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# Transvaginal Endoscopic Tubal Sterilization – Surgical Technique

## Esterilização Tubária Endoscópica Transvaginal – Técnica Cirúrgica

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**ABSTRACT**

Tubal sterilization is one of the most widely used options for female contraception. It can be performed in association with pregnancy or as an interval (not pregnancy-related) procedure. The latter is usually performed by laparotomy, laparoscopy, or hysteroscopy. Compared to open surgery, laparoscopy has been demonstrating some benefits due to its minimal invasiveness such as better cosmetic result, shorter hospitalization, decreased pain and faster return to work and to regular activities. Recent developments regarding laparoscopic surgery have been directed toward reducing the size or the number of ports or even eliminating abdominal incisions to achieve the goal of minimal invasive surgery. In this paper we describe the technique of transvaginal endoscopic tubal ligation in an attempt to minimize surgical morbidity and to offer an alternative approach to perform tubal sterilization.

**Key words:** laparoscopy, tubal sterilization, natural orifices translumenal endoscopic surgery, transvaginal surgery.

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## INTRODUCTION

The availability and use of contraception have contributed greatly to women's health. Despite the development of newer contraceptive technologies, tubal sterilization continues to be among the methods most widely used globally[1].

Tubal sterilization can be performed in association with pregnancy or as an interval (not pregnancy-related) procedure. The latter is usually performed by laparotomy, laparoscopy, or hysteroscopy. The transvaginal approach is used infrequently in the United States[2].

Laparoscopy is a minimally invasive surgery associated with many proven advantages over traditional open surgery[3] such as smaller incisions; decreased risk of local and systemic complications; decreased operative time, shorter hospital stay, and less postoperative pain, with faster recovery[4-6]. Most interval procedures (89% of outpatient and 53% of inpatient interval procedures) are performed by laparoscopy[7] with the use of coagulation, clip application, or band application as the method of occlusion[1].

Recently, a novel, minimally invasive approach to the abdominal and pelvic cavity has been described, using a transvaginal endoscopic approach. We have previously demonstrated the feasibility and the safety of this access to perform hybrid transvaginal cholecystectomy[8] and nephrectomy[9] in human beings. The transvaginal endoscopic approach provides excellent visualization of intra-abdominal and pelvic structures, and the ability to perform therapeutic maneuvers. The aim of this paper is to report the technique of transvaginal endoscopic access to perform tubal ligation.

## SURGICAL TECHNIQUE

The patient is positioned in the dorsal lithotomy position with the legs in stirrups and the arms tucked at her sides. A 14F Foley catheter is inserted to empty the bladder, and the balloon is inflated. A prophylactic antibiotic (1g of cefazolin) is used after induction of

anesthesia. The surgical field is prepared with povidone iodine, including the vaginal cavity.

The patient is placed in a Trendelenburg position. The vaginal walls are retracted by 2 lateral retractors and the posterior lip of the cervix is grasped by a Pozzi clamp. Anterior traction is given to the cervix to stretch the posterior fornix. The vaginal mucosa in the posterior cul-de-sac is opened at the cervico-vaginal junction by a semilunar 1.5-cm incision and the posterior cul-de-sac peritoneum is identified and opened (Figure 1).

The double-channel upper gastrointestinal flexible endoscope (Karl Storz Endoskope, Tuttlingen, Germany) is introduced into the peritoneal cavity, and carbone dioxide is instilled (via a nasogastric tube anchored to the endoscope) to obtain the pneumoperitoneum (abdominal pressure is maintained between 12 and 14 mmHg). A U-turn can be made to see the exact entrance point of the endoscope and to identify the pelvic structures (Figure 2). A uterine manipulator is used to mobilize the uterus anteriorly, exposing the posterior uterine wall, the Fallopian tubes, the ovaries, the pouch of Douglas, and the rectum.

The left tube is identified, electrocauterized with a 40W coagulation current (Valleylab, Tyco Healthcare Group LP, Boulder, Colo) using a hot biopsy forceps (Boston Scientific, Natick, Mass), and sectioned (Figure 3). The same procedure is performed in the right tube (Figure 4).

The pelvic cavity is checked for bleeding and the cul-de-sac is closed with a running 2-0 polyglactin 910 suture.

The patient is given a regular diet 6 hours after the procedure and after that she can be discharged home. The patient is advised to avoid vaginal intercourse for 40 days.

