

# Laparoscopic Varicocelectomy: Results and Outcomes in a Single Center in Cameroon

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**How to cite this paper:** Kamadjou, C., Essola, B., Eyongeta, D., Muhawenimana, E., Kameni, A. and Angwafo, F. (2022) Laparoscopic Varicocelectomy: Results and Outcomes in a Single Center in Cameroon. *Open Journal of Urology*, 12, 331-341.

<https://doi.org/10.4236/oju.2022.126032>

**Received:** January 16, 2022

**Accepted:** June 11, 2022

**Published:** June 14, 2022

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## Abstract

**Background and Objective:** The optimal treatment for varicocele is still controversial. Although there are many treatment methods, none can be considered as the best therapeutic option. We present our initial laparoscopic varicocelectomy experience by describing the clinical aspects and evaluating the outcomes of this surgical procedure at the *Centre medico-chirurgical d'urologie* in Douala, Cameroon. **Materials and Methods:** This was a retrospective study carried out between January 2015 and December 2019 on 35 patients with symptomatic varicoceles who were treated for either testicular pain or infertility. All surgical procedures were performed via laparoscopy, with ligation of the spermatic vein using a hemlock clip in the retroperitoneal space. The patients were followed up for three months after surgery, and data were collected and analyzed to obtain results. **Results:** The study participants were aged 16 - 55 years, with a mean age of  $36.11 \pm 8.45$  years. Infertility was the main presenting complaint. In 65.7% of cases, varicoceles were bilateral with testicular atrophy occurring in 26 patients (74.28%). The surgery duration ranged from 14 minutes to 60 minutes, with an average duration of 34.8 minutes. There was no case of conversion to open surgery. No major complications were observed and all patients were discharged the day after surgery. Three months after surgery, all patients stopped experiencing pain and semen parameters improved in 71.42% of the study participants, with 42.82% of them impregnating their partners. **Conclusion:** Laparoscopic varicocelectomy is efficient, less time-consuming, with minimal postoperative complications. It can be performed easily in the outpatient department.

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## Keywords

Varicocele, Laparoscopic Varicocelectomy, Testicular Pain, Male Infertility

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### 1. Introduction

The testes, which are the male gonads, are a set of oval-shaped organs located in the scrotum. They are suspended in the scrotum by spermatic cords, which are cord-like structures that run from the deep inguinal ring down to each testicle. The spermatic cord is made up of the vas deferens, the testicular artery, the artery of the ductus deferens, the cremasteric artery, the pampiniform plexus, the genital branch of the genitofemoral nerve, sympathetic and parasympathetic nerves, and lymphatic vessels. Venous drainage of the testis is done via the pampiniform plexus, which is primarily drained by the testicular and external pudendal veins [1]. Varicocele is a vascular abnormality of the testicular venous drainage system. It is better defined as an abnormal venous dilatation and/or tortuosity of the pampiniform plexus in the scrotum. It represents the most common cause of primary and secondary infertility in men [2]. Varicocele more commonly occurs in the left (in 78% - 93% of cases) since the left testicular vein is usually 8 - 10 cm longer than its right counterpart [3]. This condition, which is a major cause of infertility in men, is present in 19% - 41% of infertile men [4]. It is found in 15% of the general population [5], 35% of men with primary infertility, and 81% of men with secondary infertility [6]. In fact, this condition is often diagnosed during routine workup for male infertility. There are no confirmed risk factors for this condition; however, Kumanov *et al.* reported that the incidence of varicocele in adolescents was associated with certain somatometric parameters, some of which predisposed patients to varicocele (height, penile length, and penile circumference) and others that protected them against varicocele (weight and BMI) [7]. The etiology of varicocele is said to be multifactorial. The anatomic differences in venous drainage between the left and right internal spermatic vein (accounting for the predominance of left-sided varicocele), and the incompetence of venous valves resulting in reflux of venous blood and increased hydrostatic pressure are the most quoted theories for varicocele development [8]. Physical exertion during puberty may lead to the development of varicocele whereas physical exertion at a later age can aggravate the condition but does not modify the prevalence of varicocele [9]. Clinically, a varicocele can be identified via an increase in the size of the affected testis and a palpable dilatation in the pampiniform plexus of the affected testis with or without the help of the Valsalva maneuver [10]. Varicoceles could also present with a dull, aching, or throbbing pain in the testicle, scrotum, or groin; rarely, it can be acute, sharp, or stabbing [11]. Imaging modalities for the diagnosis of varicocele include ultrasound, which is the most widely used imaging modality [12], and retrograde spermatic venography, which is considered the gold standard for diagnosis [13].

