



Brazilian Journal of Videoendoscopic Surgery

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Veres, Verres, Veress, or Verress?

MARCO AURELIO PINHO DE OLIVEIRA

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Over decades, laparoscopy, as with other areas of medicine, has accumulated a growing number of specific names and terms that are cited in scientific literature. All too often these names or terms are misspelled in presentations and manuscripts. Perhaps one of the most cited names in the literature related to diagnostic and surgical laparoscopy is that of János Veres. He developed a CO₂ insufflation needle that bears his name, one of the most popular instruments in laparoscopy. Despite his prominence in the field – or perhaps because of it – his name is written incorrectly most of the time, often as Verres or Veress, less frequently as Verress.

In 2004, Szabó and László, both Hungarians, published an article in the American Journal of Obstetrics and Gynecology commemorating Veres' 100th birthday.¹ We adapt part of this text, which follows.

Because his original studies were published in Hungarian and German, his contribution received little attention in the global literature.^{2,3} János Veres was born in 1903 in Kismajtény, a small village in Hungary. Son of a train engineer, he was sent to Debrecen, where he received his medical education. He completed medical school in 1927 and, after training in internal medicine, became the chief of Department of Pulmonology and Internal Medicine of the Kapuvár Hospital in Debrecen.

The treatment for tuberculosis at that time involved the establishment of an artificial pneumothorax. This was done with a conventional needle that frequently caused trauma to the lung parenchyma. Dr. Veres invented a new instrument: an 8 to 15 cm needle with an internal automatic protection system (Figure 1). Upon loss of resistance after the entry into a cavity (pleura), the inner part of

the needle is designed to pop out automatically, preventing trauma to the underlying lung parenchyma.

In 1936, after more than 900 successful procedures with his new instrument – known as the “Veres’ needle” – he published his series in the Hungarian literature² and two years later in the German literature.³ However, it was only in the 1970s, with its wide use in laparoscopy is that the needle began to be better appreciated.

Dr. Veres served in the Army during the 2nd World War and in 1955 moved to Budapest, where he worked until retiring in 1973. He died of heart failure in 1979 at 76 years of age.

Recognizing the importance of his contributions, the Hungarian Society of Gynecologic Endoscopy established “Veres Medal” for outstanding physicians in the field of gynecologic endoscopy.

We hope this editorial will help reduce the misspellings of the name of this great inventor. János Veres deserves at least this.

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Veres, Verres, Veress ou Verress?

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A laparoscopia, assim como outras áreas, possui uma série de nomes e termos específicos que são citados na literatura científica ao longo das décadas. Não raras vezes esses nomes ou termos vão sendo grafados incorretamente nas apresentações e nos manuscritos. Talvez um dos nomes mais citados na literatura relacionada à laparoscopia diagnóstica e cirúrgica seja o de János Veres. Ele desenvolveu uma agulha de insuflação de CO₂ que leva seu nome, um dos instrumentais mais populares na laparoscopia. Apesar desses fatos, o seu nome é escrito erroneamente na maioria das vezes (especialmente Verres ou Veress, menos frequentemente Verress).

Em 2004, Szabó e László, ambos Húngaros, publicaram um artigo no *American Journal of Obstetrics and Gynecology*, in memoriam do 100º ano do aniversário de Veres¹. Adaptamos parte deste texto, que se encontra a seguir.

Devido aos seus estudos originais terem sido em Húngaro e Alemão, existe pouca divulgação na literatura mundial sobre a sua contribuição^{2,3}. János Veres nasceu em 1903 em Kismajtény, um pequeno vilarejo na Hungria. Filho de um maquinista de trem, ele foi enviado para Debrecen, onde recebeu sua educação médica. Ele concluiu o curso em 1927 e, após seu treinamento em medicina interna, ele se tornou o chefe do departamento de Pneumologia e Medicina Interna do Hospital Kapuvár, em Debrecen.

O tratamento para tuberculose naquela época envolvia o estabelecimento de um pneumotórax artificial. Isso era feito com uma agulha convencional que causava trauma para o parênquima pulmonar. Dr. Veres inventou um novo instrumento: uma agulha de 8 a 15 cm com um sistema interno automático de proteção (Figura 1). Com a perda da resistência após a entrada em um espaço oco (pleura), a parte interna da agulha é projetada para automaticamente para fora,

prevenindo o trauma ao parênquima subjacente (pulmão).

Em 1936, após mais de 900 procedimentos exitosos com seu novo instrumental, conhecido como “agulha de Veres”, ele publicou sua casuística na literatura Húngara² e dois anos depois na literatura Alemã³. Porém, apenas na década de 70, com o amplo uso na laparoscopia é que a agulha começou a ser mais bem apreciada.

Dr. Veres serviu no exército durante a 2ª guerra mundial e em 1955 se mudou para Budapeste, onde trabalhou até se aposentar em 1973. Ele faleceu de insuficiência cardíaca em 1979, aos 76 anos de idade.

Reconhecendo a importância de Veres, a Sociedade Húngara de Endoscopia Ginecológica estabeleceu a “Medalha Veres” para os médicos de destaque no campo da endoscopia ginecológica.

Esperamos que esse editorial possa ajudar a corrigir o erro de escrita do nome deste grande inventor. János **Veres** merece.

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Modification of Hasson's Technique to Establish the Pneumoperitoneum Used in Laparoscopic Surgery

Modificação da Técnica de Hasson para a Realização do Pnemoperitônio em Laparoscopia

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ABSTRACT

Laparoscopy cholecystectomy is now the technique of choice for gallbladder removal. This technique requires a pneumoperitoneum to allow visualization of the intra-abdominal organs. The safest technique is that described by Hasson, in which the abdominal cavity is opened before the insertion of the trocar and the insufflation to create the pneumoperitoneum. We described a variant of Hasson's technique, that is safe, fast and technically easy to perform.

Key words: Pneumoperitoneum, Hasson's technique, Laparoscopy.

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INTRODUCTION

Laparoscopic surgery was the great advance in surgery at the end of the 20th century. Today laparoscopy is considered the gold standard for performing cholecystectomy, fundoplicature, and treatment of pelviperitonitis in women. Some centers of excellence have extended this concept to dozens of other procedures. Initially, only the easiest cases were feasible by laparoscopy.^{3,9,13} Previous surgery, obesity, acute cholecystitis, were among the many contraindications. During the first decade of laparoscopic surgery, especially during the learning curve, there were many complications. Let's stick to those related to the use of the Veres needle and the introduction of the first trocar. Perforations of viscera and blood vessels are the most feared, but extraperitoneal insufflation, although minor, is annoying.^{2,4,14}

The introduction of the first trocar, without the use of the Veres needle, through a small incision into the peritoneal cavity, described by Hasson was an advance in laparoscopy.⁵ We describe a variation of the Hasson technique, that is safe, fast and technically accessible to beginners and requires no special instruments.

DESCRIPTION OF THE TECHNIQUE

The creation of the pneumoperitoneum offers a mortality risk greater than 0.2%, and the injuries caused during its creation are responsible for 50% of the complications of laparoscopy.^{11,12} Two randomized trials showed no differences in surgical time between the open (Hasson) or closed (Veres needle puncture) technique.^{1,15} Complications are more frequent in the closed than in the open technique.¹⁰ In a study by YERDEL and cols., with 1500 patients undergoing laparoscopic cholecystectomy, the injury rates was 14% with the Veres needle technique versus 0.9% with the open technique.¹⁶

In the Hasson technique an incision is made in the periumbilical skin and, with dissecting forceps, is advanced the subcutaneous fat. Hemostasis is done when necessary. An opening in the anterior fascia is made and repair sutures are placed at the edges of the fascia. The sutures are used for fixation of the trocar, preventing its movement and the escape of gas. The preperitoneal fat is dissected and using a Kelly clamp the peritoneum is raised to make the incision. The index

finger is introduced into the cavity to check for adhesions or omentum blocking the tunnel created. Finally we introduce the Hasson trocar and attach to it the repair sutures of the anterior fascia. Next the cavity is insufflated with CO₂.^{5, 6,7,8,13}

In our modification of the Hasson technique, the periumbilical skin is incised (Figure 1) and the subcutaneous fat is dissected the same way as in the original technique (Figure 2). When we reach the anterior fascia and linea alba, we use two Backhaus clamps, proximal and distal to the site chosen for the incision in the linea alba. With upward traction on the Backhaus clamps the incision is made (Figure 3 and 4). After incision of the linea alba and peritoneum, with the upward traction maintained the trocar is inserted (Figure 5). Sometimes, for greater safety we use a retractable trocar with the first puncture. If there is a movement of the trocar and gas escapes, another Backhaus can be used clamp one of the sides of the incision closing any spare space.

DISCUSSION

The laparoscopic technique is now the technique of choice for various abdominal surgeries. Initially performed in France by Mouret, DuBois and Perissat in the late 1980s, is now accepted and performed throughout the world. In laparoscopic surgery a pneumoperitoneum needs to be established to create a real space in the peritoneal cavity so that the surgery can be performed.

There are two techniques for establishing the pneumoperitoneum. The first is with a Veres needle. In this technique, the Veres needle, manufactured specifically for the creation of pneumoperitoneum, is inserted through the abdominal wall after stabilization of the skin with forceps. After penetration into the cavity a permeability test is performed and the abdomen is inflated. Only then is an incision made in the abdominal wall and the trocar introduced. The second way to establish the pneumoperitoneum is through incision of all layers of the abdominal wall until the visualization of the abdominal cavity, as described by Hasson. Today this technique is performed introducing a specially designed trocar (Hasson trocar).

During the learning curve, complications are frequent during the process of establishing the pneumoperitoneum. With the closed technique,

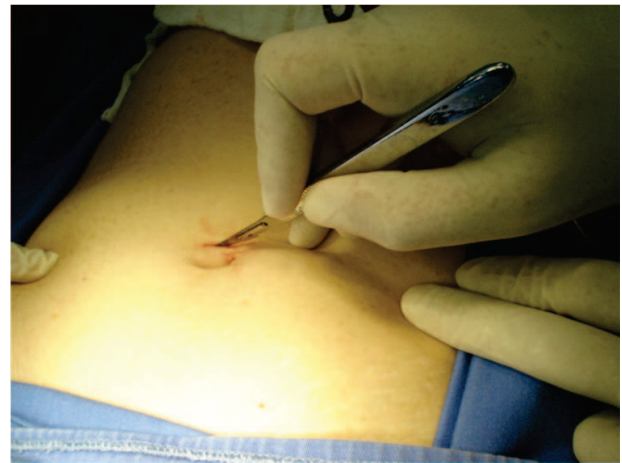


Figure 1

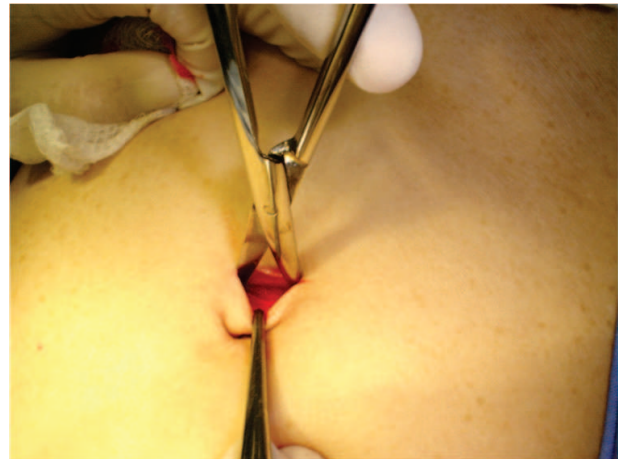
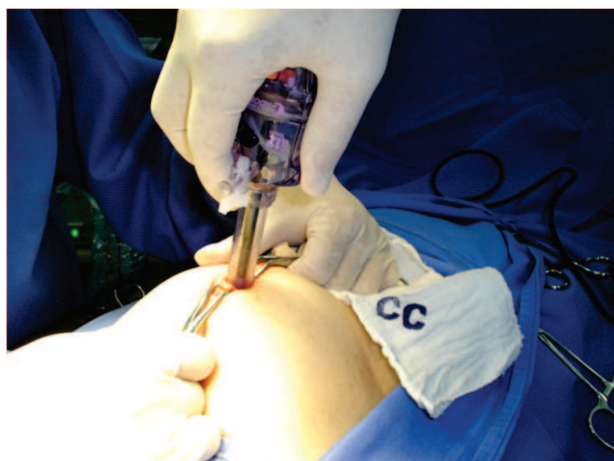


Figure 2



Figure 3

complications of the insertion of the Veres needle that have been reported include perforation of loops of bowel, perforation of intra-abdominal vessels, and insufflation of air into the pre-peritoneal tissue or in

*Figure 4**Figure 5*

the round ligament. The first two can result in serious and even fatal complications if not identified. The inadvertent insufflation of air hampers the introduction of the trocar and, once it is introduced, diminishes the field of view.

These complications can be more common if the patient has had previous surgery which may increase intra-abdominal adhesions, increasing the risk of perforating viscera.

The Hasson technique seeks to reduce the possibility that these complications occur. In some countries the Hasson technique has been adopted in order to decrease these complications. Therefore injuries caused by closed techniques may be subject to more severe sanctions if litigated.

We have used this technique for several years. Besides being easy to perform, it is rapid, safe, inexpensive (because we do not use the Hasson trocar) with low complication rates. Furthermore, it is quickly learned.

