Microlaparoscopic varicocelectomy.

EDUARDO SÁNCHEZ DE BADAJOZ and ADOLFO JIMÉNEZ GARRIDO.

Urological Teaching Unit, Department of Surgery, Faculty of Medicine, University of Malaga, Spain.

Summary. OBJECTIVES: To review the development of laparoscopic varicocelectomy from our initial description in 1986 based in the first pioneering works of K. Semm and to describe our latest microlaparoscopic technique that uses 3 mm instruments.

METHODS: We use 3 mm reusable trocars with a specially designed telescope and instruments. One port is in the umbilicus the others are in the flanks at this level. Spermatic vessels are identified by firm traction of the testicle. The peritoneum is incised transversally at this level to dissect and ligate the two or three veins usually found here. To shorten operation time and improve results the vascular bundle is ligated en-bloc and when it is bulky, we divide it into two smaller bundles before tying the knot.

RESULTS: Field of vision and image brightness is adequate and allows the operator to suture with great precision and ease. Large angular movements of the 3 mm telescope should be made with its trocar. Image brightness depends on the proximity of the lens to the structure being inspected; it worsens when the lens is withdrawn even slightly. Reusable 3 mm instruments can be used hundreds of times and with care they have sufficient strength to permit tying tight even en-bloc ligatures of vascular bundles. Operating times are between 20 and 25 minutes, bilateral operations need about 10 minutes more. Wounds made by the 3 mm trocars are usually self-closing and rarely need a stitch.

CONCLUSIONS: Many authors confirm that since we first described the technique 15 years ago laparoscopic varicocelectomy is a safe, quick and easy minimal invasive procedure, less expensive than open techniques or occlusion under radiological control. The Palomo retroperitoneal approach using en-bloc ligatures of the vascular pedicle laparoscopically shortens operative times, the percentage of failures is minimum and postoperative testicular volumes and sperm counts increase. The microlaparoscopic technique not only reduces surgical aggression, but also the risk of complications is less and it does not increase operative difficulty or operation time.

Keywords: Varicocele. Varicocelectomy. Laparoscopic. Laparoscopy. Microlaparoscopy. Infertility.

Address correspondence to
Eduardo Sánchez de Badajoz
C/ Strachan, 4 - 2º
29015 Málaga.
España.
e-mail: edusaba@arrakis.es
te lo ligamos en bloque y cuando es voluminoso lo dividimos en dos mitades antes de ligarlo.

RESULTADOS: El campo de visión y la luminosidad es adecuada y permite al cirujano trabajar con gran precisión. Si hay que realizar grandes movimientos angulares con la óptica de 3 mm es recomendable hacerlos sujetando simultáneamente el trocar para no doblar la óptica. La luminosidad del campo de trabajo depende de la proximidad de la óptica, ya que el campo se oscurece en cuanto nos separamos aunque sea ligeramente. Los instrumentos reutilizables de 3 mm pueden usarse cientos de veces y manejados adecuadamente tienen fuerza suficiente para hacer ligaduras incluso en bloque de los vasos espermáticos. El tiempo operatorio oscila entre 20 y 25 minutos, en casos bilaterales hacen falta unos 10 minutos más. Las heridas que dejan estos trócares normalmente se cierran solas y rara vez requieren un punto.

CONCLUSIONES: Desde nuestra descripción inicial de la técnica hace 15 años hay muchos autores han confirmado que la varicocelectomía laparoscópica es un procedimiento seguro, rápido, fácil y mínimamente invasivo, además es más barato que la cirugía abierta o que la oclusión radiológica. El abordaje retroperitoneal de Palomo utilizando ligaduras en bloque, vía laparoscópica, acorta el tiempo operatorio, la incidencia de fracasos es mínima y el volumen testicular y la calidad del esperma mejoran. La técnica microlaparoscópica no sólo reduce la agresión operatoria, sino que el riesgo de complicaciones es menor y no aumenta la dificultad o el tiempo operatorio.


INTRODUCTION

Nearly 20 years ago the gynecologist K. Semm opened for us the gate to the new field of laparoscopic surgery. His pioneering works published at the beginning of the eighties describe in detail the forerunners of the forceps, scissors, needle-holders, and trocars that we use today. He developed the techniques of endoligation and endosuture and even developed the first CO₂ pneumoinsuflator. At this time he carried out salpingolyses, extirpation of ovarian cysts, ovariectomies, anexectomies, enucleation of myomas, resolution of ectopic pregnancies and even hysterectomies. Because in those days there were no surgical video cameras he carried out these procedures by direct vision. Looking back, it is almost unbelievable, and not a little shameful, that surgeons of other specialties showed no interest in the then new laparoscopic surgery and its potential. In consequence, its benefits were ignored so that, for some time, only a few informed and creative gynecologists accumulated experience with the technique that revealed for everyone to see its versatility and potential for other surgical applications (14).

