of 0.001. Significant co-relation was found for this. Post operative Analgesia required for Laparoscopic group was in 5.6% and 88.9% in Open group with p-value of 0.001. Significant co-relation was found for this. Post operative hospital stay in Laparoscopic group was 1.55 days. Whereas in open group it was 2.72 days with p-value of 0.05. Positive correlation was found for this. No significant differences between the groups in improvement of semen analysis regarding surgical technique

LIMITATIONS

1) A large scale study is needed to Extrapolate the findings to the whole population
2) Study design was a cross sectional observational study

CONCLUSION

The present study was done in patients who presented with Symptomatic Varicocele to K.R.Hospital, Mysuru. They were randomly allocated for the study and was grouped into Group A as Laparoscopic varicocelectomy group and Group B as Open Varicocelectomy group. The mean age of presentation in both groups were 39.38 and 39.16 respectively.

The present study concludes that the Laparoscopic Varicocelectomy is better than Open Varicocelectomy in terms of significantly less Operative Time, Less Surgical site infections , significantly less requirement for post operative analgesia and significantly less length of stay in hospital, post operatively with early return to normal day to day activities post surgery.

However, there was no significant co-relation in improvement of semen analysis when surgical technique was compared.

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