

The Effect of Varicocele on Spermatogenesis: A Retrospective Study

Sheetal Sarang Patil¹, Thorat Sukdeo Lingaji²

^{1,2}Assistant Professor, Department of Surgery, SMBT Institute of Medical Sciences and Research Centre, Dhamangoan Nashik, Maharashtra 422403, India.

How to cite this article:

Sheetal Sarang Patil & Thorat Sukdeo Lingaji. The Effect of Varicocele on Spermatogenesis: A Retrospective Study. *New Indian J Surg.* 2018;9(6):796-99.

Abstract

Background: Varicocele is still an enigma. Its effects on semen analysis, fertility are not yet fully understood. Studies showed that surgical correction of varicocele could improve the semen parameters. However, there is scarcity of study to demonstrate post-operative outcome of varicocelelectomy. **Objectives:** The objectives of the present study were 1) To study clinical profile of varicocele patients 2) To study the effect of varicocelelectomy on spermatogenesis. **Material and Methods:** The present descriptive type of retrospective record base study was carried out at tertiary care teaching hospital of Maharashtra. Archives were screened, to retrieve out previous three years (2014 to 2017) medical records of varicocelelectomy patients. Total 50 medical records of patients who had undergone varicocelelectomy were analyzed. **Results:** Statistical significant difference was observed in between pre and post operative sperm parameters like count, motility and morphology. **Conclusion:** This study showed that surgical treatment could lead to the betterment of semen parameters in patients. However, to recommend varicocelelectomy as a most useful procedure further comprehensive multi centric trials are required to confirm the findings of present study.

Keywords: Varicocelelectomy; Spermatogenesis; semen.

Introductions

Since many decades; varicocele and its complications are still a mystery to medical science. A varicocele is defined as the abnormal dilation of the internal testicular vein and pampiniform venous plexus within the spermatic cord [1]. Etiology and patho-physiology behind varicocele is not clear. Many theories have been put forward to establish the causes for varicocele-associated testicular failure viz, elevated testicular temperature [2], increased venous pressure [3], hypoxia [4], oxidative stress [5], hormonal imbalances [6] and reflux of toxic metabolites from adrenal or renal origin [7] etc.

Varicocele is present in 13% of the normal male population [8], and it is observed in 35%–40% of all men with primary infertility and in up to 80% of those with secondary infertility [9]. It's effect on semen analysis and fertility is a matter of debate [10]. There are a number of treatments available to handle varicoceles. Several surgical techniques are available to treat varicocele including open inguinal, subinguinal microscopic, and laparoscopic ligation etc. [11,12] these techniques said to improve sperm parameters, testosterone production, and fertility. However, the ideal approach of varicocele treatment is still a matter of controversy. With this background current study was conducted at tertiary care medical teaching hospital with an aim to determine the effect of varicocelelectomy on spermatogenesis.

Objectives

The objectives of the present study was

1. To study clinical profile of varicocele patients

Corresponding Author: Thorat Sukdeo Lingaji, Professor, Department of Surgery, SMBT Institute of Medical Sciences and Research Centre, Dhamangoan Nashik, Maharashtra 422403, India.
E-mail: sheetalpatil78.sp@gmail.com

Received on 24 | 07 | 2018, Accepted on 31 | 08 | 2018

- 2. To study the effect of varicocele on spermatogenesis.

Material and Method

Institutional Ethical Committee’s permission and clearance from medical record department (MRD) was obtained before starting of the study. This was a descriptive type of record base retrospective study. The present study was conducted at tertiary care teaching of hospital of western Maharashtra. Archives were screened, to retrieve out previous three years (2014 to 2017) medical records of varicocele patients. All the medical records were duly checked for their completeness. Out of 61 records 50 records were found to be complete in terms of compliance to the treatment and follow up; were included in the study. Predesigned and pretested questionnaire was used for data collection. Study questionnaire consisted two parts. In part I socio-demographic and clinical data of the patients was recorded and in part II pre and post varicocele information on sperm count, its motility and morphology were recorded. Confidentiality of the patients was ensured while collecting and analysis of data.

Statistical Analysis

Questionnaires were checked for the completeness and data entry and coding was done in Microsoft excel. Descriptive and inferential analysis like mean, standard deviation and Wilcoxon matched-pairs signed rank test (W) were used for the analysis.

Observation and Results

In present study total 50 records of patients who have undergone varicocele were analyzed. Out of total patients maximum patients were in the age group of 31-40 years. The mean age of the patients was 28.04± 5.9 Years. The youngest and oldest patients were 19 years and 39 years old respectively (Table 1). Out of all patients 76% (38) were sedentary workers and 24% (12) were laborers. As per medical records 82% (41) were married and 18% (09) were unmarried. Out of 41 who were married 13 (23%) patients had infertility problem; out of that 07 had a primary infertility while 06 had secondary infertility (Graph 1). Out of all patients; 32 (64%) cases had the symptoms either in the form of pain or swelling or both. Varicocele was found on left side in 68% (34) cases, in 30% (15) patients, bilateral varicocele was found and one case had varicocele on the right side. Out of all patients four patients had history of other associated diseases; two patients had lipoma of the cord and another two had inguinal hernia and kidney cyst.

