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Cure of Varicocele under Local Anesthesia: Impact on Sperm Parameters

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Abstract

Introduction: Varicocele is one of the most frequent causes of infertility. There are several therapeutic modalities, namely surgery (open and laparoscopic) and conventional radiology. The aim of our study was to evaluate the impact of a varicocele cure under local anaesthesia on spermogram quality. **Material and Methods**: We conducted a retrospective descriptive study from 1 January 2022 to 31 December 2023 in the urology department of the Hôpital Militaire de Ouakam (HMO). The parameters studied were age, reasons for consultation, time to urology consultation, grade of varicocele, Doppler ultrasound and spermogram data before treatment and 3 months after treatment. Treatment consisted of bilateral subinguinal varicocelectomy under local anaesthetic. Data were entered and analysed using Excel software version 2021. **Results**: We studied 41 patients. The mean age of the patients was 35.3 ± 6.9 years, with extremes of 22 and 50 years. Thirty-eight of our patients (88.37%) were married. The most frequent reason for consultation was primary infertility (72.09%). 28 patients (68.3%) had a bilateral varicocele on ultrasound. Varicocele was associated with bilateral testicular hypotrophy in 13 patients (31.7%) and unilateral left testicular hypotrophy in 11 patients (26.8%). All patients underwent subinguinal varicocelectomy under local anaesthetic. Mean follow-up was 4.5 months. A clear statistically significant improvement was noted in sperm motility and concentration in postoperative spermograms, with normalisation of the spermogram in 15 (36.5%) of patients. **Conclusion**: The impact of varicocele on sperm parameters has been clearly established. There are various therapeutic methods for curing varicocele, including varicocelectomy under local anaesthetic, which, in addition to its undeniable economic

advantages, can significantly improve sperm parameters in patients with varicocele and prevent their deterioration over time.

Keywords

Varicocele, Local Anesthesia, Spermogram

1. Introduction

Varicocèle can be defined as an abnormal and/or tortuous dilation of the scrotal veins of the pampiniform plexus [1]. It occurs in 22% of the general male population, 40% of men with primary infertility and 80% of men with secondary infertility [2]. In a study conducted by the World Health Organization (WHO), it was shown that men with varicocele had lower sperm concentration and motility than men without varicocele [3]. Another study in healthy men in Europe identified deterioration in sperm quality even in men with grade 1 varicocele [4]. These data show a relationship between varicocele and hypofertility. However, the mechanisms by which a varicocele affects sperm parameters are not yet fully understood [2] [3]. It is one of the most common causes of infertility. There are several treatment modalities, including open surgery, laparoscopic surgery and interventional radiology, but the most effective remains surgery, which has undergone major changes, with debates on the choice of approach still ongoing, in particular, the subinguinal approach with microdissection [1] [5]. In Senegal, varicocele surgery plays a significant role in the management of male infertility [6]. Varicocele surgery in Senegal is increasingly being performed via the inguinal or even subinguinal route [6]. The aim of this study was to evaluate the impact of varicocele cure under local anaesthesia on spermogram quality.

2. Materials and Methods

This was a retrospective descriptive study over a 2-year period, from 1 January 2022 to 31 December 2023, on the records of patients treated for varicocele under local anaesthesia in the urology department of the Hôpital Militaire de Ouakam (HMO). The study population consisted of men who had undergone a varicocele cure under local anaesthesia. Patients with a complete file (testicular ultrasound, pre- and postoperative spermogram) were included in our study. Patients who did not have a control spermogram were excluded from the study.

Data were collected using a standardised data collection form. The following clinical and paraclinical parameters were used: sociodemographic, in particular age, which was grouped into 10-year age brackets; diagnostic (reason for consultation, time to consultation, diagnosis chosen), grade of varicocele, Doppler ultrasound and spermogram. The spermogram was performed according to the analysis protocol described by WHO 2010. Data were entered and analysed using SPSS 29.0 and Excel version 2021. Proportions were compared using Pearson's chi2 test

with a significant level of 5%.

