

MEAN CHANGES IN SPERM COUNT IN ADULT MALES AFTER VARICOCELECTOMY

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ABSTRACT

Objective: To determine changes in the sperm count in adult males with clinically palpable varicocele after varicocelectomy.

Methodology: This quasi experimental research was performed in 174 adult male patients with clinically palpable varicoceles at the department of general surgery, Lady Reading Hospital (LRH) Peshawar from January 2016 to January 2017. Adult males with clinically palpable varicocele were selected with consecutive sampling. Inguinal varicocelectomy was performed by consultant surgeon after obtaining written informed consent. Sperm count was done before and after the procedure. Data was entered in SPSS version 20.0 and was analyzed using descriptive statistics. Paired t- test was applied to compare mean change in pre-operative and post-operative sperm count.

Results: Mean age was 39 ± 10.37 years. Mean pre-operative sperm count was 15 ± 17.880 million, while mean post-op sperm count was 34 ± 13.149 million indicating change of 5 ± 9.95 million. The difference was statistically significant ($p = 0.0001$).

Conclusion: Sperm count in adult patients with clinically palpable varicocele increases after inguinal varicocelectomy.

Key Words: Adult male, Sperm count, Varicocele, Varicocelectomy.

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INTRODUCTION

Varicocele is described as abnormally dilated tortuous testicular veins of pampiniform plexus in spermatic cord. It is a pathological condition which can affect size and function of ipsilateral testis and produce symptoms of pain and discomfort¹. Varicocele is classified as sub-clinical and clinical^{1,2}. Subclinical varicocele cannot be palpated or seen at rest or at the time of demonstration of valsalva manoeuvre, but can be identified by doppler ultrasound studies³. Clinical varicocele is divided into three grades. Grade one is only palpable at the time of demonstration of valsalva manoeuvre, grade two can be palpated at rest but cannot be seen. Grade three can be seen as well as palpated⁴. Varicocele was described as pathology of clinical importance in 1630 AD. Russian scientists mentioned it as a disease of venous system of spermatic cord in 1960. A surgeon from United Kingdom reported an association between infertility and varicocele, however relationship between blockage of sperms and varicocele was established in 1980. Another group of surgeons of United States reported publications favoring surgical management of varicocele to be regarded as solution of infertility in patients having low number of sperm counts in their semen specimens⁵.

Treatment approach depends upon expertise, presence of previous surgical scars and availability of technical facilities. A high retroperitoneal or low trans inguinal approach can be adopted, the latter being commonest in this part of the world⁶.

This study was designed to find out change in sperm count after correction of varicocele in adult males.

METHODOLOGY

This quasi experimental study was performed at the department general surgery LRH Peshawar from January 2016 to February 2017. Sample size was 174 with 95% confidence interval (CI), 80% power of test and keeping mean \pm Standard deviation (SD) (1.88 ± 0.19) and prevalence of (1.79 ± 0.23) 4 for pre-operative and post-operative sperm count respectively. All males of 20 to 60 years of age who had clinically palpable varicocele were included into the study. All other causes of scrotal swelling i.e. hydrocele, haematocele, pyocele, recurrent varicocele and inguino-scrotal hernia were excluded by clinical examination and scrotal ultrasound. Approval from the local ethics committee of the hospital was sought. Patients who fulfilled the inclusion criteria were selected in the surgical outpatient department

(OPD). Informed written consent was obtained from the patients for inclusion in the study. Senior postgraduate resident of the unit collected and entered data from the patients in a semi structured proforma. Detailed history was taken and thorough examination performed. Ultrasound was performed by single consultant with fellowship in radiology, from the hospital radiology department to rule out other causes of scrotal swelling and to minimize personal bias.

Semen samples were collected from diagnosed patients in private area by self-stimulation at body temperature (37°C / 98.6 °F) and were examined by a single laboratory technician through same technique within 30 minutes after ejaculation to minimize sampling bias. The data was saved in password protected computerized database of surgical unit of LRH. Patient was prepared for surgery in the ward and informed consent was taken after explaining the whole procedure and its complications. All patients underwent inguinal varicocelectomy. Incision was given one and half centimeter above and horizontal to the inguinal ligament. After soft tissue dissection, external oblique aponeurosis was cut from superficial inguinal ring to deep inguinal ring. Ilio inguinal nerve was identified and preserved. Spermatic cord was dissected out, followed by identification of spermatic vein and or tributaries. Spermatic artery was differentiated using doppler ultrasonography. Spermatic vein and its tributaries were ligated with vicryl two zero and divided. Anatomic layer wise closure was done for all cases ensuring hemostasis⁶. Patients were followed up at intervals of ten days for wound and after six months for semen analysis. The data was analyzed in statistical package for social sciences (SPSS) version 20.0. Quantitative variables like age, duration of varicocele, pre-operative sperm count and post-operative sperm count was calculated as mean \pm SD. Qualitative variables like grades of varicocele were presented as frequency and percentages. Paired t-test was applied to compare mean pre-operative and post-operative sperm count keeping P value \leq 0.05 as significant. Sperm count was stratified among grade, age and duration of varicocele to see effect modification. Post stratification paired T test was applied keeping P value \leq 0.05 as significant.