CONCLUSIONS

We present a modification of the Hasson technique for the introduction of the first trocar and the insufflation of the peritoneal cavity in laparoscopic surgery. The technique presented is easy to learn, fast, economical, and does not need special clamps or trocars; moreover it avoids complications frequently described in this stage/phase of laparoscopy.

RESUMO

Colecistectomia laparoscópica é hoje a técnica de eleição para a retirada da vesícula biliar. Essa técnica exige pneumoperitônio para a visão dos órgãos intra-abdominais. A técnica mais segura é a descrita por Hasson, na qual a cavidade peritoneal é aberta antes de introduzir o trocarte e realizar a insuflação para criar o pneumoperitônio. Descrevemos uma variante da técnica de Hasson, segura, rápida e tecnicamente fácil de ser realizada.

Palavras-Chave: Pneumoperitônio. Técnica de Hasson. Laparoscopia.

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Evaluation of the Hysteroscopic Surgery Service of a University Hospital

Avaliação de um Serviço de Histeroscopia Cirúrgica em um Hospital Universitário

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This study was carried out in the Department of Obstetrics & Gynecology, School of Medicine, State University of Campinas (UNICAMP), Campinas, São Paulo, Brazil.

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ABSTRACT

Objective: The purpose of this study was to compare the changes that occurred in a hysteroscopic surgery service at a tertiary care university hospital at two different moments in time, analyzing factors such as operative time, procedure complexity, and the complications. **Methods:** A retrospective descriptive study, including women who underwent hysteroscopic surgery at two distinct time (62 patients in 1999 and 100 in 2007), at CAISM/UNICAMP. Factors analyzed were type and length of procedure, type and length of anesthesia, and complications during the procedure. Data was abstracted from the patients' medical records. **Results:** There were a statistically significant reduction in mean operative time (31.8 minutes to 19.7 minutes; $p < 0.0001$) and mean anesthesia time (160 minutes to 141.7 minutes; $p = 0.0246$). The most common procedure was polypectomy, increasing from 54.8% to 71% ($p = 0.03$). The complication rate was 8.06% in 1999 and 9% in 2007, with 8% uterine perforations. **Discussion:** This study showed a significant reduction in operative time probably related to faculty physicians advancing on the learning curve, but revealed a complication rate (8% uterine perforations) that is high when compared with literature (0.22%-1%). The high complication rate may be attributed to the fact the institution is a university hospital where the residents serve as the primary main surgeon under the supervision of faculty. **Conclusions:** There was an evolution throughout the studied period as demonstrated by the decrease in operative and anesthesia time while maintaining the same complication rate. The complication rate is comparable to that in the literature, but efforts should be undertaken to reduce the complication rate.

Key words: Hysteroscopic surgery. Hysteroscopy complications. Learning.

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INTRODUCTION

Hysteroscopy is a technique which permits assessment of the intrauterine cavity.^{1,2} The main therapeutic indications of surgical hysteroscopy include removal of polyps and fibroids, uterine septum resection, endometrial ablation, and lysis of uterine synechiae. Hysteroscopy is also immensely valuable in the evaluation of abnormal uterine bleeding and infertility.³

Hysteroscopic surgery has shown itself to be safe and it offers patients quick resumption of their regular activities. Experience has shown that complications of hysteroscopic surgery are infrequent and rarely severe.⁴ The main types of complications

are uterine perforation, hemorrhage, infection (endometritis), injury to adjacent organs (bladder, intestine) and intravasation.³

The literature has shown that the most frequent complication is uterine perforation.⁴ Most complications occur at the start of surgery, or in other words, during the dilation of the cervix and entry into the uterine cavity. After menopause women have, in general, stenosis of the cervix, which can hinder its dilatation during a surgical procedure.⁵

Complications depend on the type of surgery; more complex procedures have risks of graver complications such as bleeding or water intoxication.⁶ Among these surgeries we can cite complex myomectomies and endometrial ablation. Although

much rarer, the removal of endometrial polyps can also be associated with these complications, but the reports show a surgical time that is longer than expected in these situations.⁶

In this study, we compared the changes that occurred in the hysteroscopic surgery service of a university hospital at two distinct times, particularly with regard to operating time, the complexity of the procedures, and their complications.

MATERIALS AND METHODS

This was a retrospective study which selected women who underwent hysteroscopic surgery under anesthesia at the Center for Integral Attention to Women's Health (Centro de Atenção Integral à Saúde da Mulher – CAISM) of the State University of Campinas (UNICAMP). We compared cases from 1999 and 2007 in order to evaluate the changes that occurred in the service during this period.

Hysteroscopy was introduced at CAISM in 1995 and since June 1998 we have the computerized data for these surgeries. The year 1999 was chosen as the initial year of the study because it was the first full year for which computerized data was available. 2007 was chosen as the final year because the data were collected for analysis in early 2008.

The calculation of sample size was 62 women in 1999 and 100 women in 2007 (from a total of 100 and 314 hysteroscopic surgeries performed during those periods, respectively). The sample was evenly distributed over the months of the year (January to December). The subjects were selected using a list of surgeries, distributing them evenly over the months of the year, choosing from the list the first few of each month.

The medical records were identified and the data abstracted and entered into a special form for the study. Comparisons were made between age,

parity, BMI, time since menopause, use of HRT, past medical history (hypertension, diabetes mellitus, smoking, breast cancer, tamoxifen use), anesthesia and operative time, and presence of intraoperative complications. For the analysis of quantitative variables we used the Mann-Whitney test; qualitative variables were evaluated using the chi-square. Statistical significance was defined as $p < 0.05$.

The research project was approved by the Research Ethics Committee of the Faculty of Medical Sciences of UNICAMP, registered as protocol number 254/2008. A continuous flow resectoscope with a monopolar 26 Fr resection loop was used during both periods studied. 2% glycine or 3% sorbitol distention media was used, in some cases infused under pressure and in others with the help of gravity. Because it is a teaching hospital, most of the procedures were performed by a resident under the supervision of a faculty member. A 1st generation cephalosporin or clindamycin in cases of allergy to penicillin were used for antibiotic prophylaxis.

RESULTS

Patients ranged in age from 19 to 83 years. The average age was 49.6 years (SD = 14.3) in 1999 sample and 54.1 years (SD = 13.1) in the 2007 sample, a difference that was not statistically significant. In 1999 and in 2007, slightly more than half of women were postmenopausal, with the average time since menopause around ten years.

The mean number of deliveries was 2.1 in 1999 and 2.4 in 2007. Based on the mean body mass index of each group's sample, both the 1999 group and 2007 group were "overweight". There were no statistically significant differences between the 1999 sample and 2007 sample on these characteristics (Table 1). As for medical history, hypertension and

Table 1 - Comparison of the demographic and clinical characteristics of the sample of women who underwent hysteroscopic surgery in 1999 and 2007.

	1999 Mean	(N=62) +/- DP	2007 Mean	(N=100) +/- DP	P Value
Age	49.6	14.3	54.1	13.1	0.0780
BMI	27.7	5.6	28.3	5.2	0.4577
Pregnancies	3.2	2.7	3.4	2.4	0.6672
Deliveries	2.1	2.2	2.4	2.2	0.2409
Time (years) since menopause	10.8	7.3	11.4	7.6	0.6351

diabetes mellitus were the comorbidities most frequently reported; there was no statistically significant change between the two periods studied.

100 hysteroscopic surgeries were performed in 1999 and 314 in 2007, an increase of more than 300% in the number of procedures. In both 1999 and 2007 polypectomy was the most common surgery; its share of the total rose from 54.8% in the 1999 sample to 71% in the 2007 sample (Table 2).

The use of diagnostic hysteroscopy prior to surgery increased from 58.1% in 1999 to 64% in 2007. A statistically significant reduction was noted in the mean time of surgery: from 31.8 minutes in 1999 to 19.7 minutes in 2007 ($p < 0.001$). The same occurred with regard to the duration of anesthesia, which decreased from 160.5 minutes in 1999 to 141.7

minutes in 2007 ($p = 0.0246$). Spinal anesthesia was the most frequently used type of anesthesia in both 1999 and 2007, increasing from 62.9% in 1999 to 84% in 2007.

The complication rate was unchanged: 8.06% in 1999 and 9% in 2007. Uterine perforation was the most common complication, corresponding to approximately 8% in both groups (Table 3). Of the thirteen cases of perforation, seven had no vaginal deliveries (four nulliparous) and nine were postmenopausal. Besides the cases of perforation, there was one case of a cervical laceration requiring suturing in 2007. Other possible complications reported in the literature, such as hemorrhage, excessive absorption of distention medium with electrolyte imbalance, infection, injury to adjacent organs,

Table 2 - Frequency distribution of hysteroscopic surgeries in 1999 and 2007 by type of surgery.

Type of Surgery	1999 (%)	2007 (%)
Myomectomy	9.7	11
Polypectomy	54.8	71
Ablation of the endometrium	3.2	1
Adhesiolysis	8.1	2
Septoplasty	1.6	1
Diagnostic/biopsy	22.6	15

$p = 0.03$

Table 3 - Surgical complications, type of surgery performed and characteristics of women who underwent hysteroscopic surgeries in 1999 and 2007.

Period	Complication	Age	Parity	Menopause	Surgery
1999	Perforation	33	G1A1	No	Adhesiolysis
	Perforation	73	G2P2	Yes	Polyp
	Perforation	40	G2A2	Yes	Myomectomy
	Perforation	34	G1C1	No	Adhesiolysis
	Perforation	61	G4C4	Yes	Polyp
2007	Perforation	55	G11P7A4	Yes	Polyp
	Perforation	48	G5P4C1	Yes	Polyp
	Laceration of the cervix	83	G2P1C1	Yes	Polyp
	Perforation	56	GO	Yes	Polyp
	Perforation	54	G1P1	No	Myomectomy
	Perforation	39	G4P1A1	No	Biopsy
	Perforation	51	G8P1C2A3	Yes	Polyp
	Perforation	69	GO	Yes	Polyp
	Perforation	59	G1C1	Yes	Polyp

conversion to laparotomy or hysterectomy, did not occur in the 1999 and 2007 samples studied.

DISCUSSION

This study demonstrated a significant decrease in the surgical time, probably related to the greater skill of the supervising physicians of the service, which after eight years of hysteroscopic surgery practice are more accustomed to minimally invasive procedures, now incorporated into our daily lives. The average surgical time in 2007 is less than that reported by other authors such as Shveiky, which reported an average time of 21.3 minutes⁷ and Propst, with surgical time ranging from 21.4 to 64.6 minutes in general, and 27.9 minutes, on average, for the polypectomies.⁶

There was a reduction of the duration of anesthesia (defined as the time between the entry of the patient in the operating room and discharge from anesthetic recovery), but we can infer that this was due more to the decrease in operating time than because of changes in the anesthesia, as there was an marked increase in the number of spinal blocks in 2007.

Given the short duration of the surgery, we should rethink the types of anesthesia indicated and perhaps use intravenous general anesthesia, permitting an even faster recovery and making it possible to perform the procedures on an outpatient basis. The spinal blocks are indicated in more complex surgeries, where the risk of water intoxication is greater. The patient, thus maintained awake, can facilitate the rapid diagnosis – if there are alterations of consciousness – of this complication.¹⁰

Another finding was the increase in the demand for polypectomies, possibly a consequence of the greater number of ultrasounds being performed routinely (often unnecessary) in postmenopausal women for endometrial cancer screening. The literature has shown that this practice greatly increases the number of diagnoses of benign diseases, especially endometrial polyps without other repercussions.¹¹

Another explanation for the increase in indications of hysteroscopic polypectomy was greater acceptance of the procedure by the medical profession. During the time when hysteroscopic surgery was being introduced, it was not uncommon for the surgeon to believe that uterine curettage was

sufficient for the removal of endometrial polyps. Many patients then underwent another ultrasound and the image of the polyp or endometrial thickening persisted, requiring additional procedures. It can be observed under the direct visualization afforded by hysteroscopy, that polyps after menopause have a fibrous component which hampers their complete removal by curettage, but which can be completely removed through hysteroscopic surgery. There is now a consensus that hysteroscopy is the appropriate procedure for the removal of polypoid formations in the uterus,¹² because it removes their basal layer preventing the persistence or recurrence of this disease.¹³

Over time, the medical profession also experienced the resolution of cases of submucosal myomas with improvement in uterine bleeding and without the need for major surgery – another situation which has increased the credibility of hysteroscopic surgery. Recurrence of uterine fibroids can, however, have hindered the acceptance of this technique in all cases.

