

# EFFECTIVENESS OF PALOMA'S PROCEDURE IN MALE FERTILITY

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## ABSTRACT

**Objectives:** To study the effectiveness of Paloma's procedure for varicocele in male fertility.

**Materials and Methods:** This descriptive study was conducted on 50 patients over 3-year duration from Jan 2018 to Dec 2020 at Institute of Kidney Disease (IKD), Hayatabad Medical Complex, Peshawar. Infertile male Patients having varicocele, age range from 18 to 40 years were included in the study. Cases having abnormal hormonal profile, urinary tract infection, testicular size less than 20 ml and recurrent varicocele were excluded. Varicocele in all cases was treated with high ligation (Paloma's procedure) by open surgery. All cases were advised semen analysis (4-5 days interval after sexual intercourse) before and at 3-6 months after operation. Age, clinical grade of varicocele, side involved seminal volume, sperm density, activity and morphology were recorded of all participants. Pre and post-operative seminal volume, sperm density, activity and morphology were compared using paired t test. The level of significance was  $P \leq 0.05$ .

**Results:** The mean age was  $27.12 \pm 5.19$  years. Most of the varicocele were present on left side ( $n=44$ , 88%). Most common grade of varicocele clinically was grade III ( $n=24$ , 48%) followed by grade II ( $n=15$ , 30%). Sperm density, activity, and morphology improved after varicocele surgery through high ligation technique which was very highly and statistically significant ( $P < 0.001$ ).

**Conclusion:** Paloma's procedure is safe and effective modality of treatment for varicocele affected sub-fertile males.

**Keywords:** Male fertility, Paloma's procedure, Sperm, Varicocele.

## INTRODUCTION

The prevalence of varicocele is from 10 to 15% among general population and 30 to 45% in infertile males. Majority of varicocele are on the left side (95%). The possible reason for more on left side is left-sided dominant venous drainage.<sup>1, 2</sup> In most of the cases varicocele is idiopathic but it can arise due to renal cell carcinoma invading renal vein.<sup>1, 3</sup> Varicocele is one of the surgically treatable etiologic factors for infertility among males.<sup>4, 5</sup>

Varicocele by definition are dilated tortuous veins of the pampiniform plexus, which are the venous sinuses that draining the testes.<sup>6</sup> Evaluation of varicocele involves both clinical and ultrasound in recumbent and upright position. There are three clinical and five ultrasound grades for varicocele.<sup>7, 8</sup> In case of subclinical varicoceles, the diagnosis required some diagnostic tests like Doppler ultrasound in addition to clinical examination.

The treatment of subclinical varicoceles is debatable especially in term of pain and fertility but several investigations reported improvement in fertility following treatment.<sup>9-11</sup> The treatment options for varicocele are open varicocelectomy, laparoscopic varicocelectomy, robotic surgery, percutaneous retrograde and antegrade venous embolization/sclerotherapy.<sup>12</sup>

The basic principles involves in the management of varicoceles is to cut the venous drainage of the spermatic blood vessels through surgical low ligation also called Ivanissevich procedure, high ligation (known as Paloma procedure) and laproscopic approach.<sup>13, 14</sup> Moazzam et al.<sup>4</sup> conducted a study on the effect of high ligation through Paloma's method of varicocele on male fertility. Their results showed that statistically significant improvement in sperm activity, density and morphology was observed after Paloma's procedure ( $P < 0.05$ ).

The objective of this study was to study the effectiveness of varicocele surgery through Paloma's procedure in male fertility.

## MATERIALS AND METHODS

This descriptive study was conducted on 50 patients at Urology Department of IKD, Hayatabad Medical Complex Peshawar, over 3 year duration from Jan 2018 to Dec 2020. The hospital ethical approval was obtained from ethical review committee. Infertile males with varicocele, age range from 18 to 40 years were included in the study. Cases having abnormal hormonal profile, urinary tract infection, testicular size less than 20 ml (assessed by ultrasound) and recurrent varicocele were excluded.

Varicocele in all cases was treated with high ligation of Paloma's procedure. All cases (who had 4-5 days interval after sexual intercourse) were advised semen analysis. To grade varicocele clinically and for testicular

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size assessment, scrotal Doppler and conventional ultrasound were advised. All cases were re-advised semen analysis (4-5 days interval after sexual intercourse) at 3-6 months after operation.

Age, Seminal volume (ml), density of sperm (Million per milliliter), sperm activity (percentage of active sperms) and morphology (Percentage of normal sperms) were recorded of all participants.

Clinical grading of varicocele was done as a grade I (varicocele palpable on Valsalva maneuver only), grade II (varicocele palpable without Valsalva maneuver, dilated veins, but no visible varicocele in skin scrotal) and grade III (visible varicocele in scrotal skin even in relaxed condition).

Statistical analysis of all cases was conducted in SPSS version 22. Mean and standard deviation were computed for continuous variables like age, seminal volume, and sperm density, activity, and morphology.