RESULTS

As per descriptive statistics, mean and SD for pre-operative sperm count was recorded as 15 ± 17.880 million, mean and SD for post-operative sperm count was recorded as 34 ± 13.149 million and the mean change ($p=0.0001$) was recorded as 5 ± 9.954 million as shown in table 1. The mean and SD for age was recorded as 39 ± 10.37 years, mean and SD for duration of varicocele was recorded as 4.5 ± 6.62 years. As per age distribution, 62 (35.63%) patients were recorded in 20-30 years age group, 47 (27.01%) patients were recorded

in age group 31-40 years age group, 40 (22.98%) patients were recorded in 41-50 years age group and 25 (14.26%) patient were recorded in age group of 51-60 years as shown in table 2 . All of the cases were having left sided varicocele. Frequency and percentages for grades of varicocele were recorded as 18 (10.34 %) patients in grade I, 84 (48.27%) patients were recorded in grade II and 72 (41.37%) patients were recorded in grade III (table 3).

DISCUSSION

Varicocele repair has remained a debatable subject for decades. However, Sperm counts have increased after varicocele embolization when pre intervention sperm counts were compared with post intervention sperm counts⁴. It can be deduced from the current information and our findings that sub optimal fertility may have cause-effect relationship with palpable varicocele in adult male patients⁶. Varicocele is related to excessive damage of genetic material in sperm nucleus which can be reversed by varicocelectomy as evident from several studies⁷, supporting our results. On the contrary, there is no evidence that repair of varicocele is associated with increase in couples' chance of conception as shown by the 2009 Cochrane Database review⁸.

A recent meta-analysis on varicocelectomy showed better results after surgical intervention in adult males having palpable varicocele and oligospermia, which is in favor of our study. The combined odds ratio 2.23 (95% confidence interval [CI], 0.86. 5.78; $p= 0.091$) showed surgical treatment to be better approach though difference was statistically insignificant⁹.

The 2009 Cochrane Database review was having some technical flaws comprising of few heterogeneous articles, males having optimum sperm counts and males having sub clinical varicocele¹⁰. We excluded the sub-clinical varicoceles from the study. Further, the quasi experimental design of our study precludes bias related to effect of different hormones on sperm count meaning that a sperm count of particular patient with specific level of FSH is compared with sperm count of same patient with same level of hormones before and after intervention by using paired t-test. Literature review showed that 15 out of 22 studies are in favor of our results of significant improvement in sperm count after varicocele repair. Results of rest of 7 studies may be attributed to heterogeneity in patient characteristics^{11,12}. In a randomized controlled trial by Abdel-Meguid TA, a sample of 145 candidates were followed up for 1 year; 13.9% of un-treated arm had spontaneous pregnancy in comparison with 32.9% of treated arm (odds ratio, 3.04). A significant increase in rate of achieving pregnancies and sperm counts was reported after follow-up ($p < 0.0001$)¹³ which, as compared to our study also yielded similar results where semen parameters also

Table 1: Mean change in pre-op and post-operative sperm count. (n=174)

Mean and SD	Sperm Count	P Value
Pre-operative sperm count	15 + 17.880 million	0.00001*
Post-operative sperm count	34 + 13.149 million	
Mean Change	5 + 9.954 million	

Table 2: Stratification of sperm count with respect to age (n=174)

Age	Sperm Count	Frequency & Percentages		P Value
		Pre-operative	Post-Operative	
20-30 Years	< 30 Million	25 (14.36%)	12 (6.89%)	0.00001
	> 30 Million	37(21.26%)	50 (28.73%)	
31-40 Years	< 30 Million	34 (19.54%)	31 (17.81%)	0.00001
	> 30 Million	13 (7.47%)	16 (9.19%)	
41-50 Years	< 30 Million	34 (19.88%)	31 (17.81%)	0.00001
	> 30 Million	06 (3.44%)	09 (5.17%)	
51-60 Years	< 30 Million	03 (1.72%)	15 (8.62%)	0.00001
	> 30 Million	22 (12.64%)	10 (5.74%)	

Table 3: Stratification of sperm count with respect to grades of varicocele (N=174)

Grades of Varicocele	Sperm Count	Frequency & Percentages		P Value
		Pre-operative	Post-Operative	
Grade I	< 30 Million	04 (2.29%)	01(0.57%)	0.00001
	> 30 Million	14 (8.04%)	17 (9.77%)	
Grade II	< 30 Million	29 (16.66%)	16 (9.19%)	0.00001
	> 30 Million	55 (31.60%)	68 (39.08)%	
Grade III	< 30 Million	66 (37.93%)	54 (31.03%)	0.00001
	> 30 Million	06 (3.44%)	18 (10.34%)	

improved significantly having sperm count less than 15 million / milliliter ($p < 0.00001$). Keeping this randomized controlled study in mind, surgical management is better than non surgical management in patients having grade two or three varicoceles and low sperm counts. In an another study Najari et al studied a total of thirty patients. One group had 17 infertile patients and other group had 13 patients with palpable varicoceles as well as low sex hormones levels. Out of these, 15 patients (44%) showed increased libido while 18 (53%) showed increased ejaculation volume. Blood testosterone levels improved 136.0 ± 201.3 ng/dL¹⁴ which as compared to our study where in grade III, 72 (41.37%) patients were recorded and as the sperm count rose significantly with a mean change of 5 ± 9.954 million.

Apart from fair sample size the strength of this study is its design. Although it is a semi-experimental study but effectively establishes linear relationship of variable of interest before and after intervention.

LIMITATIONS

Semen characteristics like pH, volume, sperm morphology, motility and percentage of dead and alive sperms have not been considered which affect the results and fertility.

CONCLUSION

Varicocelectomy significantly increases the sperm count in adult patients with clinically palpable varicocele.

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CONTRIBUTORS

IK conceived the idea, acquired the data and critically reviewed final draft of the manuscript. AQ carried out editing, revised the manuscript and did correspondence with editor. TU and SI helped in data collection, analysis and bibliography. NK supervised the whole project and provided guidance when needed. All authors contributed significantly to the submitted manuscript.