Treatment options for varicoceles include open varicocelectomy performed at various anatomical levels, laparoscopic varicocelectomy (which has been proven to be a safe and effective treatment for varicoceles), robotic surgery (which was introduced recently as an alternative surgical option for varicocelectomy), and microsurgical varicocelectomy (which has gained increasing popularity among experts in male reproductive medicine as the treatment of choice for varicocele because of its superior surgical outcomes [14]). Laparoscopic varicocelectomy has been widely used to treat varicoceles, and this technique has been reported to be associated with a low incidence of persistent or recurrent hydrocele [15]. Despite its numerous advantages, this procedure is not yet common practice in Africa. In 2020, Gbenou *et al.* reported that laparoscopic treatment was done as part of a training mission for pediatric surgeons through a European Non-governmental organization in two university hospitals in Africa [16]. With time, many surgeons and urologists are getting trained in laparoscopic surgery, and laparoscopic procedures are becoming common in this part of the globe. In this paper, we present our initial laparoscopic varicocelectomy by describing the clinical aspects of varicoceles (with a special focus on varicocele-associated pain and the effect of varicoceles on sperm quality) and evaluating the outcomes of this surgical procedure at the *Centre medico-chirurgicale d'urologie* in Douala, Cameroon.

## 2. Materials and Methods

This was a retrospective study carried out at the *Centre medico-chirurgicale d'urologie* in Douala, Cameroon. The clinical records of 35 male patients who were managed at our center between January 2015 and December 2019 were consulted for data collection. We included patients who were diagnosed with varicocele and underwent laparoscopic varicocelectomy and excluded patients with incomplete clinical records. The data collected from the patients' clinical records include patients' ages, professions, initial clinical presentation (testicular pain or infertility), laterality (left, right, or bilateral), testicular volume, method of diagnosis of varicoceles, varicocele grade, results of semen analyses, surgery duration, postoperative hospitalization, and postoperative complications. In this study, varicoceles were graded using the Dubin and Amelar varicocele grading system as shown in **Figure 1**.

Laparoscopic varicocelectomy was performed under general anesthesia in all cases, with the patients in the supine position. In each case, three trocars were used: a 10-mm trocar for the camera that was inserted two finger-breadths above the umbilicus and two 5-mm trocars for monopolar pairs of scissors and forceps on the upper left iliac fossa and just above the umbilicus. The peritoneum was inflated with carbon dioxide using a Veress needle at a pressure of 15 mmHg, after which the patient was placed in the Trendelenburg position to expose the internal inguinal ring and the varicocele complex. Thereafter, the posterior parietal peritoneum was incised using a pair of monopolar scissors, which was fol-

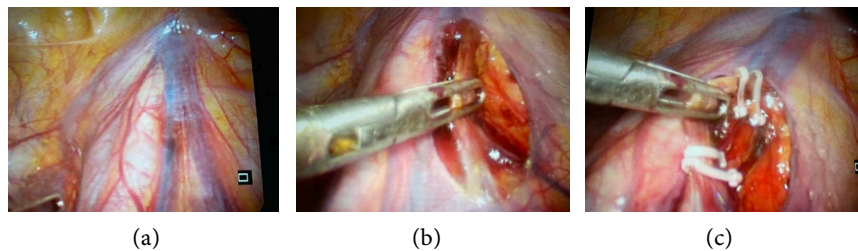
lowed by a dissection of the varicocele with preservation of the spermatic artery. Finally, we applied four 5-mm Hemlock clips without sectioning the vessels. The visual analog scale (VAS) was used to assess the pain felt by the patients during the laparoscopic procedure. This is a horizontal scale graduated from 0 to 10 that is used for the subjective assessment of pain intensity, with 0 representing no pain and 10 representing the highest possible intensity of pain. After the procedure, we monitored all the patients and checked for adverse effects. The outcome of the intervention was assessed after one month for patients whose presenting complaint was testicular pain (via the visual analog scale) and after three months for patients who consulted for primary infertility (via semen analysis) (**Figure 2** and **Figure 3**).