In our study, the number of diagnostic hysteroscopies under anesthesia decreased, which can be explained by the higher rates of resolution achieved when the procedure is performed on an outpatient basis without anesthesia. Our service has had a thinner optic (2.9 mm in diameter) since 2003. The use of the thinnest optics allows passage through the cervical canal with less pain. The complication rate of this study was 8.5% overall, with an 8% perforation rate which, when compared to the literature, is high. Other studies have shown low rates of uterine perforation such as Propst 0.43%,⁶ Shveiky 1%,⁷ and Aydeniz 0.22%.⁸

We can explain our higher rate because it is teaching hospital where residents tend to act as the principal surgeons, under the supervision of a faculty member. In our study we found that the more complex surgeries are still few in number and complications, when they occurred, were not serious. More serious complications were more frequent in the study of Smith who had a sepsis rate of 4% and a water intoxication rate of 5%.¹⁴ Jansen showed a 12-fold greater risk of complications in adhesiolysis than with polypectomy and emphasized the need for the surgeon's experience as well as appropriate supervision during the training of residents.⁴

Learning hysteroscopy is slow and requires spatial and proprioceptive coordination that is difficult

to teach. Because the procedure requires only one surgeon, the resident often finds it difficult to advance technically when under the supervision of someone also still in training.⁹

Obviously, the procedures which are more difficult and require more skill are performed by the instructor. We note that in our service the team has matured along the learning curve and there is, therefore, greater willingness to perform more complex hysteroscopic surgeries. Studies have shown that when the training of endoscopic surgery techniques, both laparoscopy and hysteroscopy, occurs during residency, these skills persist and are most commonly incorporated into professional life than when the physician returns for training years after graduating in order to learn new techniques.¹⁵

The service as a whole became more experienced and the team of faculty surgeons has specialized over these eight years, but it is still necessary to increase the complexity of procedures performed. We are hostages of the surgical case demand which is a reflection of the volume of referrals for polypectomy. This is good if we consider that this is the ideal type of surgery to initiate the training of residents, as it has low rate of complications.⁴

Another fact that occurred over these years, and which may justify a reduced number of surgeries such as endometrial ablation, was the introduction of Mirena® (an intrauterine system which releases levonorgestrel) as a conservative treatment for uterine

bleeding. CAISM is able to provide Mirena to patients of the public health system (*Sistema Único da Saúde – SUS*). Because it is an outpatient procedure and can be performed without anesthesia, it is considered the treatment of choice for uterine bleeding. Despite this fact, there are still cases where the endometrial ablation is indicated, further reducing hysterectomy in women with benign uterine disorders or totally normal uterus.

A limitation of this study is the fact that it was retrospective. Nevertheless, we encouraged ourselves to proceed with the study as we observed during the data collection that the data in the medical record and anesthesia documentation were reliable. As hysteroscopy is currently one of the most performed surgeries in our service, we should study means of identifying patients at risk for complications. This study revealed that uterine perforation was the most common complication. In this way, one should identify women at increased risk of uterine perforation and better prepare the cervix to prevent accidents during the introduction of cervical dilators.

CONCLUSION

The hysteroscopy service of CAISM grew as shows the increase in the number of surgical procedures with shorter operating time, but the complication rate remained high. The challenge for this service would be to reduce these complications with better preparation of the cervix of these women.

RESUMO

Objetivo: Comparar o serviço de histeroscopia cirúrgica do CAISM em dois momentos (1999 e 2007), no que se refere ao tempo cirúrgico, à complexidade dos procedimentos e presença de complicações. **Métodos:** Realizou-se um estudo descritivo de corte transversal, onde foram selecionadas 62 mulheres submetidas à histeroscopia cirúrgica em 1999 e 100 mulheres em 2007, no CAISM. Foram colhidos dados referentes ao tipo e duração do procedimento realizado, tipo e duração da anestesia e presença de complicações no ato operatório. **Resultados:** Houve diminuição significativa do tempo de cirurgia (31,8 minutos para 19,7 minutos; $p < 0,0001$) e do tempo de anestesia (160 minutos para 141,7 minutos; $p = 0,0246$). A cirurgia mais realizada foi a polipectomia, com aumento de 54,8% para 71% ($p = 0,03$). As taxas de complicações foram 8,06% e 9%, respectivamente em 1999 e 2007, com 8% de perfurações em ambos os períodos. **Discussão:** Este estudo demonstrou uma diminuição significativa do tempo de cirurgia provavelmente relacionado à curva de aprendizagem dos médicos supervisores, mas apresentou 8% de perfurações que uma taxa de complicação alta quando comparamos com a literatura (varia 0,22 a 1%), isso provavelmente pelo fato de ser um hospital escola onde os residentes atuam como cirurgiões principais sob supervisão de um docente. **Conclusão:** A equipe cirúrgica evoluiu ao longo do tempo como demonstra o menor tempo de cirurgia, conseqüentemente de tempo anestésico sem aumento do número de complicações. A taxa de complicações está dentro do aceitável pela literatura, mas esforços devem ser feitos na tentativa de diminuir complicações.

Palavras-chave: Histeroscopia cirúrgica. Complicações histeroscópicas. Aprendizado.

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Minimally Invasive Incisions: Can we Improve our Patients' Results?

Incisões Minimamente Invasivas: Podemos Melhorar os Resultados dos nossos Pacientes?

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ABSTRACT

Background: Surgeons are looking for new challenges in minimally invasive surgery, searching for ways to improve cosmetic results and recovery time through smaller or fewer incisions. **Objective:** To report our experience reducing trauma to the abdominal wall and how this influences the post-operative recovery of patients operated for appendicitis and cholelithiasis. **Method:** Different minimally invasive approaches used from January 2009 to April 2011 were analyzed. 120 **cholecystectomy cases** were divided into three groups comparing standard cholecystectomy, 5mm, and Mini approach. 13 cases of overweight (IMC>30) patients undergoing cholecystectomy compared the same three surgical approaches. 160 appendectomy cases compared standard, 5mm, mini, and transumbilical laparoscopy approaches with open appendectomy. Outcome variables studied included pain in the first 24 postoperative hours, number of days pain medication was administered, other problems, cosmesis, and days before normal activities were resumed. **Results:** In the Cholecystectomy cases the Mini laparoscopic approach had the lowest pain scale values (0-1). Patients walked without discomfort, and received pain medication for no more than 24 hours. Patients resumed normal activities in 2 to 4 days. Cosmetic results were excellent. For the 13 overweight cholecystectomy cases the 5mm approach showed the best results in terms of pain and recovery, especially when compared with the Mini approach. Patients who had Mini laparoscopy developed more right shoulder pain. Mini and Transumbilical appendectomies had the best results in terms of pain, number of days of pain medications, and recovery (2-4 days). **Conclusion:** Using smaller laparoscopic incisions (Mini and Transumbilical) or incisionless techniques, we are able to reduce parietal trauma, pain, and patients resumed normal activities sooner. Cosmetic results were excellent.

Key words: Cholelithiasis. Appendicitis. Appendectomy laparoscopic. Standard cholecystectomy. 5mm, Mini, Transumbilical, pain, cosmetic results, activity.

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INTRODUCTION

The first cholecystectomy performed through a subcostal incision was in 1882 by Langenbuch. This technique remained largely unchanged for over 100 years. In 1987 Philippe Mouret was credited with the first laparoscopic cholecystectomy, and this event marked the beginning of a revolution in the history of Medicine called minimally invasive surgery.

Laparoscopic cholecystectomy is considered the standard of care for the treatment of cholelithiasis, and laparoscopic appendectomy is also a frequent procedure in surgical practice. With these two common procedures surgeons use a wide variety of approaches according to their expertise and surgical skills.(1, 2)

Surgeons are constantly looking for the way to improve patients' cosmetic results and speed their recovery. First surgeons moved from open surgery to minimally invasive surgery; today surgeons are looking for incisionless surgery. There are three laparoscopic approaches which appear as the most attractive alternatives in the new incisionless era. (3, 4, 5, 6, 7, 8)

Natural Orifice Transluminal Endoscopic Surgery (NOTES) or transluminal surgery was first performed in 2007. It uses natural orifices to approach the abdominal cavity with potential advantages over conventional laparoscopic surgery reducing surgical trauma of the abdominal wall. Zorron was the first to perform a transvaginal cholecystectomy, but to date there has not been

significant progress in demonstrating advantages of this technique. Large series necessary to make this surgical procedure an acceptable technique that surgeons can use in their therapeutic armamentarium are not available.(8, 9)

Single Incision Laparoscopic Surgery (SILS) is another novel approach recently developed. This technique uses a single port in the umbilicus with multiple orifices for instrument access to the abdominal cavity. SILS has the limitations for the traction and countertraction required in laparoscopic triangulation. The goal of SILS is to improve cosmesis and perhaps reduce pain. This is considered a rapidly expanding technique, but it represents technical challenges for surgeons. Data proving that SILS is superior to conventional laparoscopy has yet to be reported.(7)

Needlescopic laparoscopy has been used for more than ten years. It is considered a refinement of laparoscopic surgery. This technique uses 2mm and 3mm incisions – combined with the laparoscopic techniques surgeons have used for years – to remove the gallbladder or the appendix. There are reports of promising results suggesting that this is an excellent and versatile alternative.(5,6)

Two years ago we started to work on comparing different minimally invasive approaches, and how smaller incisions can influence the postoperative recovery of patients treated surgically for cholelithiasis and appendicitis.

METHODOLOGY AND PATIENTS

Patients with diagnoses of cholelithiasis and acute appendicitis were enrolled in this prospective study from January 2009 through April 2011.

A total of 120 patients diagnosed with of cholelithiasis were divided into three groups whose cholecystectomies were performed using different minimally incision approaches:

Group 1: 40 patients who had **Standard** cholecystectomy with two 10mm and two 5mm incisions.

Group 2: 40 patients who had **5mm** cholecystectomy with one 10mm and three 5mm incisions.

Group 3: 40 patients who had **Mini** cholecystectomy with one 10mm, one 3mm and two 2mm incisions.

Then we performed the same minimally invasive procedures in 13 **Overweight patients (BMI > 30)**, five patients with standard, five patients with 5mm, and three with Mini approaches.

The cystic duct and artery were clipped and transected in patients who had the standard technique. In the 5mm and Mini technique, the cystic artery was cauterized and the cystic duct was ligated using an intracorporeal suture technique with 2-0 vycril. In those patients in which the gallbladder had no or minimal inflammatory changes the gallbladder was extracted without extending the original incision sizes.

75 patients with acute appendicitis were divided into 5 groups:

Group 1: 15 patients who had a 3 cm **Open** appendectomy with the Rocky Davis technique.

Group 2: 15 patients who had a **Standard Laparoscopic** approach with one 10mm and two 11mm incisions.

Group 3: 15 patients with a **5mm** Laparoscopic approach with one 10mm and two 5mm incisions.

Group 4: 15 patients operated with the **Mini** Laparoscopic approach, one 10mm and two 3mm incisions.

Group 5: 15 patients with **Transumbilical** approach with one 10mm incision in the umbilicus.

All patients had edematous or suppurative appendicitis that permitted that the appendix be extracted through the original incision without expanding its size. In the standard appendectomy the appendix was resected with an endo GIA linear stapler. In the 5mm and Mini approaches the appendix was resected with an intracorporeal suture technique. In the transumbilical approach, patients were thin with a movable cecum noted at the initial laparoscopic view, so the appendix could be extracted through the umbilicus without any problem, and then resected using an open appendectomy technique.

The outcome parameters studied in all patients were: Postoperative pain during the first 24 hours after surgery measured by asking each patient to rate the level of their pain using a 0 to 10 Visual Analog Scale (VAS), how long analgesics were used, other problems, cosmetic results as perceived by the patient and by the surgeon, time needed by the patient to resume normal activities, and postoperative incision edema at postoperative days 10 and 30. All patients received three doses of Dexketoprofene in the first 24 hours after surgery.

RESULTS

208 patients were operated from January 2009 through April 2011. Ages ranged from 11 to 50 years. For purposed of analysis patients were divided according to diagnosis: cholelithiasis and acute appendicitis.

With regard to pain, cholecystectomy patients (Table 1) who underwent the Mini laparoscopic approach reported the least pain (0 or 1 on the VAS). These patients started to walk within the first four postoperative hours without complaining of pain. The other two groups experienced more pain and had more difficulty to start moving compared with the Mini group. The Mini group was more likely to decline pain medication within the first 24 hours after surgery, and were able to start doing routine activities sooner (2-4 days post-op) compared to the other two groups (10 days and 3 weeks). Cosmetic results with the Mini laparoscopic approach were excellent.

In the overweight cholecystectomy patients (Table 2), the 5mm and Mini groups had the lowest pain on the VAS. The 5 mm group took pain medications for an average of 5 days, but the Mini group took pain medications for almost 10 days

because they developed right shoulder pain. The 5mm group resumed full activities sooner than the other two groups. The Mini approach had excellent cosmetic results.

Table 3 shows the results of patients who underwent appendectomy. The patients who had the Mini and Transumbilical approaches had the least pain (0-1) on the VAS, and they took pain medication only for the first 24 hours post-op. Due to considerably less pain, these two groups of patients moved easily by the fourth post-operative hour feeling very comfortable compared with the other groups. The Mini and Transumbilical groups resumed normal activities between the second and fourth postoperative day, sooner than the other groups; the cosmesis was also superior.

Patients in all study groups were seen in the outpatient clinic on post operative days 10 and 30 and wound edema was evaluated by palpation. We did not find an exact clinical parameter to evaluate it, but on post-op day number 10 all cases which used minimally invasive approaches had at least 50% less clinically palpable edema compared with the open appendectomy cases. The Mini and Transumbilical incisions had less edema than the standard and 5mm

Table 1 - Results in Patients operated for Cholelithiasis.

	Standard	5mm	Mini
Patients	40	40	40
Pain first postoperative day	2-4	1-3	0-1
Days of pain medication	5-10 d	< 5 d	<24 h
Resume normal activities	2-3 w	1-2 w	2-4 d
Cosmesis	good	very good	excellent

w: weeks d: days h: hours

Table 2 - Results of Cholecystectomy in the overweight patients (BMI>30).