Pre operative and post operative sperm count was 47.96±20.29 (95% CI 42.18- 53.73) and 70.9±23.38 (95% CI 64.24-77.55) respectively. Statistically significant difference was observed in between pre and posts operative sperm count. (Wilcoxon matched -pairs signed rank test: [W]-1176, p <0.001 Significant) (Table 2).

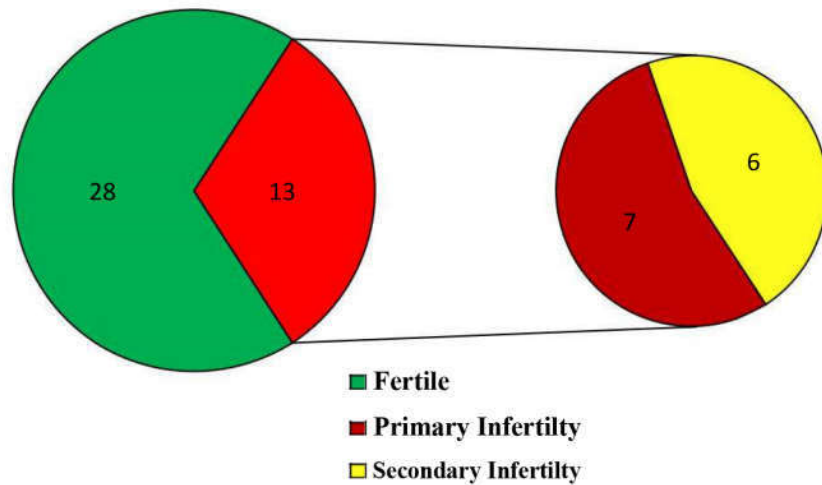
Motility of sperm also improved post varicocele. Pre and post operative sperm motility was 49.56±11.57 (95% CI 46.26- 52.85) and 62.32±11.16 (95% CI 59.14-65.49) respectively. Statistical significant difference was observed in

Table 1: Distribution of the patients according to age (n=50)

Sr. No.	Age groups (Years)	No of percentage (%)
01	≤ 20	04 (08.00%)
02	21 to 30	29 (28.00%)
03	31 to 40	17 (34.00%)
	Total	50 (100%)

Table 2: Distribution of cases according to pre and post operative sperm count

Sr. No.	Sperm count	No of patients (Pre operative)		No of patients (Post Operative)	
1.	≤ 20 million/ml	05	10.00%	02	04.00%
2.	21-40 million/ml	19	38.00%	07	14.00%
3.	41-60 million/ml	14	28.00%	21	42.00%
4.	61-80 million/ml	09	18.00%	11	22.00%
5.	≥ 81 million/ml	03	06.00%	09	18.00%
	Mean sperm count ± SD	Preoperative 47.96 ± 20.29		Postoperative 70.9 ± 23.38	
Wilcoxon matched -pairs signed rank test: (W)-1176, P <0.001 Significant					



Graph 1: Distribution according to fertility status

Table 3: Distribution of cases according to pre and post operative sperm motility

Sr. No.	Sperm count	No of patients (50)	
		Preoperative	Postoperative
	Mean count ± SD	49.56±11.57	62.32 ± 11.16
Wilcoxon matched –pairs signed rank test: (W)-1160, P <0.001 Significant			

Table 4: Distribution of cases according to pre and post operative sperm morphology

Sr. No.	Sperm morphology	No of patients (50)	
		Preoperative	Postoperative
	Mean morphology ± SD	24.58±4.82	17.28 ± 4.43

Wilcoxon matched –pairs signed rank test: (W) 1275, P <0.001 Significant

between pre and post operative varicocelelectomy sperm motility. (Wilcoxon matched –pairs signed rank test: [W]-1160, p <0.001 Significant) (Table 3).

Pre operative and post operative sperm morphology was 24.58±4.82 (95% CI 23.20 - 36.00) and 17.28±4.43 (95% CI 16.01-18.54) respectively. Statistically significant difference was observed in between pre and posts operative sperm morphology. (Wilcoxon matched –pairs signed rank test: [W] 1275, p <0.001 Significant) (Table 4).

Discussion

The effect of varicocelelectomy; on spermatogenesis is still one of the most debated issue. In this study 50 records were scrutinized to study clinical profile of varicocele patients and effect of varicocelelectomy on sperms count, motility and morphology. The most common age group affected by varicocele in present study was 31-40 years old and the mean age of the patients was 28.04±5.9 Years. Somewhat similar (27.87± 6.5 years) mean age was reported by the Shamsa Ali et al. [13]. In a study conducted by Morshed MS et. al. [14]

almost 60.1% of patients were from 25 to 35 years age group, and mean age was 28.3± 6.0 years .Kumanov et al. [15] conducted a study among Bulgarian boys reported 7.9% prevalence of varicocele in the age group of 10 to 19 years. In present study as per records 76% varicocelelectomy patients were sedentary workers and 82% were married. In present study 23% of married patients had infertility; out of that 07 had a primary infertility while 06 had secondary infertility. Cakiroglu B et al. [16] reported, all of the varicocele patients were married and they had primary infertility.