At the end of the eighties, some ten years after the pioneering works of Semm laparoscopic cholecystectomy was described that stimulated enormous interest among general surgeons, yet, curiously, urologist appear to have remained mere spectators on the sidelines of this new field of play until 1992, when reports of the first laparoscopic lymphadenectomies and nephrectomies were published. Nevertheless, the initial enthusiasm of the urologists for laparoscopic surgery lasted only a short time; the small amount of literature in the journals of the next two years suggests that most of them had forgotten it. The excuse for not continuing with the new technique was that the retroperitoneum was inaccessible and that at that time there was not a standard technique like cholecystectomy to give them confidence. This apparent disinterest in laparoscopy by urologists lasted until the beginning of the new millennium by which time the undeniable advantages of laparoscopy had been widely demonstrated by the development of new standard techniques that were unimaginable only two years before; prostatectomy for example.

In 1986, our enthusiasm for the works of Semm stimulated us to develop and describe laparoscopic varicocelectomy in which we introduced air into the peritoneum manually with a rubber bulb before introducing a Jacob-Palmer operating laparoscope, a 10 mm diameter bayonet-like instrument similar to a nephroscope. Under direct vision we then inserted scissors through the laparoscope to approach, dissect and coagulate the spermatic veins (10). In a later stage of development we added another trocar of 5mm in the left iliac fossa through which we introduced a new instrument that helped us dissect the dilated veins (11, 12). In 1992, experience led us to modify the technique again and instead of coagulating the spermatic veins
we applied clips. Now we needed three trocars, one of 10 mm in the umbilicus, another 10 mm trocar in the right flank, and a 5mm trocar in the left flank (13).

In this article we describe our latest technique and discuss the published experiences of more than 100 different authors. We also offer a comparative study of other treatment options for this condition.

MATERIAL AND METHODS

As we have described in other publications, the patient is placed in the lithotomy and Trendelenburg position. The trolley with the monitor and other instruments is placed between the patient's feet. The surgeon stands to the patient's right side and the assistant to the left.

The first 3 mm reusable trocar, for the telescope, is introduced through the umbilicus (Fig. 1). At the level of the umbilicus on both flanks two other 3 mm reusable trocars are introduced (Fig. 2). Firm traction of the testicle helps identify the spermatic vessels, particularly in obese patients. Our procedure is then to incise the peritoneum transversally at the level of the vessels and to dissect and ligate the two or three veins usually found at this level (3). Currently we ligate the vascular bundle en-bloc because there is sufficient evidence that this greatly simplifies the procedure, shortens operation times and improves results. (4, 8, 16). However, when the bundle is bulky, we prefer, for safety, to divide it into two smaller bundles before we tie the knot.

RESULTS

The 3 mm telescopes were specially designed for microlaparoscopy, their field of vision and image brightness is adequate and allows the operator to suture with great precision and ease. However it is most important to recognize the delicate nature of these telescopes and avoid excessive angular movements that could easily bend the telescope at the fulcrum. When large angular excursions are needed they should be made manually manipulating the telescope trocar with the telescope well supported within it. Satisfactory image brightness depends on

Fig. 1: The trocar for the 3 mm telescope is introduced through the umbilicus. Two more trocars for the instruments are introduced through the flanks.

Fig. 2: The patient is in the lithotomy and Trendelenburg position. The surgeon stand on the right side of the patient and the assistant holding the camera on the left.
the nearness of the telescope lens to the structure being inspected, it deteriorates when the lens is withdrawn even slightly.

Properly used and maintained, the instruments and trocars can be used hundreds of times and with care they are strong enough to tighten and tie even en-bloc ligatures of vascular bundles.

In practice, operating times with the microlaparoscopic technique, are between 20 and 25 minutes, little different from those of conventional laparoscopy; bilateral operations usually need about 10 minutes more. At this point we should mention that the wounds left by the 3 mm trocars are usually self-closing and rarely need a stitch.

DISCUSSION

If a new technique is to be considered superior to existing techniques it must give similar or better results with less risk and also, preferably, permit lower treatment costs. We find that varicocelectomy offers a considerable improvement of several objective criteria and the operating times of a surgeon experienced in the technique are less than those he would need to carry out other treatments for the condition. More than 100 published works by different authors confirm that the incidence of complications is less than that of other surgical treatments (1, 6, 8, 9, 17).