	Standard	5mm	Mini
Patients	5	5	3
Pain first postoperative day	2-3	0-1	0-1
Days of Pain medication	<10 d	<5 d	<10 d
Other problems	No	No	Yes
Resume normal activities	2-3 w	7-8 d	1-2 w
Cosmesis	good	very good	excellent

d: days w: weeks

Table 3 - Results in Patients with acute appendicitis.

	Open	Standard lap	5mm	Mini	T.U.
Patients	15	15	15	15	15
Pain first postop day	5-6	2-3	1-2	0-1	0-1
Days of Pain medication	>10d	<10d	5d	<24h	<24h
Resume normal activities	3 w	8-12 d	7-10 d	2-4d	2-4 d
Cosmesis	good	good	very good	excellent	excellent

h: hours d: days w: weeks T.U.: Transumbilical

cases. At post-operative day 30 the minimally invasive approaches had almost no edema, compared to the conventional open technique used for appendectomy; these was also evident in the Mini and Transumbilical approaches.

DISCUSSION

Since the advent of laparoscopic surgery the importance of surgical incision size has been controversial, with some arguing that minimally invasive surgery offers no advantage, because a surgeon can perform surgical procedures through a small open incision that is equal to the sum of three laparoscopic incisions. An open appendectomy with a 3 cm incision is, for example, comparable to three 10mm incisions; the resulting scars are the same assuming a simple arithmetic addition operation.(10)

When we talk about surgical incisions' morbidity, we refer to factors that can influence the normal wound closure and healing process. If we employ this concept, then we should endeavor to reduce the surgical inflammatory response by reducing tissue tension and by improving our surgical techniques in order to manipulate the incisions less. This should result in less pain, lower risk of dehiscence, lower risk of infection, and better cosmetic results. We found two interesting models which analyze the morbidity of surgical incisions.(11)

Blinman designed an elliptical incision model indicating that surgical incision morbidity is a function of the tension across it, with the highest level of tension in the middle of the incision, and that the tension moves in a non-linear pattern. Using his model Blinman compared a laparoscopic appendectomy scenario (one 10mm trocar and two 5 mm trocars) with an open appendectomy and a single port laparoscopic scenario,

and reported that the open appendectomy generates 2.67 fold more tension than the laparoscopic scenario, with the single port adding 50% more tension than the laparoscopic multiport approach(12).

Carvalho explains that with a cylindrical model the volume of the surgical trocars – which is proportional to the incision radius — is equivalent to the surgical trauma that the abdominal wall suffers (parietal trauma). He described several scenarios of cylindrical models used in laparoscopy, and proposed that the models of Hybrid NOTES and Mini Laparoscopy represented the lower level of parietal trauma expressed as pain, while the single port technique represented the worst scenario by increasing the parietal trauma seven-fold when compared with Mini Laparoscopy. (13)

Both models point in the same direction, which means that if we reduce significantly the area of trauma to the abdominal wall (parietal trauma), then we will have less incision edema and less tension resulting in considerably less post-operative pain and a faster recovery.

Our study group demonstrated that the use of incisionless techniques (MINI and transumbilical) in patients operated electively for cholelithiasis and in selected cases of appendicitis, offers the advantage of a reduction of parietal trauma of up to 53%, with a reduction in pain (as measured by the VAS) of 75%, which permits the patient to start moving comfortably early in the immediate post operative period (within 4 hours) . There was a reduction in the number of days of pain medicine intake of 90% compared with the standard laparoscopic techniques, and patients were able to resume normal activities 81% faster than the standard laparoscopic techniques (2-4 days vs. 2-3 weeks).

With incisionless techniques the post-operative period of patients was more benign

compared to the standard techniques. Post-operative incision edema is very difficult to measure, but we were able to see that the smaller the incision is, the fastest it disappears. In appendectomy cases, 3 cm incisions were significantly noticeable four weeks after surgery.

The overweight patients warrant special comment. We believe that the operative time – which was twice that of the MINI group compared to the 5mm group – was the reason for shoulder pain because of the technical difficulties posed by handling a larger liver with the needlescopic instruments. In our experience the best option in elective cholecistectomy is the use of 5mm trocars offering the best results in

terms of operative time, pain, and recovery when compared with the MINI incisionless technique.

Our study supports the minimally invasive model scenarios. Through the incisionless techniques we can improve wound morbidity by reducing the area of trauma to the abdominal wall (parietal trauma). In the future, as part of our strategies to reduce post-operative pain, obtain excellent cosmetic results, and achieve faster recoveries that lets patients resume their normal activities sooner, we will emphasize the importance of the size of our incisions in patients who are good candidates for these types of approaches. We believe that patients' early recovery is our most important achievement in this study.

RESUMO

Introdução: Os cirurgiões estão à procura de novos desafios na cirurgia minimamente invasiva, buscando formas de melhorar os resultados estéticos e tempo de recuperação através de incisões cada vez menores ou menos invasivas.

Objetivo: Relatar a experiência obtida reduzindo-se o trauma à parede abdominal e como isso influencia na recuperação pós-operatória de pacientes operados por apendicite e colelitíase. **Método:** Diferentes abordagens minimamente invasivas foram utilizadas de janeiro de 2009 a abril de 2011. Foram analisados 120 casos colecistectomia divididos em três grupos: colecistectomia padrão (5 e 10mm), 5mm, e Mini. Em 13 casos havia sobrepeso (IMC > 30) nos pacientes submetidos à colecistectomia e foi comparado neste subgrupo as mesmas três vias de abordagem cirúrgica. Em 160 casos de apendicectomia foi comparada a cirurgia padrão laparoscópica com abordagens 5mm, mini e transumbilical e cirurgia aberta. As variáveis analisadas foram a dor nas primeiras 24 horas pós-operatórias, número de dias utilizando medicação para dor, cosmesis, e número de dias para o retorno das atividades normais. **Resultados:** Nos casos de colecistectomia a Mini teve os melhores resultados de escala de dor (0-1). Os pacientes caminharam sem desconforto, e receberam medicação para a dor por não mais que 24 h, retornando as atividades normais em 2 a 4 dias, tendo os resultados cosméticos sido excelentes. Para os 13 casos colecistectomia em pacientes com excesso de peso a abordagem com material de 5mm apresentou os melhores resultados em termos de dor e de recuperação, especialmente quando comparados com a Mini. Neste grupo os pacientes submetidos a Mini desenvolveram dor no ombro direito mais frequentemente. Apendicectomias Mini e transumbilical tiveram os melhores resultados em termos de dor, número de dias de uso de analgésicos, e recuperação (2-4 dias). **Conclusão:** A utilização de incisões laparoscópicas ou técnicas menos invasivas (Mini e transumbilical), promove a redução do trauma parietal e da dor. Os pacientes retomaram a suas atividades habituais mais precocemente dos resultados cosméticos obtidos foram excelentes.

Palavras-chave: Colelitíase. Apendicite. Apendicectomia laparoscópica. Colecistectomia. 5mm. Mini. Transumbilical. Dor. resultados cosméticos.

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Laparoscopic versus Abdominal Radical Hysterectomy with Pelvic Lymphadenectomy in Patients with Early Cervical Cancer: A Randomized Clinical Trial

Histerectomia Radical Laparoscópica versus Abdominal com Linfadenectomia Pélvica em Pacientes com Câncer de Colo Inicial: um Estudo Clínico Randomizado

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ABSTRACT

Background: Radical hysterectomy with pelvic lymphadenectomy is one of the FIGO (International Federation of Gynecology and Obstetrics) recommended treatments for early cervical cancer. The laparoscopic approach has been described in the literature as feasible and safe. The objective of this study was to compare laparoscopic radical hysterectomy and open radical hysterectomy in a single center using a randomized clinical trial. There are no completed randomized controlled trials comparing laparoscopic radical hysterectomy and abdominal radical hysterectomy, although one trial is ongoing. **Methods/Design:** 30 stage IA2 patients with lymphatic vascular space invasion or stage IB cervical cancer patients were enrolled. Postoperative pain intensity was the primary endpoint; the sample size necessary was calculated to be 30 patients. Pain intensity was measured using a 10-point numeric rating scale. Both surgical techniques were executed by the same surgical team. Secondary outcome measures included intraoperative and postoperative complications, histopathologic findings, and overall and disease-free survival during a 5-year follow-up period. Patients were randomized using a random number table. IRB approval was obtained in 1999, and patients were enrolled between late 1999 and early 2004. This article described the study protocol in detail. The data analysis is currently being performed and will be reported in a subsequent article. **Trial Registration:** NCT01258413.

Key words: Cervical cancer. Laparoscopic. radical hysterectomy.

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INTRODUCTION

Cervical cancer is the second most common cancer among women worldwide, and 83% of cases occur in developing countries.[1] In Brazil, the estimated annual incidence is about 19 cases per 100,000 women.[2] The cure rate for radical hysterectomy with pelvic lymphadenectomy is up to 80% in stages IB e IIA patients with a tumor size of less than 4 cm, and is around 70% in patients whose tumors exceed 4 cm.[3, 4] Tumor size, lymphovascular space invasion and positive nodes all decrease disease-

free survival[4, 5] and require adjuvant pelvic radiotherapy.[5, 6] Radiotherapy and surgery, when compared in randomized clinical trials, have been shown to have similar survival rates.[3, 7]

The reported benefits of a laparoscopic versus an open approach for benign gynecological diseases include decreased postoperative pain and a shorter hospital stay.[8, 9] Several randomized studies have reported an increased operative time.[9, 10]

Various studies have reported the feasibility and safety of a laparoscopic radical hysterectomy.[11-13] Non-randomized comparative studies have shown

Abbreviations: laparoscopic radical hysterectomy (LRH); abdominal laparoscopic radical hysterectomy (ARH); numeric rating scale (NRS); FIGO (International Federation of Gynecologic and Obstetrics)

an increased operative time,[14-16] a shorter hospital stay,[14, 15] and fewer postoperative infections [14] when laparoscopic radical hysterectomy was compared with the open approach. Preliminary data suggest an equivalent survival between the two techniques.[16, 17]

No randomized trials are available that compare laparoscopic radical hysterectomy with an abdominal laparoscopic hysterectomy for treating early stage cervical cancer. A randomized, international protocol was elaborated; it calls for the enrollment of 740 patients to evaluate the feasibility, complications, quality of life, and survival in early stage cervical cancer patients assigned to either abdominal or laparoscopic/robotic radical hysterectomy. Equivalence will be declared if the difference in the disease-free survival between the two trial arms does not exceed 7% at four years.[18] The protocol was designed to compare postoperative pain, postoperative complications, and survival rates after laparoscopic radical hysterectomy (LRH) versus abdominal radical hysterectomy (ARH) for early stage cervical cancer in usual care settings. This analysis considered patients operated from 1999 to 2004, years when the laparoscopic technique was being introduced in Brazil.

Our hypothesis was that a laparoscopic radical hysterectomy will result in decreased postoperative pain compared to an abdominal radical hysterectomy, but will have similar postoperative complications and survival rates.

MATERIAL AND METHODS

This article details the study protocol as a single center randomized controlled trial comparing laparoscopic radical hysterectomy (LRH) and abdominal laparoscopic radical hysterectomy (ARH). Eligible patients were randomized to undergo either LRH or ARH

Ethical considerations

The Ethics Committee of Grupo Hospitalar Conceição approved the study protocol in 1999. This protocol was registered at ClinicalTrials.gov

Primary endpoint

The primary outcome is postoperative pain as measured by a 10-point numeric rating scale (NRS) during the postoperative period. Pain was assessed every six hours by nursing staff during a patient's usual

postoperative care. The nursing staff was not aware of the study objective.

Secondary endpoints

1. Operative variables included the following: operative time (minutes), injuries to the ureter, bladder, bowel or vessels requiring blood transfusion, and anesthesia complications.

2. Surgical and pathologic variables included the following: histological type, surgical margins, lymph node status and lymph node number, all assessed by pathologists with expertise in gynecologic oncology. In addition, parametrial and vaginal cuff width (centimeters) was assessed by the primary surgeon in the operating room, before tissue processing.

3. Early (< 30 days) postoperative events and findings during the hospital stay including: duration in days of the hospitalization, complications, need for extra analgesic drugs, and all clinical and surgical events during this period.

4. Clinical or surgical findings that could be attributable to the treatment or the disease through five years of follow-up.

5. Date and anatomic site of the first recurrence or metastasis within the first five years of follow-up.

6. Overall survival and disease-free survival at five years of follow-up

Eligibility Criteria

Inclusion Criteria: women at least 18 years of age referred to our service with histologically confirmed primary squamous, adenocarcinoma or adenosquamous cervical cancer diagnosed by biopsy or cervical conization and clinically staged according to the International Federation of Gynecologic and Obstetrics (FIGO) classification as IA2 with lymph vascular invasion, IB, or IIA [5].

Exclusion Criteria: patients with clinically advanced disease (stages IIB-IV), previous pelvic or abdominal radiotherapy, current pregnancy, or clinical diseases that would preclude one or both surgical approaches.