Out of all patients; in present study, 32 (64%) cases had the symptoms either in the form of pain or swelling or both. Shamsa ali et al. [14] reported pain and heavy sensation were most common complaints. In present study majority of patient’s (68%) varicoceles were on left side; study conducted by Morshed MS et al. [14], also reported left side (86.7%) involvement was most common by varicocele. However; in contrast to our finding, Shamsa Ali et al. [14] reported right side involvement by varicoceles were most common. In our study pre and post operative sperm count, motility and morphology was found to be improved. Shamsa Ali et

al. [14] also reported improvement in sperm count, its motility and morphology post varicocelectomy. Cakiroglu B et al. [16] reported post varicocelectomy improvement in sperm motility and morphology but not in sperm count.

Conclusion

Based on findings of current study we may consider that varicocelectomy had effect on spermatogenesis, in terms of improvement in sperm count, its motility and morphology. However, to recommend varicocelectomy as treatment of choice for varicocele, further comprehensive multi centric trials are required to confirm the findings of present study.

References

- Chiba K, Ramasamy R, Lamb DJ, Lipshultz LI. The varicocele: diagnostic dilemmas, therapeutic challenges and future perspectives. *Asian Journal of Andrology* 2018;18:276-81.
- Garolla A, Torino M, Miola P, Caretta N, Pizzol D, et al. Twenty four hour monitoring of scrotal temperature in obese men and men with a varicocele as a mirror of spermatogenic function. *Hum Reprod* 2015;30:1006-13.
- Eisenberg ML, Lipshultz LI. Varicocele induced infertility: newer insights into its pathophysiology. *Indian J Urol* 2011;27:58-64.
- Hu W, Zhou PH, Zhang XB, Xu CG, Wang W. Roles of adrenomedullin and hypoxia inducible factor 1 alpha in patients with varicocele. *Andrologia* 2014;47:951-7.
- Agarwal A, Makker K, Sharma R. Clinical relevance of oxidative stress in male factor infertility: an update. *Am J Reprod Immunol* 2008;59:2-11.
- Rajfer J, Turner TT, Rivera F, Howards SS, Sikka SC. Inhibition of testicular testosterone biosynthesis following experimental varicocele in rats. *Biol Reprod* 1987;36: 933-7.
- Fujisawa M, Yoshida S, Kojima K, Kamidono S. Biochemical changes in testicular varicocele. *Arch Androl* 1989;22:149-59.
- Wu Tao, Duan Xi, Yang X, Deng X, Cui S. Laparoendoscopic single-site varicocelectomy compared with conventional laparoscopic surgery: a systematic review and meta-analysis. *SpringerPlus* 2016;5:1483.
- Tiseo BC, Esteves SC, Cocuzza MS. Summary evidence on the effects of varicocele treatment to improve natural fertility in subfertile men. *Asian Journal of Andrology* 2016;18:239-45.
- Ali SM, Nademi M, Aqae A, Fard N, Molaei M. Complications and the Effect of Varicocelectomy on Semen Analysis, Fertility, Early Ejaculation and Spontaneous Abortion Saudi J Kidney Dis Transplant 2010;21(6):1100-05.
- Al-Kandari AM, Shabaan H, Ibrahim HM, Elshebiny YH, Shokeir AA. Comparison of outcomes of different varicocelectomy techniques: open inguinal, laparoscopic, and subinguinal microscopic varicocelectomy: a randomized clinical trial. *Urology* 2007;69(3):417-20.
- Ding H, Tian J, Du W, Zhang L, Wang H, Wang Z. Open non-microsurgical, laparoscopic or open microsurgical varicocelectomy for male infertility: a meta-analysis of randomized controlled trials. *BJU Int* 2012;110(10):1536-42.
- Shamsa A, Nademi M, Aqae M, Fard AN, Molaei M. Complications and the effect of varicocelectomy on semen analysis, fertility, early ejaculation and spontaneous abortion. *Saudi J Kidney Dis Transplant* 2010;21(6): 1100-05.
- Morshed MS, AKMK A, AKMA I, Zaman SB, Alam MS, Islam N. Effects of Varicocelectomy on Abnormal Semen Parameters in Patients with Clinically Palpable Varicocele. *Bangladesh Med Res Coun Bull* 2017;43: 94-100.
- Kumanov P, Robeva RN, Tomova A. Adolescent varicocele: who is at risk? *Pediatrics* 2008;121:e53-7.
- Cakiroglu B, Sinanoglu O, Gozukucuk R. The effect of varicocelectomy on sperm parameters in subfertile men with clinical varicoceles who have asthenozoospermia or teratozoospermia with normal sperm density. *ISRN Urology* 2013;2013:1-3.