

## **Surgical ligation of Scrotal Varicocele for male factor infertility is a valid option of treatment**

Muhammad Moazzam, Khurram M. Siddiqui, Mohammed H. Ather, S. Raziuddin Biyabani

Department of Surgery, The Aga Khan University, Karachi.

### **Abstract**

**Objective:** To evaluate the role of surgical ligation of scrotal varicocele for treatment of male factor infertility.

**Methods:** We studied 60 patients who presented with infertility and were also found to have scrotal varicocele. Patients with other probable causes contributing to infertility were excluded. Diagnosis was made by clinical examination and scrotal ultrasonography. All the patients underwent either laparoscopic varicocelectomy or open retroperitoneal high ligation of the testicular veins. Operative time and hospital stay was recorded. All patients were evaluated for postoperative improvement of semen parameters and development of any postoperative complication. The results were analyzed by commercially available software.

**Results:** During the study period 5 patients were lost to follow up and were excluded. The rest of patients (n=55) were young, with age ranging from 20 - 35 years (Mean age 27.8 years, SD  $\pm$  4.38). All patients had unilateral left sided varicocele; two patients (3.6%) had grade I varicocele, 21 patients (38.2%) had grade II varicocele and 32 patients (58.2%) had grade III varicocele. Statistically significant improvement in sperm density (p value < 0.05), sperm activity (p value < 0.05) and sperm morphology (p value < 0.05) was observed after the surgical ligation. The mean operative time was 54.88 minutes (SD  $\pm$  13). The mean hospital stay in laparoscopic procedure was 33.4 (SD  $\pm$  15.3). Minor complications were noted in 13 patients and included superficial wound infection in 3 patients, 6 patients exhibited testicular pain and persistence of varicocele in 4 patients.

**Conclusion:** Surgical ligation of scrotal varicocele is a safe and effective mode of treatment of male factor infertility in selected population (JPMA 56:363;2006).

### **Introduction**

Natural fertility is a complex process with almost equal contribution by both the partners. Although male factor infertility is easier to diagnose, it may not be the sole cause of sub fertility in a couple and hence its correction may not always lead to the desired results. Seminal abnormalities in the male partner contribute to nearly 50% of cases of subfertility.<sup>1</sup> Varicocele has been postulated as a factor responsible for inductions of seminal abnormalities. Seminal correction of varicocele for treatment of male factor sub-fertility has sparked significant interest. Studies have shown that treatment of varicocele has produced favorable outcome in seminal improvement and natural pregnancy in up to 60% couples.<sup>2</sup>

In our study we attempted to highlight the role of surgical ligation in improvement of seminal parameters in carefully selected patients in which other contributing causes of male factor sub-fertility have been excluded.

### **Patients and Methods**

This was a cross-sectional study of 60 consecutive patients over a period of twelve months presenting to us with the complaint of infertility. On evaluation, if they were

found to have varicocele, they were included in this study prospectively. Thirty patients underwent laparoscopic ligation while retroperitoneal high ligation of testicular vein (Paloma's method) was performed in the rest.

Patients with urinary tract infection, abnormal hormonal profile, abnormal testicular size (Volume less than 20ml or more than 30ml, determined by ultrasonography), azoospermia, recurrent varicocele and follow-up of less than 3 months were excluded.

All patients had semen analysis (after 3-5 days of sexual intercourse abstain). Scrotal Doppler and conventional ultrasonography was performed to confirm the clinical presence and grade of varicocele, size of testes and to rule out any associated scrotal abnormality. Operative time, length of hospital stay, mortality and morbidity were recorded.

All patients were examined in the follow up clinic after 7-10 days. All patients were re-examined after an interval of 3 months. Any recurrence or persistence of varicocele was noted. Semen analysis was performed again after abstain of 4-5 days after at least three months (up to six months of surgery) to document changes in seminal parameters following testicular vein ligation.

## Results

Five patients were unable to complete the follow up and were excluded from the study.

All of our patients (n=55) were young, with age ranging from 20 - 35 years (Mean age 27.8 years, SD  $\pm$  4.38). All of the patients had left sided varicocele; two patients (3.6%) had grade I varicocele, 21 patients (38.2%) had grade II and 32 patients (58.2%) had grade III varicocele. The overall preoperative and postoperative seminal parameters of entire population are shown in Table. Statistically significant improvement in sperm density (p value < 0.05), sperm activity (p value < 0.05) and sperm morphology (p value < 0.05) was observed.

The mean operative time was 54.88 minutes (SD  $\pm$  13). The mean hospital stay was 33.4 (SD  $\pm$  15.3).