3. Results

There were 41 patients in total. The mean age of the patients was 35.3 ± 6.9 years with extremes of 22 and 50 years. The population of our study consisted of 88.37% couples compared to 11.63% singles. The most frequent reason for consultation was primary infertility with 72.09%. Bilateral involvement was noted in 28 patients or 68.3%. The varicocele was unilateral on the left in 11 patients or 26.8%. Grade 2 was the most marked on clinical examination with 58.5%, followed by Grade 1 which had 21.9% and Grade 3: 19.6%.

Of the 41 patients in whom testicular duplex ultrasound was performed, 28 had a bilateral varicocele or 68.3% of patients. The varicocele was associated with bilateral testicular hypotrophy in 13 patients or 31.7% and unilateral left in 11 cases or 26.8%. No patient had unilateral right testicular hypotrophy (Table 1).

Table 1. Distribution of patients according to parameters ultrasound.

SETTINGS ULTRASOUND	WORKFORCE (N = 41)	FREQUENCY (%)
ACHIEVEMENT RATING		
LEFT	11	26.8
RIGHT	2	4.88
BILATERAL	28	68.3
GRADE OF THERE VARICOCELE		
GRADE1	8	19.6
GRADE2	24	58.5
GRADE3	9	21.9
TESTICULAR VOLUME		
ATROPHY	2	4.9
HYPOTROPHY	13	31.7
EUTROPHY	26	63.4

All patients had a control spermogram at least 3 months after the intervention. A clear, statistically significant improvement was noted in the mobility and concentration of spermatozoa in post-operative spermograms.

The general results of the average spermiological parameters preoperatively and postoperatively and the distribution of spermiological characteristics of the patients preoperatively and postoperatively have been reported in Table 2 and Table 3.

In our study, there was a statistically significant improvement in count and mobility, but a non-statistically significant improvement in vitality and typical shape.

Table 2. Breakdown of pre- and post-operative spermogram parameters.

PARAMETRES	PREOPERATIVE AVERAGES	POSTOPERATIVE AVERAGES	P. VALUE
COUNT (MILLIONS/ML)	20.4	28.9	0.01
MOBILITY (%)	23.6	38.6	0.016
VITALITY (%)	42.5	52.4	0.25
TYPICAL FORM (%)	10.6	16.5	0.34

Paired t test, significance threshold $\alpha = 0.05$.

After a minimum follow-up of 4.5 months for the 41 patients with sperm abnormalities prior to surgery. A significant improvement in sperm quality was noted in these patients, with normalisation of the spermogram in 15 of them. However, no improvement was noted in the patient with azoospermia.

Thus, preoperatively, we observed abnormalities of asthenospermia type (90.2%), oligospermia (68.3%), teratospermia (46.3%), azoospermia (2.4%) and necrozoospermia (58.5%) (Table 3).

Table 3. Distribution according to abnormalities in pre- and post-operative spermogram parameters.

ANOMALIES	PERCENTAGE BEFORE SURGERY (N = 41) (%)	PERCENTAGE AFTER SURGERY (N = 41) (%)
OLIGOZOOSPERMIA	28 (68.3)	13 (31.7)
ASTHENOZOOSPERMIA	37 (90.2)	15 (36.5)
NECROZOOSPERMIA	24 (58.5)	17 (41.4)
TERATOZOOSPERMIA	19 (46.3)	3 (7.3)
AZOOSPERMIA	1 (2.4)	1 (2.4)
NO ANOMALIES	1 (2.4)	15 (36.5)

Patients with azoospermia (1 patient) and severe oligozoospermia (5 patients) had a hormonal assessment. The FSH level was normal in 4 patients and elevated in 2 patients. Testosteronemia was normal in 4 patients (66.6%) and low in 2 patients (33.3%).

18 cases of pregnancy after surgery were noted among the 41 patients who were evaluated, giving a post-operative pregnancy rate of 43.90%. Pregnancies occurred on average 9 months after the operation.