Grade 1	Varicocele only palpable during or after Valsalva maneuver on physical exam
Grade 2	Varicocele palpable on routine physical exam without the need for Valsalva maneuver
Grade 3	Varicocele visible to the eye and palpable on physical exam

**Figure 1.** Dubin and Amelar varicocele grading system.



**Figure 2.** Positions of the trocars during laparoscopic varicocelectomy.



**Figure 3.** Laparoscopic view of the different stages of the procedure: (a): Varicocele complex before dissection; (b): Dissection of the varicocele complex; (c): Hemlock clips on varicocele complex.

This study was approved by the institutional review board of the Faculty of Medicine and Pharmaceutical sciences and the ethics committee of the *Centre medico-chirurgicale d'urologie*, Douala, Cameroon. The requirement for patients' informed consent was waived due to the retrospective nature of the study. The data collected from patients' clinical records were entered into Microsoft Excel 2016 and exported to Epi info 7 for analysis. Continuous data were presented using the mean value and standard deviation for normally distributed variables and as median values with interquartile ranges for variables with skewed data distributions. Values of  $p < 0.05$  were considered statistically significant.

### 3. Results

The ages of the 35 study participants ranged from 16 years to 55 years, with a mean value of  $36.11 \pm 8.45$  years. The most represented age group was the 31 - 40 years age group with 19 (54.29%) participants. Their heights ranged from 170 cm to 191 cm, with a mean value of  $178.6 \pm 4.92$  cm. Their body weights ranged from 63 kg to 121 kg, with a mean value of  $87.49 \pm 13.47$  kg. The BMIs of the participants ranged from 21.72 to 37.34, with a mean value of  $27.34 \pm 3.73$  kg/m<sup>2</sup>. The presenting complaint was testicular pain in 14 (40.0%) participants and infertility in 21 (60.0%) participants. The varicocele was located to the left in 12 (34.29%) patients and was bilateral in 23 (65.71%) cases; thus, a total of 58 testes were affected. Of these 58 affected testes, 2 (3.45%) had grade 1 varicocele, 37 (63.79%) had grade 2 varicocele, and 19 (32.76%) had grade 3 varicocele. In 9 (25.71%) participants, the two testes had varicoceles of different grades. The testes were normal in size in 12 (34.29%) patients while 23 (65.71%) patients had testicular atrophy. Out of the 23 patients with testicular atrophy, 11 (47.83%) had left testicular atrophy, 4 (17.39%) had right testicular atrophy, and 8 (34.78%) had bilateral testicular atrophy. Semen analyses were carried out before and after the intervention. The pre-intervention analyses revealed that 14 (40%) participants had normal semen, 8 (22.86%) participants had azoospermia, 9 (25.71%) participants had oligoasthenoteratozoospermia, 3 (8.57%) participants had oligospermia, while 1 (2.86%) had oligoasthenozoospermia (Table 1).

The duration of the intervention ranged from 14 minutes to 60 minutes, with a median duration of 37 [27 - 44] minutes. The intervention had no complications in 33 (94.29%) patients; however, one patient (2.86%) ended up with a left hydrocele and another one (2.86%) ended up with a right hydrocele. All the patients felt only mild pain during the laparoscopic procedure, with the VAS score being 1/10 in 33 (94.29%) participants and 2/10 in 2 (5.71%) participants. All the participants were hospitalized for 24 hours after the intervention. Regarding the outcome of the intervention, all the patients whose presenting complaint was testicular pain experienced a complete resolution of the pain (VAS score of 0). For the 21 patients who consulted for infertility, there was an improvement in semen analysis findings in 15 (71.43%) of them, with 9 (42.86%) of them impregnating their spouses by the end of the 3-month follow-up period. However,