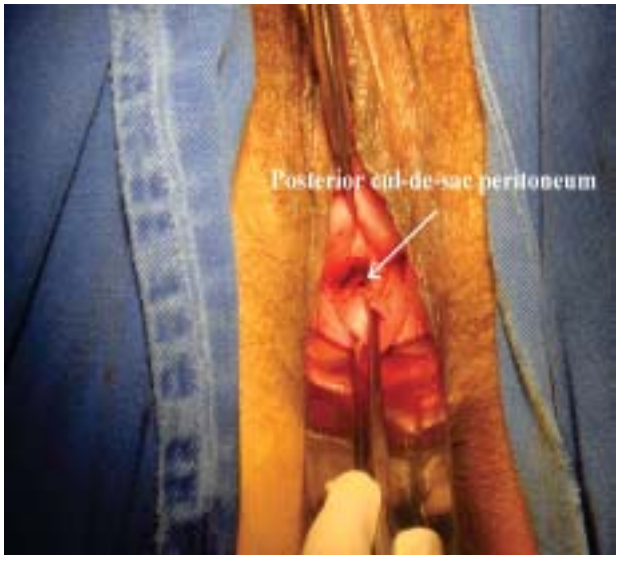


***Figure 1 -*** *Opening the posterior cul-de-sac peritoneum to access the abdominal cavity.*

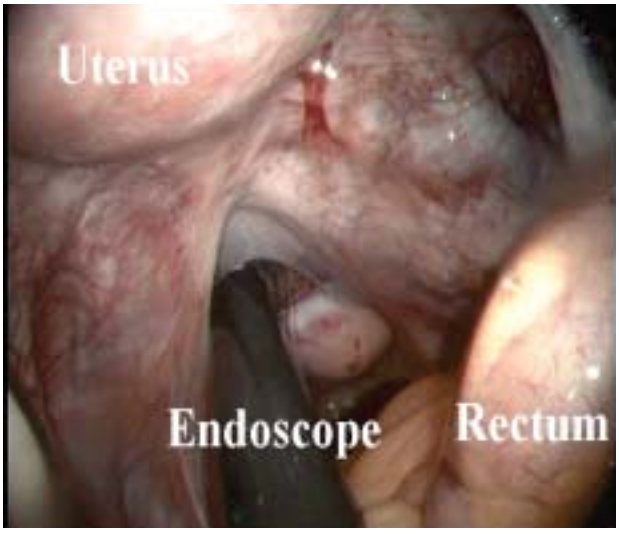


***Figure 2 -*** *U-turn to identify the pelvic anatomy and to check the exact point of entrance of the endoscope.*

## DISCUSSION

In the last 6 years, exponential development of therapeutic endoscopy has been realized. There is interest now in developing surgical procedures that enter the peritoneum or through hollow viscera that can be accessed via natural body openings precluding skin incisions[10,11]. The new approaches, coined natural orifice translumenal endoscopic surgery (NOTES), aim to further reduce surgical treatment morbidity and may represent the next frontier in minimally invasive surgery[12].

The idea of using natural orifices to perform abdominal surgeries is based on three main justifications: improved cosmetic appearance, ease of access, and the concept that human ingenuity and technological advance can continue to reduce the trauma and discomfort associated with effective surgery[13]. Intra-abdominal organs would be accessed by passing an endoscope into the peritoneal space via a transgastric, transvaginal, transvesical or transcolonic approach[14].

The first report of NOTES was published in 2002 when GETTMAN e cols.[15] demonstrated the feasibility of performing transvaginal laparoscopic