Surgical team

All surgeries were performed by the same team. The first surgeon (LFC) performed all surgeries and two other team members (RK and LSC) served as first or second assistants. The first surgeon had already performed more than one hundred abdominal

radical hysterectomies before performing laparoscopic radical hysterectomies. [19]

STANDARDIZATION OF SURGICAL PROCEDURE

Before the beginning of the study, a surgeon with expertise in abdominal radical hysterectomies evaluated the digital records of other laparoscopic radical hysterectomies performed by the first surgeon. To assess the adequacy of the oncologic resection, the first surgeon measured the parametrial and vaginal tissue in the operative room before tissue processing.[20]

SURGICAL TECHNIQUES

Laparoscopic Radical Hysterectomy: A Foley catheter and a uterine manipulator with chrome plated tubing were placed under sterile conditions. This manipulator allowed for full uterine and vaginal manipulation without interfering with the approach of the pararectal and paravesical spaces, the rectum or parametrial tissue. Supraumbilical insertion of a Verres needle was employed for insufflation, and a 10-mm trocar was placed for a 30 degree laparoscope. The intra-abdominal pressure was maintained between 15 and 18 mmHg. The abdominal cavity was then inspected. Three additional 5mm trocars were inserted next. Then the vessels of the infundibulopelvic ligament were coagulated and cut. The round ligament was transected, and the broad ligament was opened along the superior vesical artery, thereby opening the paravesical space to the muscular plane. The ureter was posteriorly identified, after which the pararectal space was opened and the rectum was freed, keeping the ureter posterior and the parametrium anterior, until it communicated with the paravesical space. The uterine vessels were transected until they were confluent with the internal iliac vein. The parametrial tissue close to the pelvic bone was then transected. The ureter was unroofed to the point of its insertion into the bladder, freeing it completely. A paracolic dissection was performed to free the parametrium and lateral vaginal wall, and was repeated on the contralateral side. An incision of the rectal peritoneum was made to open the rectovaginal space. Dissection of the uterosacral ligaments was performed as close to the pelvic wall as possible. Blunt dissection of the bladder was performed with gauze, after dissection of the vesicouterine fold. The vagina was

circumferentially transected, and the specimen was removed. The pneumoperitoneum was maintained using latex glove fingers filled with saline.

Laparoscopic pelvic lymphadenectomy: First, the right and left pelvic lymph nodes were dissected from the common external iliac artery to the circumflex iliac vein, and the tissue behind and between the iliac vessels was removed. The dissection started cephalically, with removal of the lymph nodes from the external iliac artery along the genitofemoral nerve and inferiorly/externally down to the level of the circumflex iliac vein. The Cloquet's node was identified, internal to the common iliac vein and superior to the circumflex internal iliac vein and the inguinal canal. The obturator lymph nodes were removed by dissecting over Cooper's ligament along the internal iliac vein lymph nodes and dissecting the lymph ducts internal to the obturator vessels and nerve, ending at the iliac bifurcation. An isolated dissection of a small group of lymph nodes was also performed, under the ureter and next to the common iliac vessels. These specimens were removed vaginally, protected in identified glove fingers. The vaginal cuff was sutured laparoscopically. Closed-suction drainage was placed until daily drainage fell below 100 ml.

Abdominal radical hysterectomy: ARH was performed according to the Piver III classification for a radical hysterectomy.[21]

Antibiotic prophylaxis: One hour before surgery, and after 2 hours during the procedure, cefalotin 1g IV was administered for prophylaxis.

Anesthesia and postoperative analgesia: the same team of anesthesiologists performed anesthesia following a defined protocol. Patients were premedicated with midazolam 15 mg orally one hour before surgery, and once in the operating room. IV access was established and standard monitoring (ECG, noninvasive blood pressure, oxygen saturation and capnography) was measured. General anesthesia was induced with fentanyl 3 µg/Kg and propofol 2 mg/Kg. Orotracheal intubation was facilitated with atracurium 0.5 mg/Kg, and the orotracheal tube was inserted. After intubation, the lungs were ventilated with 50% O₂, 50% N₂O and sevoflurane 2%. Fentanyl and propofol were controlled to maintain a systolic blood pressure within 10% of the basal systolic pressure. At the beginning of the lymphadenectomy, ketoprofen 100 mg and metoclopramide 10 mg were administered IV. Before extubation, dipyrone 15 mg/Kg IV and

morphine 0.05 mg/kg SC were administered. Residual neuromuscular blockade was antagonised with neostigmine and atropine, if necessary.

Postoperative analgesia: First day: diclofenac 75 mg IM BID, dipyron 15 mg/kg IV QID, and morphine 0.05 mg/kg mg SC every four hours. Second day: diclofenac 50 mg PO TID and morphine 3 mg SC every four hours (on demand). Third day: diclofenac 50 mg PO TID (on demand) and morphine 3 mg SC every four hours (on demand).

Adjuvant radiotherapy / chemotherapy

Histopathological findings were used to determine the need for adjuvant postoperative treatment, at the discretion of the responsible physician.

Postoperative follow-up

All patients were evaluated by the study team in the early postoperative period. Most patients were followed up exclusively by the study team. Long-term follow-up should be for five years by the study team or a personal physician. Personal physicians were contacted periodically to ascertain the patients' status. All serious complications were documented and managed by the study team.

Sample size calculation

The NRS score scale was considered the primary postoperative endpoint. We expected a 55% difference in pain scale intensity between groups. The sample size calculated using Epi Info version 6.04b software in a 1:1 sample, was 30 patients. To compensate loss from follow-up, we decided to include 30 patients.

Randomization

Patients were randomly assigned to the laparotomy or laparoscopy by a random number table of 180 five-digit numbers generated by an independent author (ATS) who did not participate in patient selection, surgery or follow-up. After informed consent was obtained and prior to surgery, random allocation of a number was determined by a telephone call by a person unaware of the study objectives; the authors that participated in patient screening (LFL e LSC) did not had access to the random number table. Patients randomly allocated to even numbers underwent LRH and those with odd numbers underwent ARH. On the day before surgery, the nursing staff was trained to use the VAS scale. The nursing staff was not aware of the study objectives.

Statistical analysis

Patients will be analyzed according to the treatment group they are assigned to. Differences between two treatment groups will be tested for statistical significance with a two-sided Student t-test and Mann Whitney test for continuous data. A Chi-Square test will be used for categorical data and a Fisher exact test will be used for categorical variables. Survival and disease-free survival will be estimated by a Kaplan-Meier curve. P values < 0.05 will be considered statistically significant.

DISCUSSION

This single-center trial was designed to compare the severity of postoperative pain amongst IA2 and IB cervical cancer patients who agreed to be randomized to receive LRH or ARH as usual care. NRS is considered an appropriate statistical test to detect modifications associated with treatment across different cultures and settings.[22] This scale has previously been validated at our hospital in a sample of oncology patients.[23] The validity of a scale cannot be determined directly, but its agreement with another known scale can be evaluated.[24]

Using pain as the primary outcome measure requires the use of a surrogate endpoint. Although overall survival and disease-free survival are the primary clinical endpoint in oncology, aspects related to quality of life are relevant in surgical trials because the procedure itself impacts early postoperative quality of life, which can be significant.[25]

Competing interests

All authors read and approved the final manuscript and declare that they have no competing interests.

Authors' contributions

Each author has sufficiently participated in the work to take public responsibility for portions of its content. LFL, LSC ATS designed this randomized clinical trial. LFL, RK, LSC performed the standardization of the surgical procedure. LFL, RK and LSC were the surgical team. LFL managed all surgical and clinical complications. LSC and LFL wrote this manuscript. ATS and ANK made significant contributions to protocol validity, design and drafting and revising this manuscript.

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RESUMO

Revisão: A histerectomia radical com linfadenectomia pélvica é uma das recomendações da FIGO (Federação Internacional de Ginecologia e Obstetrícia) no tratamento do câncer cervical inicial. O acesso pela laparoscopia tem sido descrito na literatura como seguro e possível. O objetivo deste estudo foi o de comparar a histerectomia laparoscópica radical e a histerectomia radical aberta em um único centro utilizando um estudo clínico randomizado. Não existem estudos completos controlados randomizados comparando histerectomia radical laparoscópica e histerectomia radical abdominal, contudo um estudo encontra-se em andamento. **Métodos/Desenho:** 30 pacientes em estágio IA2 com invasão do espaço linfático vascular ou estágio IB pacientes com câncer cervical fizeram parte do estudo. A intensidade da dor pós-operatória foi considerada a marcação primária; o tamanho da amostra necessária foi calculada em 30 pacientes. A intensidade da dor foi mensurada utilizando uma escala numérica de 10 pontos. Ambas as técnicas cirúrgicas foram executadas pela mesma equipe de cirurgiões. As medidas dos resultados secundários incluíram complicações intra-operatórias e pós-operatórias, achados histopatológicos, e a sobrevida livre da doença e geral no período de 5 anos de acompanhamento. Os pacientes foram randomizados utilizando-se uma tabela numérica randomizada. A aprovação pelo comitê de ética foi obtido em 1999, e os pacientes incluídos no período final de 1999 ao início de 2004. Este artigo descreve o estudo do protocolo em detalhes. A análise dos dados esta sendo atualmente realizada e será publicada em um artigo a posteriormente. **Registro do estudo:** NCT01258413.

Descritoras: Câncer cervical, histerectomia radical laparoscópica

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Bizarre Findings During Redo Laparoscopic Anti-reflux Surgery

Achados Bizarros na Reoperação da Cirurgia Anti-refluxo

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ABSTRACT

Laparoscopic antireflux surgery is an effective and durable treatment for gastroesophageal reflux disease. However, the procedure has a rate of reoperative or "redo" surgery. Reoperative surgery is associated to a higher degree of difficulty. Anatomy can be severely distorted by scarring and fundoplication herniation. Moreover, esophageal surgeons are sometimes faced with previous not indicated/incorrectly performed or unconventional procedures found during the operation. The authors report a case series of bizarre findings during redo laparoscopic antireflux surgery. Two gastroplication, one esophagopexy and one excessive dissection of the greater curvature are shown. Complex operations, such as the reoperations of anti-reflux surgery, should be referred to specialized centers.

Key words: Gastroesophageal reflux. Surgery. Fundoplication.

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INTRODUCTION

Laparoscopic antireflux surgery (LARS) is an effective and durable treatment for gastroesophageal reflux disease (GERD).^{1,2} However, the procedure has a rate of redo surgery ranging from 2 to 5 % in population studies³⁻⁶ and 1 to 5% in single institution series.⁷⁻¹⁰

Reoperative surgery is substantially more difficult.^{11,12} Anatomy is often severely distorted by scarring and fundoplication herniation.¹² Moreover, esophageal surgeons are sometimes faced with the consequences of previous incorrectly performed or unconventional procedures encountered during the redo operation.

This case series reports bizarre/unexpected findings encountered during redo LARS.

CASES

Case 1. A 65 year old women complained of severe heartburn that had persisted for six years after LARS. Interestingly, only three trocars were used and they were peculiarly placed in the left side

of the abdomen. Intraoperative findings included signs of a fundoplication close to the hiatus, although the right lip of the fundoplication was not found. The hiatus and the abdominal esophagus did not appear to have been dissected. Short gastric vessels (SGV) were divided to allow posterior visualization and a search for the gastric fundus behind the esophagus. After this maneuver, the old sutures were taken apart, and it became evident that the previous operation had actually consisted of a plication of the lesser and greater curvatures of the gastric body.

Case 2. This 34 year old woman complained of severe dysphagia and a 24 kg weight loss 2 years after LARS. The patients underwent six unsuccessful endoscopic dilatations. Intraoperative findings were a plication of the lesser and greater curvatures of the gastric body with SGV division similar to that of Case 1.

Case 3. After undergoing LARS 5 years ago, for the past three years this 73 year old woman has complained of heartburn and dysphagia.

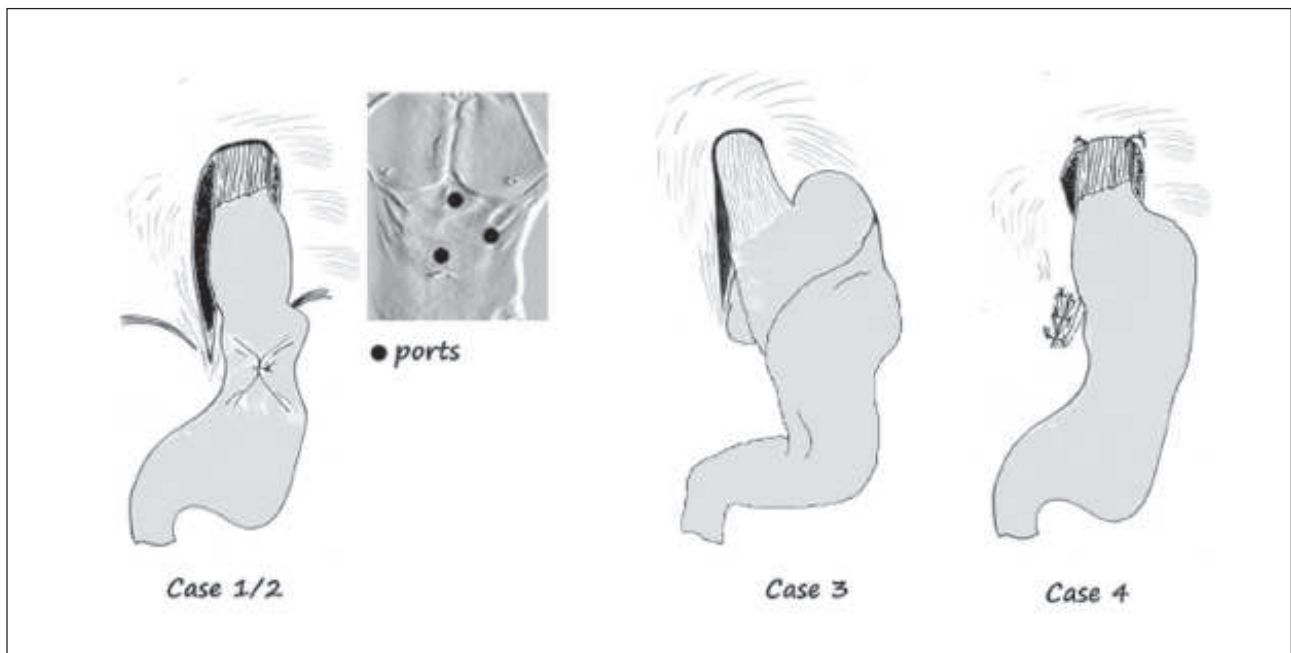


Figure 1 - Bizarre findings during redo laparoscopic antireflux surgery.