**Table. The preoperative and postoperative seminal parameters (n=55).**

Seminal parameter	Preoperative (Mean $\pm$ SD)	Postoperative (Mean $\pm$ SD)	P value
Seminal volume (ml)	2.76 $\pm$ 1.17	2.69 $\pm$ 0.94	0.568
Sperm density (Million/ml)	22.52 $\pm$ 16.2	32.69 $\pm$ 23.14	< 0.01
Sperm activity (Percentage of active sperms)	33 $\pm$ 16.43	40 $\pm$ 16.85	< 0.01
Sperm morphology (Percentage of normal sperms)	47.722 $\pm$ 1.31	60.81 $\pm$ 15.68	< 0.01

Minor complications were noted. Superficial wound infection was observed in 3 patients (5%) undergoing open high ligation, 6 patients (10%) exhibited testicular pain and persistence of varicocele was noted in 4 patients (7%).

## Discussion

Seminal abnormalities in the male partner contribute to nearly 50% of the cases of subfertility.<sup>1</sup> The incidence of varicocele is approximately 25.4% in men with abnormal semen and 11.7% in men with normal semen.<sup>3</sup> As many men with normal semen do have varicocele, many investigators have questioned the utility of treating men for this condition. Others have reported seminal improvement in 60% to 80% and natural pregnancy 20% to 60% of the treated couples.<sup>2</sup>

Varicocele is postulated to cause seminal abnormalities by increasing intrascrotal temperature, reflux of toxic renal or adrenal metabolites, hypoxia or reduced oxygen tension, and alterations in testicular blood vessels

resulting in changes in nutrient transfer or formation of interstitial fluid.<sup>4</sup>

The surgical methods used to repair scrotal varicocele, include retroperitoneal, inguinal, sub inguinal, scrotal, and laparoscopic approach. Non surgical modalities like angio-embolization are also employed but are reported to have higher recurrence rate.<sup>5</sup> At our institute we mostly perform either laparoscopic or open high ligation of testicular vein for treating varicocele.

Varicocele presents at an early stage in adolescence and is rarely detected in individuals less than 10 years age. In our study the mean age was 27.8 years (SD  $\pm$  4.38) and most of the patients were young adults in their third or fourth decade of life. The probable reason for large number of patients reporting late was the asymptomatic nature of the dilated veins and only fertility issues brought them to attention.

The diagnosis of varicocele is mainly clinical, however, subclinical varicocele can be picked up on conventional and doppler ultrasonography. In our study scrotal ultrasonography was used to confirm the presence of varicocele and to exclude any other scrotal abnormality.

The diagnosis of varicocele is not an absolute indication for surgery and the need to perform varicocelectomy in patients with subclinical varicocele is still quite controversial. However, patients who reported to infertility clinics for the assessment of fertility potentials and showed stress pattern on semen analysis were offered surgery, after meticulously ruling out other contributing factors for infertility.<sup>2</sup>

Laparoscopic surgery has recently become an accepted and increasingly popular method. Proponents of laparoscopic varix ligation assert that the technique carries a lower postoperative morbidity than the traditional or open operative approaches. We performed the laparoscopic varicocele ligation by method described by Terranova et al.<sup>6</sup> Our results also showed that laparoscopic surgery for varicocele is a practical and uncomplicated technique.

The WHO study<sup>2</sup> has clearly identified varicocele as an important detectable cause of male infertility. Improvement in seminal parameters following correction of varicocele has been variably reported in the literature ranging from 8 to 55%. Although there has been no explanation for these discrepancies in improvement but they may arise from selection bias, difficulty in defining the different grades of varicocele or difference in the observation period.<sup>2</sup>

Our study has shown significant improvement in the sperm density following varicocele. However no

statistically significant difference was observed when both approaches were compared with each other in terms of pre and postoperative sperm density indicating insignificant edge of either procedure in varicocele repair.

Sperm motility is another important factor that is taken into account for describing the fertilizing potential of the semen sample. Studies by Tinga et al, Okuyama et al, and Goldstein et al demonstrated an increased motility as well as increased sperm concentrations after varicocelectomy.<sup>7-9</sup> Our study also endorses their results.

Sperm morphology is an important predictor of fertilizing potential. In our study improvement in sperm morphology was observed in both groups.

The only complication noticed in the early postoperative period was superficial wound infection involving skin and subcutaneous tissue. Superficial wound infection was noted in 3 patients. This apparently high incidence of wound related complications might also be attributed to the small sample size in our study. Persistence of varicocele was noted in six. Incidence of persistence of varicocele has been reported variably in the literature ranging from 2-30%. Recurrence of varicocele is mostly thought to be dependant on the pre-operative grade of varicocele. This fact has been well documented in different studies that higher the grade of preoperative varicocele, greater will be the chances of recurrence, which may be secondary to existence of multiple collateral venous channels.<sup>10,11</sup> Same cause may also be true in our study in which 60% patients had grade III varicocele. Peroperative spermatic venography might be used to rule out the presence of collaterals, but it is used only in recurrent cases

currently.<sup>12</sup>

Surgical ligation of scrotal varicocele is a safe and effective mode of treatment of male factor infertility in selected population.

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