The great advantage of the Palomo retroperitoneal approach is that at this level there is only one artery and, at most, only three or four veins. The lower the surgeon approaches the spermatic cord, the more veins there are: at the upper end of the inguinal canal, there are eight or nine, two or three of which are spermatic and two or three cremasteric, plus two or three deferential veins. At the caudal extreme there is a veritable tangle of branched veins and arteries, lymphatics and nerves not found at the retroperitoneal level. This complexity of vessels increases the lower one goes and makes ligation of the veins in their subinguinal portions much more hard work because there can be as many as 20 vessels to ligate. Many failures of varicocelectomy in the past were due to the presence of the periaerial venous plexuses that communicate with larger caliber veins and when these were left intact they later dilated and the varicocele recurred (2). Microsurgeons experienced in reimplanting limbs find it much more difficult to identify and anastomose a spermatic artery than, say, a digital artery.

In 1984, we began to carry out testicular autotransplants one of the most difficult and laborious microsurgical procedures. Testicular transplants are rarely attempted nowadays because it is very difficult to identify the spermatic artery and, perhaps, this same difficulty might lead to subinguinal microsurgical treatment of varicocele being little used (15).

However, another great advantage of the Palomo approach is that at the intraabdominal level the spermatic artery is still unbranched and so it is easier to identify, dissect and keep intact. It can also be ligated here and no one has reported that this later decreases the postoperative testicular volume or adversely affects fertility. In other words, retroperitoneal ligation of the spermatic artery has no functional consequences even though testicular atrophy often occurs after inadvertent damage to the artery within or below the inguinal canal (4, 16).

Open surgery to treat retroperitoneal varicocele needs a 10 to 12cm incision. On the other hand, if the incision is made over the inguinal canal, or in the scrotal region, while the incision can be smaller, the reported recurrences range from 10 to 45% and the procedure is associated with the risk of a spermatic artery lesion that causes testicular atrophy, hematoma, epididymitis, or sometimes postoperative wound infection (2). Because of this we suggest that conventional open varicocelectomy should only be used for those patients for whom laparoscopy is contraindicated, such as those who have had previous pelvic surgery.

Today, laparoscopic varicocelectomies are generally day-surgery. On the other hand, open retroperitoneal surgery leaves the patient prostrate in bed for nearly a week and inguinal surgery needs some three or four days of bed rest. The supporters of the open subinguinal approach acknowledge that a surgeon experienced in the technique requires almost one hour and that there is always the risk of leaving some periarterial venous plexus intact or of causing testicular atrophy by inadvertently ligating some artery (2). Any type of bilateral open surgery doubles operation times and surgical aggression and when carried out on pediatric or adolescent patients local anesthesia is usually impracticable and general anesthesia is advisable.
Percutaneous occlusion, whether anterograde or retrograde, is inadequate for the following reasons. In some 15 to 20% of patients the procedure fails because the operator cannot reach the spermatic vein. The mean operating time is almost one hour. There is risk of seriously injuring arterial or venous vessels. There is risk of thrombophlebitis. The occlusor device may displace and migrate with serious consequences. The patient may suffer postoperative flank pain. There is the risk of allergic reaction to the contrast medium plus the radiation risk associated with the radiological exploration. It is a costly procedure because all the materials that may be used, either stents, coils or detachable balloons, are expensive (2). Lastly, but not least, the technique is not carried out by urologists, but by radiologists.

The laparoscopic approach has been criticized for being expensive, however, if reusable materials are used, the costs may be less than those of open surgery and just one silk suture serves for all the ligations (7). As for the allegations that the procedure is dangerous we would like to point out that during the last ten years the leading journals of the world contain more articles about laparoscopic varicocelectomy than any other surgical technique and the authors demonstrate abundantly that the operation carries less risk than other treatments for the condition (1, 6, 8, 9, 17).

Post-operative surveys of patients demonstrate their satisfaction with the unsuspected little postoperative discomfort; little or no need for analgesics; less need for postoperative antibiotic cover; short hospital stay; minimal scarring; and, at follow-up, their evident pleasure with the satisfactory long-term results.

CONCLUSIONS

Since we first described the technique 15 years ago, numerous published works by other authors who report results after long follow-up times confirm that laparoscopic varicocelectomy is a safe, quick and easy minimally invasive procedure that is less expensive than open techniques or occlusion under radiological control.

The Palomo retroperitoneal approach using en-bloc ligatures of the vascular pedicle by laparoscopy shortens operatory times, percentage of failures are minimal and postoperative testicular volumes and sperm counts increase.

Microlaparoscopic technique reduces surgical aggression, the risk of complications is less and do not increase the operative difficulty or operation times because the 3 mm telescopes give an acceptable field of vision. Our good experience with the microlaparoscopic technique detailed in this communication serves as another example of how a method originally conceived as a diagnostic procedure may later become a minimally invasive surgical treatment with much potential for other surgical applications.

REFERENCES AND RECOMMENDED READING (*of special interest, **of outstanding interest)