Intraoperative findings included dense adhesions between the liver and the omental fat of the greater curvature of the stomach, with a partial gastric volvulus. After adhesiolysis, it became clear that the whole greater curvature was freed from the colon allowing gastric rotation. The previous fundoplication was clearly torn apart. A redundant fundus was noticed leading one to believe that there was no stomach behind the esophagus. During esophageal dissection a lip of the gastric fundus was present behind the esophagus making it evident that an excessive division of the SGV and gastrocolic ligament had induced the construction of the fundoplication with the gastric body.

Case 4. This 43 year old man has complained of sore throat and cough that began one year after LARS was performed two years ago. Preoperative work-up did not reveal evidence of a hiatal hernia recurrence. pH monitoring demonstrated abnormal bipositional reflux. Intraoperative findings included sutures placed between the esophagus and hiatus that initially were interpreted as a partial fundoplication anchored to the hiatus. Using a left-sided approach and division/sectioning of SGV, an intact hiatoplasty was identified but the fundus was not found behind the esophagus. The operation was therefore described as a hiatoplasty and esophagopexy.

DISCUSSION

Reoperative LARS entails greater difficulty than the original operation.¹¹ This procedure has been described as one of the most challenging procedures for the gastrointestinal surgeon.¹² A complete work-up with endoscopy, esophagram, manometry, and sometimes pH monitoring is essential before the redo surgery. In some cases, however, preoperative tests are not sufficient to determine the actual anatomy that will be encountered during surgery. Surgeons must be prepared to perform alternative procedures and non-routine tactical maneuvers during a redo-fundoplication. The esophagus and hiatus must be adequately dissected. It is sometimes useful to try to initiate the dissection in a “virgin” area. This may be accomplished with a left-sided approach – if the SGV have not been divided beforehand, or with a median diaphragm section similar to the technique used for esophagectomies¹³ in order to reach the undissected esophagus in the mediastinum. For tactical reasons the fundoplication may be dismantled even if it seems to be intact. Similarly a good hiatoplasty may be opened to allow esophageal exposure high up in the mediastinum. Obviously, care must be taken to preserve integrity of the vagus nerve.

This series is presented to alert readers to the possibility of unconventional findings. If the surgeon does not contemplate such a possibility or believe what they encounter, such findings could lead to unnecessary dissection, time lost, and additional bleeding.

Most of the cases described here are from community hospitals. Nevertheless, the relationship between volume and outcomes is debatable. High-volume hospitals can deliver poor care as much as low-volume hospitals can deliver good care. Complex procedures, such as esophagectomies and pancreatectomies, are often regarded as volume-dependent operations.¹⁴ With regard to LARS, some

studies report a higher incidence of complications in low volumes centers,^{3,15} while other studies show good outcomes similar to those reported by academic centers.¹⁶⁻¹⁸ It must be remembered that this operation is relatively easy to perform; however, it is also relatively easy to be performed incorrectly. Different studies suggest a learning curve of close to 20 cases, and that experienced supervision should be sought by surgeons beginning laparoscopic fundoplication during their initial experience.¹⁹ Obviously, more complex operations, such as the treatment of paraesophageal hernias and perhaps most reoperations, should be referred to specialized centers.

RESUMO

A cirurgia anti-refluxo por via laparoscópica é um método efetivo e perene para o tratamento da doença do refluxo gastroesofágico, entretanto, há um certo índice de reoperações necessárias. As reoperações estão associada a maior nível de dificuldade já que a anatomia pode estar distorcida por fibrose e herniação da funduplicatura. Mais ainda, os cirurgiões podem se deparar com procedimentos prévios equivocados ou não convencionais. Os autores reportam uma série de casos de achados bizarros durante a reoperação de cirurgia anti-refluxo. Duas gastroplicaturas, uma esophagopexia e uma dissecação excessiva da grande curvatura são descritas. Cirurgias complexas, como as reoperações da cirurgia anti-refluxo, devem ser reservadas a centros especializados.

Descritores: Refluxo gastroesofágico. Cirurgia. Funduplicatura. Reoperação.

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Single Trocar Access (SITRACC) Total Hysterectomy

Histerectomia Total SITRACC (Trocarte de Acesso Único)

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ABSTRACT

Single-port surgery has emerged recently with the aim of further reducing the invasiveness of traditional laparoscopy and has been used in gynecology by experienced laparoscopic teams worldwide. In this paper we describe the first case of single-incision total hysterectomy using the SITRACC device.

Key words: Laparoscopy, Single incision, Single-port access, Hysterectomy.

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INTRODUCTION

Single-incision laparoscopic surgery (SILS), single-port surgery, laparoendoscopic single-site surgery (LESS) or embryonic natural orifice transumbilical endoscopic surgery (E-NOTES) has emerged recently with the aim of further reducing the invasiveness of traditional laparoscopy.¹⁻⁴ The first publication on single-incision laparoscopic total hysterectomy was reported in 1991.⁵ Despite the technical challenges associated with complex intracorporeal maneuvers, lack of instrument triangulation, limited traction of tissue, and external crowding and clashing,^{3,6} SILS has been successfully performed by experienced groups in gynecologic surgery.⁶⁻¹²

The aim of this manuscript is to describe the first case of single-incision total hysterectomy using the SITRACC device.

CASE REPORT

A 36-year old female patient was referred to our service with a complaint of menometrorrhagia of 7 months duration following laparoscopic tubal ligation. In addition to the recent laparoscopic tubal ligation she had a previous history of 3 cesarian sections and one laparoscopic bariatric surgery in 2007.

Transvaginal ultrasound demonstrated a small uterus (78 cm³) and normal adnexae.

After discussing all the available medical and surgical treatments for dysfunctional uterine bleeding, she elected to undergo a total hysterectomy.

A 2 cm semicircular skin incision was performed within the umbilicus. The incision in the fascia was extended further to ensure the placement of the SITRACC device (Figure 1A). CO₂ was insufflated to establish the pneumoperitoneum.

The patient was placed in Trendelenburg position. The uterus was mobilized with the aid of a uterine manipulator. A 30° 10 mm laparoscope (Karl Storz, Tuttlingen, Germany) was used during the entire procedure. Two conventional laparoscopic instruments were used most of the time. Occasionally, three instruments were placed inside the abdomen. Hemostasis was achieved with Ultracision harmonic scalpel (Ethicon Endo-Surgery) and/or RoBi bipolar forceps (Karl Storz).

The surgical steps of a total laparoscopic hysterectomy have already been described by our team¹³ and were basically the same using the single-access technique. Briefly, the round ligament was retracted medially with non-traumatic forceps and then transected. The utero-ovarian ligament and the fallopian tube were coagulated and transected (Fig-

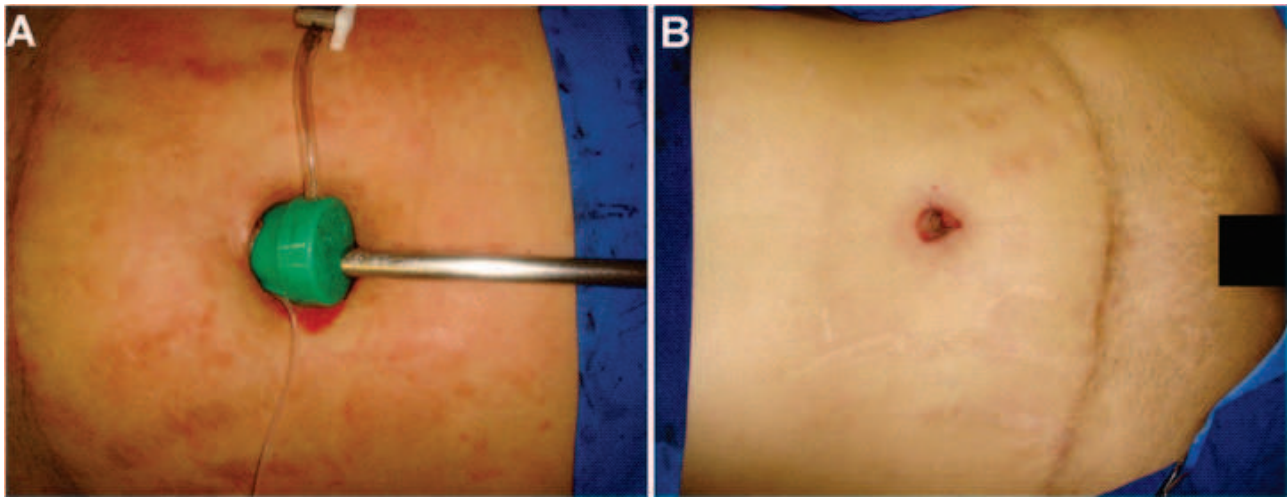


Figure 1 - (A) Placement of the SITRACC device inside the umbilical scar. (B) Final aspect/appearance of the umbilicus.

res 2 and 3). During the bladder dissection, the uterine manipulator was pushed upward and backward by the assistant. The bladder was retracted with a non-traumatic forceps and the vesicovaginal space was dissected (Figure 4). The uterine vessels were controlled with Ultracision harmonic scalpel and bipolarcoagulation (Figure 5). The cardinal and uterosacral ligaments were then transected. A complete circumferential colpotomy was performed with a monopolar hook (Figure 6) and the specimen was removed vaginally. The vaginal cuff was sutured laparoscopically with three X-shaped interrupted zero polyglecaprone 25 sutures using intracorporeal knots (Figure 7).

The adnexae were attached to their ipsilateral round ligament with 2/0 polyester suture using extracorporeal knots.

The transumbilical fascia incision was closed with zero polyglactin 910 suture, and the skin was closed with 4/0 polyglecaprone suture (Figure 1B).

Total operating time – calculated from the umbilical incision until the last cutaneous suture – was 160 minutes of which 77 minutes were devoted to the intracorporeal and extracorporeal knots. The estimated blood loss was 50cc.

Dipyrone (1g IV q6h) and ketoprofen (100mg IV q12h) were administered for postoperative analgesia. The postoperative course was uneventful and she was discharged 18 hours after surgery.

The patient returned 1, 4 and 6 weeks later for a follow-up examination and had no complaints, and no vaginal pain, discharge, or discomfort. The vaginal cuff was completely healed six weeks after the procedure.

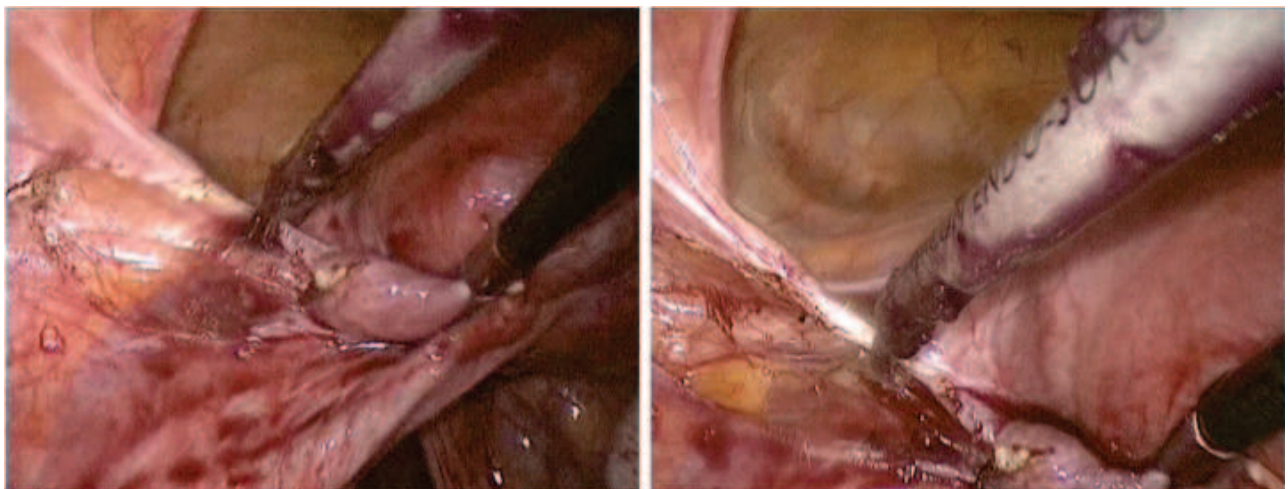


Figure 2 - Coagulation of the left round ligament and opening the anterior leaf of the broad ligament.

