Laparoscopic Varicocelectomy Carried Out with the LigaSure Device in 52 Patients

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Key Words

Laparoscope • Varicocelectomy • LigaSure

Abstract

We describe the effective use of the bipolar vessel-sealing device: LigaSure for the division of the internal spermatic vessels in a laparoscopic varicocelectomy. A total of 52 males with varicocele (left-side $n = 49$, and bilateral $n = 3$) were included in this study. Blunt dissection was used to isolate the packet of spermatic vessels. The packet of spermatic vessels was divided using a bipolar diathermy system, the LigaSure Precise. It was clear that the operative time was significantly reduced compared to the method using clips, which was done before the development of this kind of device. In another experiment to examine the effect of vessel sealing, it was confirmed that the LigaSure has performance comparable to the clips. Despite the result that the Harmonic scalpel was less effective in vessel sealing, our study found it difficult to determine which is superior, LigaSure or clips, in terms of operative time, relapse rate and complication.

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Introduction

Varicocele is the abnormal tortuosity and dilatation of the testicular vein within the spermatic cord. The incidence of varicocele is approximately 16% in the normal adult population [1, 2]. Although the exact relationship between varicocele and impaired spermatogenesis is not clear, about 40% of males who present to infertility clinic have a varicocele. Correction of the varicocele improves the semen parameter in over half of the men. With the advent of modern endoscopic surgery, the technique of laparoscopic varicocelectomy has progressively improved [3]. We describe the effective use of a bipolar vessel-sealing device: LigaSure for the division of the internal spermatic vessels in a laparoscopic varicocelectomy.

Patients and Methods

A total of 52 males with varicocele (left-side $n = 49$, and bilateral $n = 3$) were included in this study. Their age range was 13–74 years (mean 34.6 years). Forty patients presented with primary or secondary infertility and 12 patients presented with scrotal discomfort. According to Dubin and Amerlar's system, varicoceles were divided into 30 in grade I (57.7%), 15 in grade II (28.8%), and 7 in grade III (13.5%) (table 1).

The technique utilized 3 laparoscopic ports and was fully described in a previous report. Briefly, the patient emptied his bladder by puncture before surgery. The patient was in a head down position at about 10 degree. A 5-mm subumbilical trocar was inserted by open laparotomy, and the abdominal cavity was insufflated by CO₂ to a maximum of 15 mmHg. The other two 5-

Table 1. Parameters of the 52 cases

Parameter	
Age (year)	13–74 (mean 34.6)
Side	
Left	n = 49
Bilateral	n = 3
Symptom	
Infertility	n = 40
Discomfort	n = 12
Grade (%)	
I	n = 30 (57.7%)
II	n = 15 (28.8%)
III	n = 7 (13.5%)
Complications (%)	
Hydrocele formation	n = 4 (7.7%)
Recurrence of varicocele	n = 2 (3.8%)
Testicular atrophy	0

mm ports were placed in the right and left lower quadrants under laparoscopic vision. The peritoneum overlying the internal spermatic vessels was longitudinally incised about 2–3 cm superior to the internal ring over a distance of about 3 cm. Blunt dissection was used to isolate the packet of spermatic vessels. The packet of spermatic vessels was divided using a bipolar diathermy system, the LigaSure Precise (Valleylab, Boulder, CO). At the end of the procedure the fascia at the 5-mm ports and the skin were sutured with silk. All patients were examined 6 weeks postoperatively for any postoperative complications, symptomatology, testicular size, and presence of hydrocele.

Results

All procedures were completed endoscopically. Mean operation time was 43.5 min (range 23–68 min). There were no intra-abdominal visceral or vascular complications, and no postoperative analgesia was required.

There was no postoperative change in the testicular volume in any of the patients. However, hydrocele formation was detected in 4 (7.7%) patients and recurrence in 2 (3.8%) (table 1).