4. Discussion

Varicocelectomy under local anesthesia, as described, has been shown to be effective, reliable, reproducible, simple, and a safe method with minimal complications. It offers the advantages of greater patient privacy, lower morbidity, absence of significant adverse effects from anesthesia, and earlier return to regular physical activity. The low rate of procedure-related complications has varied in published reports [6] [7]. The population of our study consisted of 72.09% of patients who

consulted for primary infertility, with bilateral varicocele clinically predominantly grade II and testicular hypotrophy in 31.7% of patients. Mbouche LO *et al.* reported 57.7% of patients for secondary fertility [8]. Our results corroborate with those found by Bolanga, and Sikpa *et al.*, these authors respectively found 74% and 66% of cases of bilateral varicocele [9] [10]. However, contrary results have been found in the literature, most of which show a predominance of varicocele on the left [11] [12]. This result is different from those Ngalle *et al.* who reported 40.3% of patients, mostly grade II, and testicular hypotrophy in 50.8% of patients in their study in Cameroon in 2023 [13]. The association between varicocele and testicular hypotrophy has been documented by several studies and this further contributes to the alteration of the quality of the spermogram [3]. Literature data support the improvement of spermogram after surgery for varicocele [14]. In any case, the reported figures vary greatly from one author to another, both in terms of the improvement in sperm quality and the number of carriers induced after surgery. The preoperative spermogram revealed oligozoospermia in 68.3% of patients, asthenozoospermia in 90.2%, necrozoospermia 58.5% and teratozoospermia 46.3%. It can deduce that asthenospermia and oligospermia are the two main abnormalities observed on the spermogram of patients who consult for infertility. This observation is also made by Benazzouz who also identified asthenospermia and oligospermia as the main abnormalities of the spermogram [15] [16].

Oligoastheno-teratozoospermia was found in 26.8% of patients and constituted the most frequent anomaly. Diallo in Guinea Conakry reported 46.2% of patients with this anomaly and corroborate those of Benazzouz, Ngalle *et al.* and Diao *et al.* thus confirming the idea that the sperm profile of a patient with varicocele most often corresponds to oligo-astheno-theratospermia (OATS) [15]-[18]. We note a statistically significant improvement in asthenospermia and oligospermia. Our results corroborate with those found by Fouda *et al.* in 2023 in Cameroon, who reported a statistically significant improvement of different anomalies especially asthenospermia and oligospermia [16]. The analysis of sperm morphology did not reveal any significant statistical difference in abnormal morphologies. However, the average percentages of normal forms of sperm after surgery are slightly better than before surgery. These results are similar with those found by Bolonga *et al.* as well as Fouda *et al.* [9] [16]. These results allow us to deduce like Diallo [17] that varicocele treatment has very little effect on sperm morphology but it significantly improves sperm count and mobility in oligozoosperm and/or asthenozoosperm patients. No improvement was noted in the patient with azoosperm and a normalization rate of spermiological parameters of 36.5%. Fall B *et al.*, reported onthree patients (20%) had induction of spermatogenesis with the presence of motile spermatozoa in the ejaculate after varicocelectomy [19]. Varicocelectomy in infertile men with non-obstructive azoospermia sometimes results in induction of spermatogenesis with the appearance in the ejaculate of mobile spermatozoa that can be used in the context of medically assisted procreation [19] [20]. It therefore makes it possible in certain cases to avoid resorting to testicular extraction of

spermatozoa.

We had 18 pregnancies, *i.e.* 43.90%. In a meta-analysis, Pangani noted a pregnancy rate of between 30% and 40% whatever the technique, with the exception of subinguinal varicocele cure by microdissection, which gave a slightly higher result [5]. Thus, subinguinal varicocele cure without microdissection remains within international standards in terms of the post-cure pregnancy rate and improves the pregnancy rate.

5. Conclusion

Varicocele is a common male pathology, with an even higher incidence in infertile men. Diagnosis is essentially clinical. Scrotal Doppler ultrasound is used to quantify venous reflux and analyze testicular parenchyma. The impact of varicocele on sperm parameters has been clearly established, although its physio-pathogenesis is not well understood. There are various therapeutic methods available for curing a varicocele, including varicocelectomy under local anaesthetic, which, in addition to its undoubted economic advantages, can significantly improve sperm parameters in patients with a varicocele, and also prevent their deterioration over time.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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