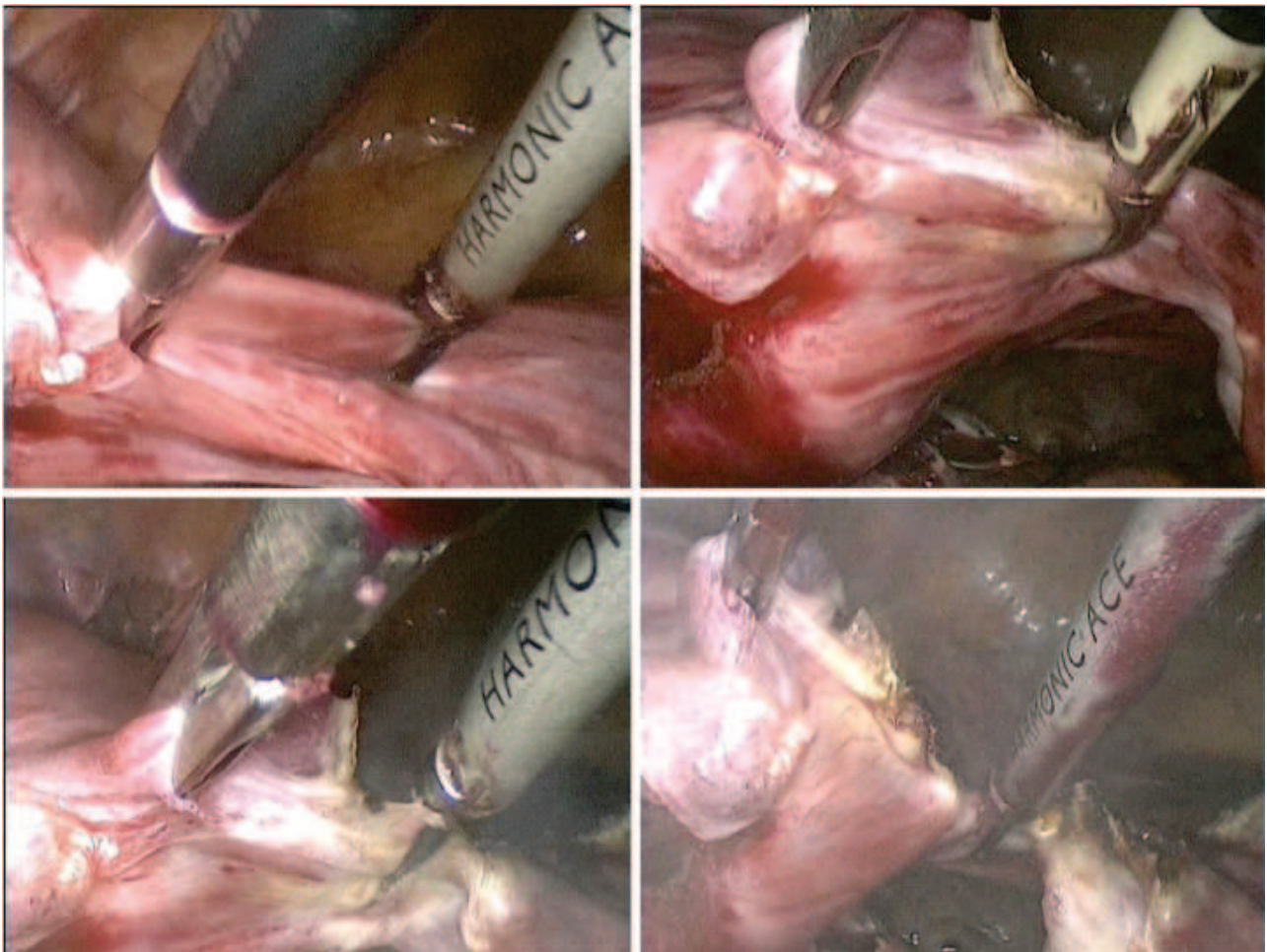


Figure 3 - Coagulation of the right round ligament and the fallopian tube/utero-ovarian ligament.

COMMENTS/DISCUSSION

Single-port laparoscopic surgery has been used in gynecology as early as 1969, when a

laparoscopic tubal ligation was described by Wheelless.¹⁴ In 1973, Wheelless and Thompson¹⁵ reported on 2600 cases of one-incision laparoscopic tubal ligation. The first complex pelvic procedure

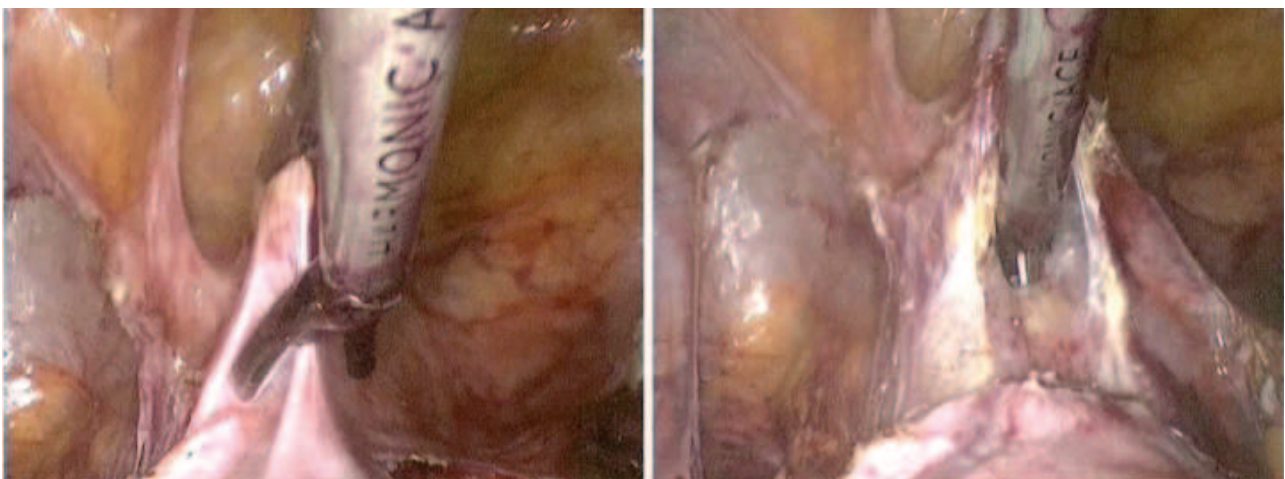


Figure 4 - Opening the vesicovaginal space.

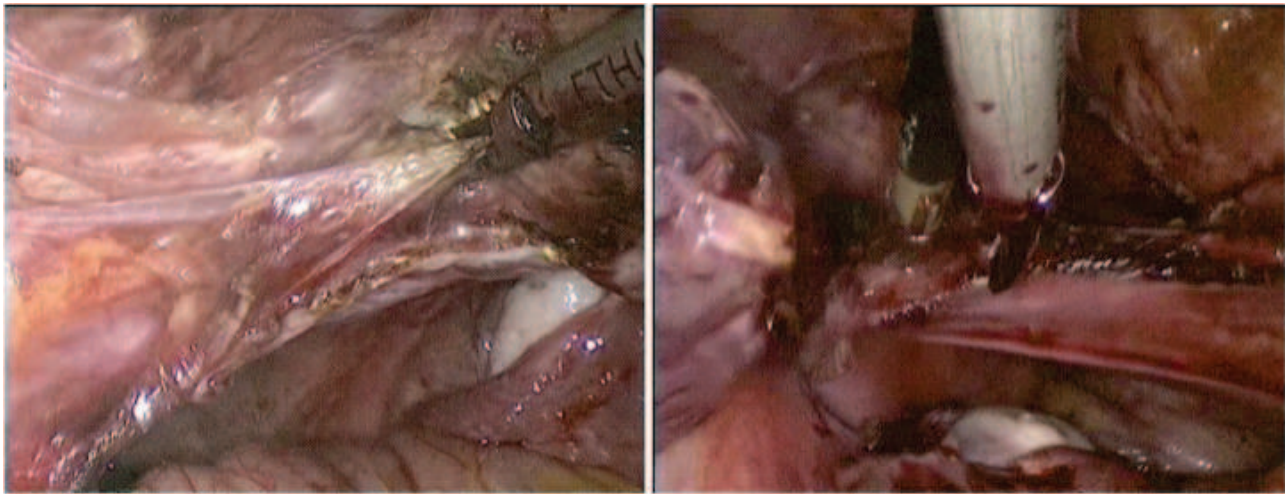


Figure 5 - Coagulation of the uterine vessels.

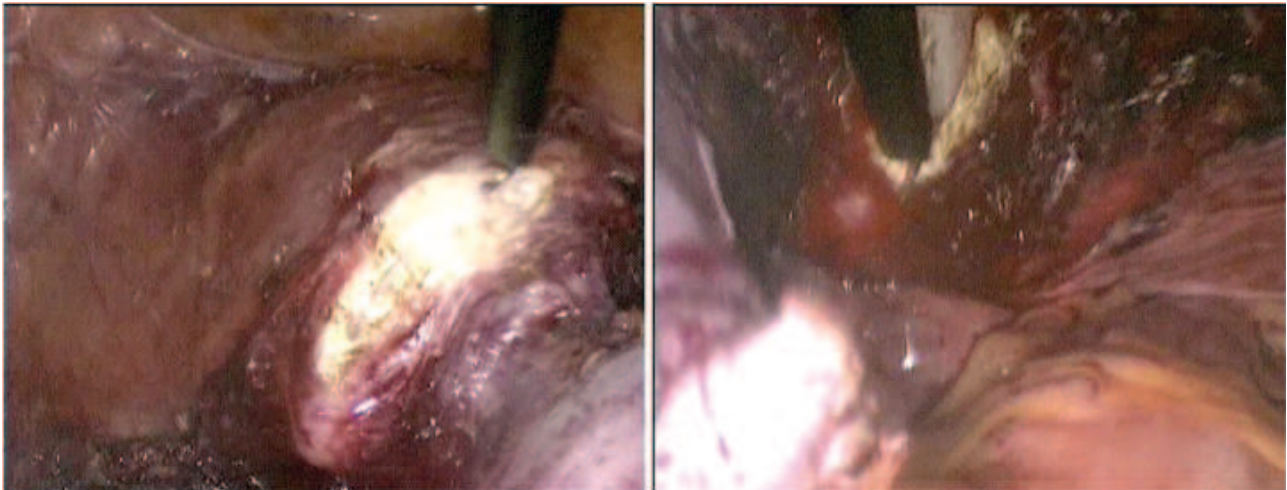


Figure 6 - Vaginal opening.

performed by means of laparoscopic single-incision access was described by Pelosi and Pelosi⁵ in 1991. They performed a laparoscopic hysterectomy with bilateral salpingo-oophorectomy utilizing a single umbilical puncture.

Recently, with the single-ports platforms and flexible instruments now available, it has become possible to perform complicated procedures through single-port access sites.⁸ Phongnarisorn and Chinthakanan⁶ reported 11 women diagnosed with leiomyoma (n=10) and adenomyosis (n=1) undergoing single-incision laparoscopic hysterectomy. The average uterine weight was 281.6g. The mean operative time, blood loss, and drop in hemoglobin level were 163.3 minutes, 114.5ml and 0.33g/dl, respectively. No intra-operative complication occurred. Park and cols.⁸ reported 200 cases of gynecologic pathologies

operated on by means of single-access surgery, including 105 total hysterectomies, 11 subtotal hysterectomies, 43 oophorectomies, 31 ovarian cystectomies, 5 salpingectomies, 2 myomectomies and 3 adhesiolysis. The median operative time was 120 minutes for total hysterectomy and 180 minutes for subtotal hysterectomy. Postoperative complications occurred in five patients after total hysterectomy (n=4) and subtotal hysterectomy (n=1), including 4 bleeding and 1 vesicovaginal fistula.