**Table 1.** Demographic and clinical characteristics of the study participants.

VARIABLE	FREQUENCY
<b>Age</b>	
10 - 20	1 (2.86%)
21 - 30	6 (17.14%)
31 - 40	19 (54.29%)
41 - 50	7 (20%)
51 - 60	2 (5.71%)
<b>BMI</b>	
18 - 24.9 (Normal)	10 (28.57)
25 - 29.9 (Overweight)	17 (48.57)
>30 (Obesity)	8 (22.86%)
<b>Presenting Complaint</b>	
Testicular pain	14 (40%)
Infertility	21 (60%)
<b>Laterality</b>	
Left (unilateral)	12 (34.29%)
Bilateral	23 (65.71%)
<b>Grade of Varicocele (n = 58)</b>	
Grade 1	2 (3.45%)
Grade 2	37 (63.79%)
Grade 3	19 (32.76%)
<b>Testicular appearance</b>	
Normal	12 (34.29%)
Atrophy	23 (65.71%)
<b>Pre-intervention semen analysis</b>	
Normal semen	14 (40%)
Azoospermia	8 (22.86%)
Oligoasthenoteratozoospermia	9 (25.71%)
Oligoasthenozoospermia	1 (2.86%)

two out of these nine pregnancies occurred via medically assisted reproduction (Table 2).

#### 4. Discussion

This retrospective study aimed to present our initial laparoscopic varicocelectomy experience by describing the clinical aspects and evaluating the outcomes of

**Table 2.** Details and outcomes of the laparoscopic procedure.

VARIABLE	FREQUENCY
<b>Surgery duration (minutes)</b>	
≤20	5 (14.29%)
21 - 40	18 (51.42%)
>40	12 (34.29%)
<b>Hospitalization duration (hours)</b>	
24	35 (100%)
<b>Complications</b>	
No	33 (94.29%)
Yes	2 (5.71%)
<b>VAS score for pain during procedure</b>	
1	33 (94.29%)
2	2 (5.71%)
<b>Postoperative semen analysis</b>	
Normal	20 (57.14%)
Azoospermia	5 (14.29%)
Oligoasthenozoospermia	3 (8.57%)
Oligoasthenoteratozoospermia	9 (25.71%)
Oligospermia	3 (8.57%)
Oligoteratozoospermia	1 (2.86%)
<b>Outcomes of patients with infertility (n = 21)</b>	
Improvement in sperm quality	15 (71.43%)
Pregnancy	9 (42.86%)
<b>Outcomes of patients with testicular pain (n = 14)</b>	
Complete resolution of pain	14 (100%)

this surgical procedure at the *Centre medico-chirurgicale d'urologie* in Douala, Cameroon. The mean age of our study participants was  $36.11 \pm 8.45$  years, which is different from the  $25.97 \pm 5.7$  years reported by Hosseini *et al.* in 2020. This difference could be due to the fact that carried out a comparison of three different surgical techniques whereas we studied only one technique [17]. This mean age is similar to the  $36.3 \pm 7.6$  years reported by ElBardisi *et al.* in Qatar in 2017 [18]. The mean BMI of our study participants was  $27.34 \pm 3.73$  years, which is similar to the  $21.66 \pm 3.21$  kg/m<sup>2</sup> reported by Bae *et al.* in 2014 [19]. In our study, varicoceles were unilateral in 12 (34.29%) patients and bilateral in 23 (65.71%) patients, which is different from the 46.43% and 53.57% reported for unilateral and bilateral varicoceles, respectively, reported by Besiroglu *et al.* in