Pre and post-operative seminal volume, density of sperm, sperm activity and morphology were compared using paired t test. The level of significance was  $P \leq 0.05$ .

## RESULTS

In this study our sample size was 50 patients. The mean age was  $27.12 \pm 5.19$  years. Most of the varicoceles were present on left side ( $n=44$ , 88%). Most common grade of varicocele clinically was grade III ( $n=24$ , 48%) followed by grade II ( $n=15$ , 30%). (Table 1)

Table 2 shows semen analysis before and after varicocele operation through Paloma's procedure. Only non-significant difference was found for semen volume ( $P=0.63$ ). Sperm density, activity, and morphology improved after varicocele high ligation technique which was very highly statistically significant ( $p < 0.001$ ).

**Table 1: Side and clinical grade of varicocele**

		Frequency	Percent
Side of varicocele	Left side	44	88.0
	Right side	6	12.0
Grade of varicocele	Grade 1	11	22.0
	Grade 2	15	30.0
	Grade 3	24	48.0

**Table 2: Comparison of semen analysis before and after varicocele operation**

Variable	Mean $\pm$ SD	P-value	95% CI
Seminal volume (ml) pre	2.66 $\pm$ 0.904	0.630	-.043, .0719
Seminal volume (ml) post	2.65 $\pm$ 0.879		
Sperm density mill/ml pre	25.92 $\pm$ 6.05	<0.001	-9.97, -9.549
Sperm density mill/ml post	35.62 $\pm$ 6.053		
Sperm activity mill/ml Pre	38.58 $\pm$ 8.41	<0.001	-8.21, -8.15
Sperm activity mill/ml Post	46.77 $\pm$ 8.39		
Sperm morphology Pre	44.41 $\pm$ 3.19	<0.001	-12.54, -699.0
Sperm morphology Post	57.012 $\pm$ 3.19		

## DISCUSSION

This study was conducted to determine the effectiveness of Paloma's procedure of varicocele on male fertility. In our study, male fertility was assessed by advising semen analysis consisting of seminal

volume, sperm density, activity, and morphology. Our main findings were most the varicocele were on left side. Most common clinical grade of varicocele was grade III and II. Treatment of varicocele through Paloma's procedure significantly improves the male fertility.

The pathogenesis of varicocele is the formation of testicular varicose veins which lead to loss of function, atrophy of the testicular cells and ultimately deranged sperm parameters.<sup>15</sup>

Surgical management for varicocele is warranted if there is asthenospermia, oligospermia, or teratospermia in semen analysis. Published investigations have found beneficial effect of varicocele surgery in individuals who have poor sperm quality.<sup>4, 16</sup> The common methods reported in literature for varicocele operation are classic Paloma technique with high ligation of the spermatic vessels, modified Paloma technique which preserve testicular artery, and inguinal or sub-inguinal procedures with or without preserving artery.<sup>17</sup>

The mean age of our study was 27.12±5.19 years. Moazzam et al.<sup>4</sup> conducted a study on the effect of Paloma's procedure of varicocele on male fertility and reported that the mean age of the cases was 27.8±4.38 years. These results are in consistent with our findings. Another study conducted in Turkey to determine the effect of varicocele in sub fertile males on sperm parameters and reported mean age of 24.53±8.13 years.<sup>15</sup> These results are also closer to our findings.

In our study most of the varicocele were on the left side. The possible reason for more on left side is left-sided dominant venous drainage. Similar findings were found in previous studies.<sup>1,2,4</sup>

According to our findings the most common grade of varicocele clinically was grade III followed by grade II. Similar results were found in a study by Moazzam M, et al.<sup>4</sup>

In this study we used Paloma's procedure for varicocele operation by open approach. We found statistical improvement in sperm parameters which is comparable to the study conducted by Hosseini et al.<sup>18</sup> on comparison of Palomo, Ivanissevich and laparoscopic varicocelectomy. Their results showed all procedure were effective in improving sperm parameters. They found that Paloma's technique was better than laparoscopic varicocelectomy. Another study conducted in Karachi found that through Paloma's method of varicocele operation, statistically significant improvement occur in sperm activity, density and morphology ( $P<0.05$ ).<sup>4</sup> These results are similar to our findings.

Motility of sperm is an important parameter for fertilization in semen analysis. The current study found a statistically significant improvement in sperm count after varicocele operation. Similar results were found in previous studies although they used different techniques of varicocele operation.<sup>4, 16, 18</sup>

Study conducted by world health organization found that varicocele is recognized etiology of male infertility. Their findings showed although the results are variable but improvement in sperm parameter after varicocele correction is from 8 to 55%. They reported that improvement in sperm parameter after varicocele operation can be associated with selection bias, different operational definition of grade of varicocele and variable observation period in various studies.<sup>19</sup> Limitations of our study is that as we have performed only Paloma procedure and have not compared it with low ligation and microscopic varicocelectomy so the results cannot

be generalized in larger population.

## CONCLUSION

Paloma's procedure is safe and effective modality of treatment for varicocele affected sub-fertile males.

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