Kim and cols.¹⁶ retrospectively compared the perioperative outcomes, length of hospital stay, and postoperative pain, of a single port-access laparoscopic-assisted vaginal hysterectomy (n=43) and conventional laparoscopic-assisted vaginal hysterectomy (n=43). There was 1 conversion to laparotomy in the former group and 2 in the latter

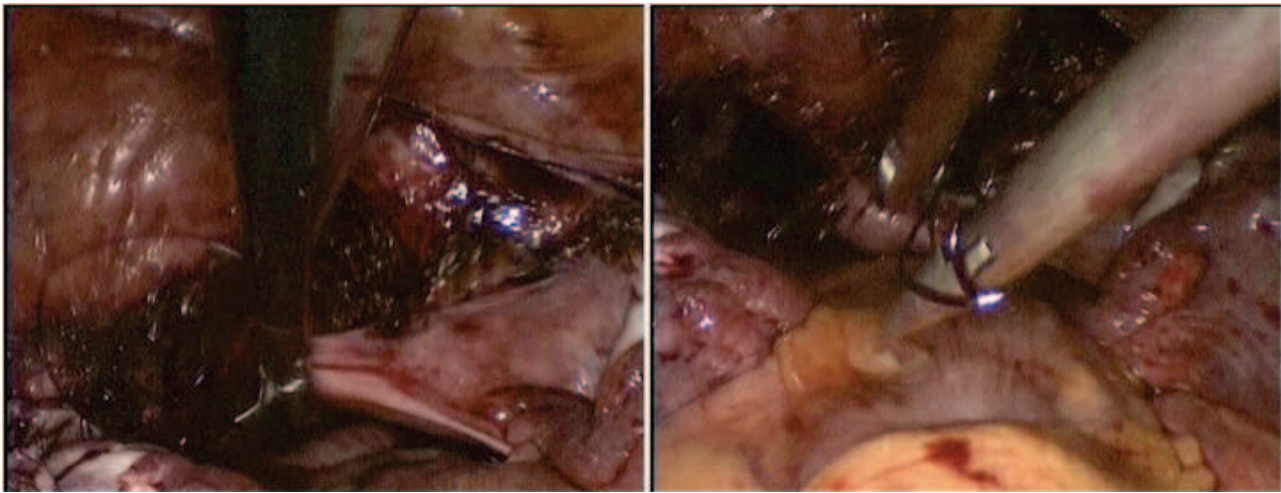


Figure 7 - Vaginal suture.

group. Additionally, 3 patients in the former group needed the placement of additional trocars (conversion to traditional laparoscopy). The operative time (119 vs. 124 min; $p=0.6$), estimated blood loss (369 vs. 378ml; $p=0.9$), drop in hemoglobin preoperatively to postoperative day 1 (14.6% vs. 12.1%; $p=0.2$), and postoperative hospital stay were comparable between both groups (2.8 vs. 2.7 days; $p=0.9$). Single port-access laparoscopic-assisted vaginal hysterectomy was associated with reduced postoperative pain. There were no complications, including reoperation, adjacent organ damage, and any postoperative morbidity, in both groups. Chen and cols.¹¹ compared the immediate results of patients undergoing either two-channel single-port laparoscopic-assisted vaginal hysterectomy ($n=50$) or conventional multiport laparoscopic-assisted vaginal hysterectomy ($n=50$). There were no statistically significant differences between the two groups in operative time, estimated blood loss, time to first flatus, intraoperative and immediate postoperative complications, shoulder tip pain, or length of hospital stay. However, postoperative pain was significantly less in the single-port group compared with the conventional group, as evidenced by lower mean scores on the visual analog scale and less mean accumulated dose of postoperative analgesics. Conversely, a randomized prospective study of single-port and four-port approaches for hysterectomy conducted by Jung and cols.¹² did not demonstrate any reduction of the postoperative pain with single-port access. The surgical outcomes of the two groups were similar.

In our first experience using the SITRACC device for total laparoscopic hysterectomy, the surgical steps were similar to those in conventional total laparoscopic hysterectomy until the extraction of the uterus. The main difference was during the vaginal suture. Suturing was the most demanding step of single-port hysterectomy. Intracorporeal knots were performed for the vaginal cuff closure. The lack of instrument triangulation made tying and securing the knots very laborious and tiring. The use of a knot pusher reduced the technical difficulty when it was applied for the ovariopexy.

Most studies do not show any superiority of the single-port access over conventional laparoscopic procedures.⁸ Any possible cosmetic advantage has not yet been demonstrated. Depending on the shape of the patient's umbilical scar, the skin incision can not be performed completely inside the umbilicus. Some studies demonstrated a reduction in the postoperative pain using the single-port access;^{11,16} however, one could contemplate that a bigger single incision could be more painful than four smaller incisions.

CONCLUSION

In this paper we demonstrated the feasibility of single-port total laparoscopic hysterectomy using the SITRACC device. The surgical steps were similar to the conventional laparoscopic hysterectomy, but the suturing was more difficult. Additional studies on single-port surgery are needed to define selective criteria and determine any benefits over conventional laparoscopic hysterectomy.

RESUMO

A cirurgia por acesso único surgiu com o objetivo de reduzir ainda mais a invasibilidade da laparoscopia tradicional e tem sido usada na ginecologia por equipes de laparoscopia experientes em todo o mundo. Neste artigo descrevemos o primeiro caso de histerectomia total por acesso único usando o dispositivo SITRACC.

Palavras-chave: Laparoscopia. Incisão única. Acesso por portal único. Histerectomia.

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Laparoscopic Pyelopyelostomy for Correction of Retrocaval Ureter

Pielopielostomia Laparoscópica na Correção de Ureter Retrocava

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ABSTRACT

Retrocaval ureter is a rare congenital malformation of the inferior vena cava, found in 1 in each 1000 births. The treatment is surgical, with correction of the obstructive factor. The present paper reports a case of retrocaval ureter and describes its videolaparoscopic correction. FFP, a 50 year old male, presented with right lumbar pain. Intravenous urography demonstrated right dilation of pelvis and proximal ureter, "in inverted J", suggesting retrocaval ureter. A CT urogram with late excretory phase and 3D reconstruction confirmed the diagnostic hypothesis. Laparoscopic pyelopyelostomy without resection of the retrocaval segment of the ureter was performed. CT urogram with late excretory phase is the imaging technique of choice for the diagnosis of the retrocaval ureter. Laparoscopic correction is feasible and yields a satisfactory result.

Key words: Ureter. Laparoscopy. Retrocaval ureter. Inferior vena cava.

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INTRODUCTION

Retrocaval ureter (RU) is a rare congenital malformation of the inferior vena cava (IVC), found in 1 in each 1000 births. It can cause mechanical obstruction of the ureter by extrinsic compression, causing pain or urinary infection. It has also been described associated with antenatal hydronephrosis.(12) When suitable, the treatment is surgical, with correction of the cause of the obstruction. Several reconstructive techniques have been used, prominent among them ureteroureterostomy, ureteropyelostomy and pyelopyelostomy, with or without resection of the ureteral retrocaval segment. (1,2,3,4) The present paper reports a case of RU and describes its videolaparoscopic correction.

CASE REPORT

FFP, a 50 year old male, presented with a complaint of right lumbar pain. Ultrasonography revealed right hydronephrosis. Intravenous urography (IVU) demonstrated dilation of the right pelvis and proximal ureter, "in inverted J", suggesting RU (Figure 1). Computerized tomography (CT) showed lateral



Figure 1

compression of the right ureter by the IVC, but without demonstrating a retrocaval segment (Figure 2). We opted to repeat the CT urogram with late excretory phase and 3D reconstruction, which allowed the visualization of the entire urinary tract (Figure 3) confirming the diagnostic hypothesis. Laparoscopic correction was recommended.

OPERATIVE TECHNIQUE

The patient was positioned in left lateral decubitus at a 60° angle with extremities and pressure areas protected. After asepsis, bladder catheter and nasogastric drainage were placed. Transperitoneal access was established through 4 portals: Veres needle puncture of the umbilicus for pneumoperitoneum with the introduction of a 10mm trocar; a 10mm trocar in the midline, between the xiphoid process and umbilical scar; a 5mm subxiphoid trocar; and a 5mm trocar along the lateral border of rectus abdominalis muscle. After inspection of the cavity Catell and Kocher maneuvers were performed. With careful ureteral dissection, over the psoas muscle and IVC, the renal pelvis was identified and dissected, revealing great dilation, until the lateral border of IVC. The IVC was dissected along its extension from the renal hilum to below the emerging retrocaval segment of the ureter. The retrocaval dissection proceeded carefully, attentive to the possible presence of lumbar veins, until the ureter was completely freed. The renal pelvis was divided in its extensive portion and the ureter was transposed anterior to the IVC. Ureteral catheterization with a 10F Nelaton catheter confirmed its complete patency. After verifying the viability and good vascularization of the stumps, the pyelopyelostomy was fashioned intracorporeally with running suture of absorbable 4-0 monofilament, first in the posterior plane, then in the anterior plane. After revision of the abdominal cavity a Penrose drain was positioned through the lateral trocar.

RESULT

The operative time was of 180 minutes and the estimated blood loss was 50ml. Ambulation and ingesting liquids was encouraged on the 1st postoperative day (POD). The patient was discharged on the 3rd POD after withdrawal of the bladder catheter and verification that the Penrose drain's output had not increased. Typically scant serous output

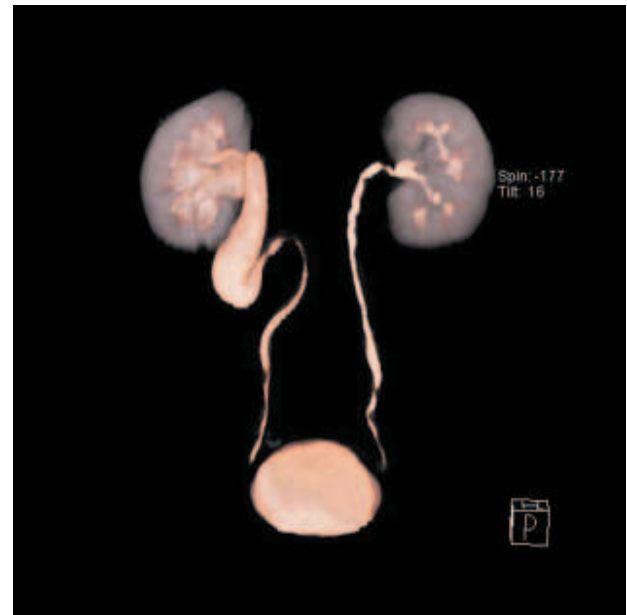


Figure 2



Figure 3

permitted removal of the Penrose drain on the 7th POD on an outpatient basis. Ultrasonography on the 21st POD showed significant regression of the hydronephrosis. IVU after 3 months demonstrated regression of the hydronephrosis and no obstruction. The patient is asymptomatic.

DISCUSSION

Retrocaval ureter is an IVC malformation that occurs when its infrarenal segment, which usually originates from the right supracardinal vein, develops from the right posterior cardinal vein. In this way, the right ureter presents a retrocaval segment, that is subject to extrinsic compression. The left ureter can be involved in cases of IVC duplication and situs inversus. It can be classified a Type I and Type II (15).

The use of a kidney with RU for transplant has been described, with the recommendation of use of the dilated segment in the ureterovesical anastomosis (6).

The symptoms usually occur after the third and fourth decades of life, especially pain and urinary tract infection (3).

The diagnosis is suggested by UGE, by the image of “inverted J” in the type I cases, and confirmed by CT. In the present case, the initial scan left doubts as to the diagnosis, as the retrocaval and distal ureteral segments were not visualized. This phenomenon can be attributed to an early excretory phase without fulfilling of the middle ureter with the excreted contrast in the obstructed segment. Performing a late excretory phase confirmed the hypothesis. The software use for 3D reconstruction allows the acquisition of good images for documentation.

The treatment is based on the transposition of the ureter anterior to the IVC, eliminating the extrinsic compression. Baba and cols. (1994) described the first reconstruction by laparoscopy, following the principles of dismembered pyeloplasty (7). Since then transperitoneal and retroperitoneal access have been described, and combined with extracorporeal anastomosis with the objective of eliminating the most difficult step and reducing the operative time.(3) The advantages of the laparoscopy

are already well established and they apply to the correction of RU; it is thus now considered the preferred therapeutic option.(8)

The sectioning of the retrocaval ureteral segment and its transposition, maintaining it *in situ* or resecting it, has been extolled by some authors, justified by the risk of dysplasia or intrinsic stenosis. Simforoosh and cols. (2006) did not find evidence of such alterations in any of their six cases described recently.(4) In the present case we opted for dissection and freeing the entire retrocaval ureter. These steps should be accomplished carefully, always attentive for the presence of lumbar veins that should be ligated because, in spite of their small diameter, they can cause bleeding which can provoke the need for conversion to conventional access. After sectioning of the pelvis, the ureteral catheterization showed that there was no evidence of obstruction.

The anastomoses more commonly described are ureteroureterostomy and ureteropyelostomy. Pyelopyelostomy was first described by Bhandarkar and cols.,(9) presenting the advantage of making possible the construction of a wide and satisfactory anastomosis, markedly reducing the risk of postoperative stenosis.(4) Given the quality of the anastomosis, as in all other studies, ureteral stenting was not performed, just placement of a Penrose drain. There was no increase in Penrose output at any moment in the postoperative follow-up. The authors agree, however, that the ureteral drainage is important and should be used, until larger series establish that it is not necessary.

CONCLUSION

CT with late excretory phase is the diagnostic imaging test of choice for RU. Laparoscopic correction is feasible and yields a satisfactory result.

RESUMO

O ureter retrocava é uma rara malformação congênita da veia cava inferior, ocorrendo em 1 em cada 1000 nascimentos. O tratamento é cirúrgico, com correção do fator obstrutivo. O presente artigo relata caso de ureter retrocava e descreve sua correção por videolaparoscopia. FFP, 50 anos, masculino com dor lombar direita recidivante. Urografia excretora demonstrou dilatação pielocalicial e de terço proximal do ureter direito, “em J invertido”, sugerindo ureter retrocava. Realizada CT com fase excretora tardia e reconstrução em 3D, que permitiu a visibilização da pelve renal, do ureter em toda sua extensão e da bexiga confirmando a hipótese diagnóstica. Realizada pielopielostomia laparoscópica sem ressecção do segmento retrocaval do ureter. Os autores concluem que a TC com fase excretora tardia é o exame de escolha para o diagnóstico do ureter retrocava e sua correção laparoscópica é factível promovendo resultado satisfatório.

Palavras-chave: Ureter. Laparoscopia. Ureter retrocava. Veia cava inferior.

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