Discussion

The LigaSure device has been demonstrated to be safe in numerous articles. One of the first published studies

illustrating the safety of the LigaSure device was in 2002 in a laparoscopic splenectomy [4]. The study demonstrated the increased safety of the operation when compared to those done using conventional knot tying techniques. Similarly, multiple studies of the Harmonic scalpel have been shown to be safe and to minimize blood loss in various surgeries such as vaginal hysterectomies and laparoscopic nephrectomies [5].

Developments in surgical instruments have advanced dramatically during recent years. Various instruments such as vessel sealing systems LigaSure, the ultrasonically activated scalpel, and the Hemoclip are used in many surgical manipulations such as hemostatic cuts [6–8]. They are also used not only in open surgical procedures but also in endoscopic surgery. Each instrument has its own character. LigaSure has the following advantages: it can be used in deep locations with safety and ease; it does not require vessels to be exteriorized during sealing; it is convenient to use when it is difficult to make a space between 2 vessels; and it is easy to use [4, 5, 8]. We have been using the Harmonic scalpel, an ultrasonically activated scalpel, in the operation which has the following advantages: it can be used in low temperatures, it causes less tissue damage, and because the electric current does not travel to both patient and operator there is less possibility the electrocardiogram will be affected, and coagulation and cutting in a narrow and deep operative field can be accomplished at one time. There is also an advantage that clips can be left in the body in these methods.

As for clinical effect, a comparative examination was made between LigaSure surgery and laparoscope-assisted surgery so far performed using the harmonic scalpel at this department, for operative duration, complications and recurrence rate [6]. Both are the same in surgical techniques but for vascular manipulation, with surgeries using the harmonic scalpel, there were no instances that led to laparotomy, average operative duration being 37 minutes, and there were no recurrences, and edema development was seen in only 2 cases after surgery. Generally, the harmonic scalpel surgery has shorter operative time and has fewer complications [6]. Despite the occasional reports that say LigaSure surgery is better in vascular sealing, 2 cases of recurrence were observed, but this is considered due to collateral circulation. Recurrence is the most common complication after varicocelectomy. Persistent or missed small collateral veins at the time of ligation are considered to be the main cause of recurrence after varicocelectomy.

Also, more cases of hydrocele testis after surgery were seen in LigaSure surgery, but this may be due to in-

involvement of causes not directly associated with the surgery, such as lymph flow in the underdeveloped scrotum [2, 3, 6]. Hydrocele formation is the second most common complication after varicocelectomy and has been reported to have a rate of up to 39% [6]. The testicular lymphatic system consists of 2 plexuses, the deep plexus that drains the substance of the testis and epididymis and the superficial plexus that commence beneath and drains the tunica vaginalis. These lymphatic trunks ascend to collect in the spermatic cord accompanying the testicular vessels to end in lateral aortic lymph nodes. Postoperative hydrocele occurs in a minority of cases in which the testicular lymphatics are ligated by means of Palomo procedure [3]. Palomo varicocelectomy is a popular method, which involves ligation of the internal spermatic veins together with the testicular artery [7]. This method results in a significant decrease in the operative failure rate compared with the artery-sparing procedures, with no increase in the incidence of testicular atrophy.

The LigaSure vessel sealing device utilizes both electrical energy and pressure to liquefy and reform the collagen and elastin in vessel walls and tissue up to 7

mm in diameter to provide hemostasis [4]. The device has incorporated a feedback control that automatically stops further energy transmission once a seal has been achieved [10, 11]. In contrast, the Harmonic scalpel uses ultrasound technology to denature proteins in vessel walls and tissues up to 5mm thick leading to coagulation [12–15]. Unlike the LigaSure, the Harmonic scalpel is also able to cut through tissue as it coagulates.

Furthermore, it is clear that the operative time is significantly reduced compared to the method using clips, which was done before the development of this kind of device. In the other experiment to examine the effect of vessel sealing, it was confirmed that the LigaSure has performance comparable to the clips. The harmonic scalpel tended to be less effective. Despite the result that the Harmonic scalpel was less effective in vessel sealing, our study found it difficult to determine which is superior, LigaSure or clips, in terms of operative time, relapse rate and complication. In conclusion, LigaSure might be more effective in larger operations such as nephrectomy or total prostatectomy, in urology.

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