2019 [20]. This difference is probably due to the fact that Besiroglu *et al.* recruited 224 participants in their study while we had only 35 participants in ours. Yigal *et al.* reported that 80.7% of the varicoceles they found in their prospective study were bilateral ones [21], which is in line with our findings and further attests to the fact that varicoceles are essentially bilateral. The most common grade of varicocele we found in our study was grade 2, which was encountered in 37 (63.79%) participants. ElBardisi *et al.* [18] and Besiroglu *et al.* [20] also identified grade 2 as the most common grade in their respective studies. This is probably because grade 1 varicoceles are subclinical and can only be palpated when the Valsalva maneuver is performed. As such, patients may not realize that it is a problem until it has progressed to at least stage 2 when it can be palpated without this maneuver. In our context, many patients do not see it as a problem even when it has progressed to grade 2 and only get to realize it when they are investigating their infertility, as can be seen in our study where 60% of cases were diagnosed when the patients had infertility as their presenting complaint. Guo *et al.* reported that up to 30% of all men that were consulted for infertility had varicoceles [22], while Valentino *et al.* reported that 40% of males with infertility had varicoceles [23]. This highlights the fact that the condition is, indeed, a major public health problem and that early diagnosis and management are of paramount importance. Twenty-three (65.71%) of our study participants had testicular atrophy, which is a finding that has long been associated with varicocele [24]. This finding attests to the fact that the condition is usually not diagnosed early enough in our context and more work needs to be done to ensure early diagnosis and treatment. The median duration of laparoscopic varicocelectomy in our study was 37 [27 - 44] minutes. This is a bit longer than the mean surgery duration reported by Söylemez *et al.* in 2012, which was  $35.8 \pm 9.5$  minutes [25]. In a comparative study, Shamsa *et al.* reported that the mean operative times were  $30.0 \pm 5.5$  minutes for laparoscopies,  $27.0 \pm 3.5$  minutes for open varicocelectomies under general anesthesia, and  $38.0 \pm 1.8$  minutes for open varicocelectomies under local anesthesia [26]. Our mean surgery duration is probably higher because this was our initial experience and we were operating on patients who were generally diagnosed late. In our study, no complication was reported after laparoscopic varicocelectomy in 33 (94.29%) participants, while 2 (5.71%) participants reported hydrocele as a postoperative complication. This finding is similar to those of a study by Franco in 2004, who reported that this procedure is usually associated with minimal postoperative complications, with hydrocele being the main one [27]. Generally, laparoscopic varicocelectomy is an intervention that is usually not associated with a high rate of postoperative complications. All the patients in our study were hospitalized for just 24 hours, which is in line with the report by Chen in 2016 that says all patients that underwent this procedure were discharged on the same day [28].

There was a complete postoperative resolution of testicular pain in all the participants of our study who presented with that symptom. This is in line with the findings of Maghraby in 2002, who reported complete postoperative pain resolu-



tion in 84.5% of his study participants [29]. Kachrilas *et al.* also reported a significant improvement in the VAS scores of 87.5% of their study participants after laparoscopic varicocelectomy in 2014 [30]. In this study, we recorded an improvement in semen quality in 15 (71.43%) participants, with 9 (42.86%) participants impregnating their spouses by the end of the follow-up period. Similar results were reported by Chen in 2016, in which 80% of study participants experienced improvements in sperm quality and 45% of their wives got pregnant [28]. In 2001, Tulloch also reported an improvement in semen quality in 86.67% of his study participants after varicocelectomy [31]. This indicates that a well-performed varicocelectomy goes a long way to resolve the problem of male infertility.

However, our study had a few limitations. First, the retrospective study design we used meant that there was some recall bias. Also, the spouses of the patients who consulted for infertility were not investigated, which means that we could not say for sure if the men were indeed the partners with the infertility issue in such couples. Furthermore, in such resource-limited settings as ours, laparoscopic procedures are costly and cannot be afforded by the vast majority of the population, which explains why our study sample was small.

## 5. Conclusion

Laparoscopic varicocelectomy is an efficient, mini-invasive, comfortable, and brief surgical procedure that is capable of addressing the two main issues associated with varicoceles, which are testicular pain and infertility. This technique also has the advantages of being almost painless, being associated with minimal postoperative complications, and requiring no more than 24 hours of postoperative hospitalization.

## Acknowledgements

The authors thank Health Search Association for their contribution to this work.

## Conflicts of Interest

The authors have no conflicting interests to declare.

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