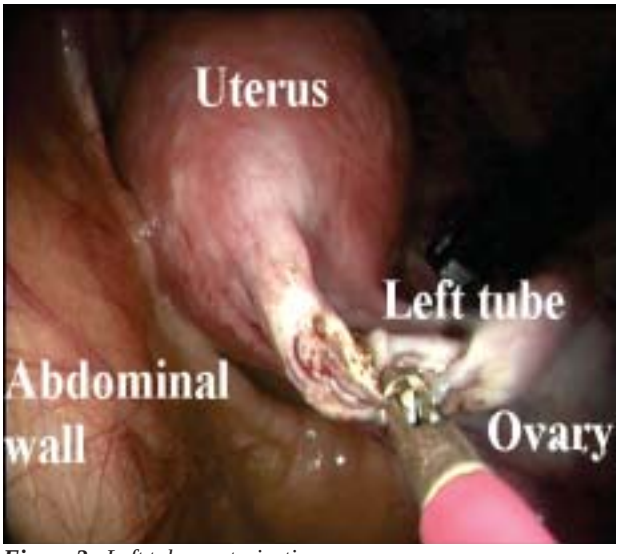


***Figure 3 -*** *Left tube cauterization.*

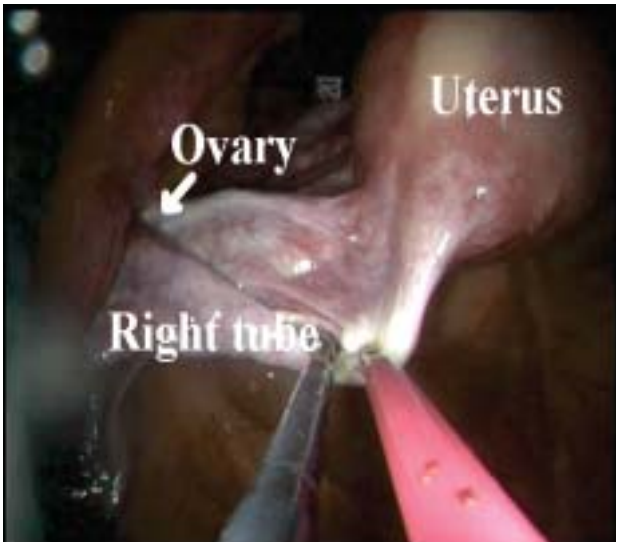


***Figure 4 -*** *Right tube cauterization.*

nephrectomies in an experimental model at the University of Texas. Two years later, KALLOO e cols.[16] performed transgastric liver biopsies at Johns Hopkins University. After these initial reports, other investigators demonstrated the safety of transgastric ligation of fallopian tubes[17], cholecystectomy[18], cholecystogastric anastomosis[18], gastrojejunostomy[19], partial hysterectomy with oophorectomy[20], splenectomy[21], nephrectomy[22], gastric reduction[23], and pancreatectomy[24], all based on experimental studies in pigs. Since 2007, the transvaginal route has been used by some surgeons to perform cholecystectomy[8,25-28] and nephrectomy[9] in human beings.

Minimally invasive surgery has numerous advantages, and a logical extension from laparoscopic surgery is to eliminate skin incisions by performing natural orifices translumenal endoscopic surgery[17]. In fact, the vaginal access to the abdominal cavity is not new. It has been performed to visualize the pelvic and intra-abdominal organs since the early 1900s, when it was called culdoscopy. On April 19, 1901, the Russian surgeon, Dr Dmitri von Ott, first described ventroscopy through colpotomy in the Trendelenburg position to the Meeting of The Gynecology and Obstetrical Society of Saint Petersburg[29]. TeLinde[30], in 1940, was recognized as performing one of the first rigid culdoscopies in the United States. Palmer[31], in 1942, introduced transvaginal rigid culdoscopy in the dorsal decubitus position. In that same year, Albert Decker[32] invented what is known as the Decker culdoscope, a rigid instrument with a lamp adjacent to a lens at the distal end. CLYMAN[33], in 1963, introduced the rigid panculdoscope with which he performed various procedures, such as adhesiolysis, ovarian biopsies, and cyst aspiration. In 1999, WATRELOT e cols.[34] described the fertiloscopy, a minimally invasive technique for investigating female infertility. It uses a minimally invasive transvaginal approach to the pelvic organs and usually combines the following diagnostic procedures: hydrolaparoscopy (or hydropelviscopy), dye test, salpingoscopy, microsalpingoscopy and hysteroscopy.

Using the same concepts of culdoscopy and fertiloscopy, in this article we described the technique of totally transvaginal endoscopic tubal ligation. Endoscopic visualization of the pelvic anatomy is superb, and identification of the structures is remarkably simple.

Some of the difficulties reported previously by our team[8,9] can be faced in this procedure due to the flexibility of conventional endoscopes, which limits the control on instruments during the surgery. Once the instruments pass through the working channels of the endoscope, they reach the abdominal cavity in parallel and it also limits the surgeon's movements. Moreover, as the surgery is performed using U-turn, the image obtained is upside-down and sometimes lateral, but it does not make the surgery more arduous. Certainly all these difficulties can be overcome with the increasing experience in handling endoscopic devices.

Tubal ligation is a simple procedure and does not need advanced maneuvers to dissect and exposure tissues. It is not necessary to set up traction and counter-traction on the structures to perform the

surgery and that is why it seems to be the ideal procedure to start practicing surgical endoscopic skills.

Transvaginal endoscopic tubal ligation appears less invasive than a laparoscopy and a minilaparotomy, because it obviates any skin incision. The described technique is feasible and can be reproduced by any group with experience in laparoscopy and endoscopy, as such a group has the appropriate endoscopic equipment. In our opinion, transvaginal endoscopic surgery can provide patients the benefit of reduced pain, faster recovery time, and absence of scars compared to the traditional laparoscopic and open surgeries, remaining as an alternative approach to perform this kind of procedure. We know that the current experience on transvaginal endoscopic surgery is scarce and prospective studies comparing all these techniques must be done to confirm the safety, indications, and real advantages of this new surgical approach.

**RESUMO**

A esterilização tubária é uma das opções mais utilizadas para a contracepção feminina. Ela pode ser realizada durante o parto ou como um procedimento de intervalo, não relacionado à gestação. Este último é geralmente realizado por laparotomia, laparoscopia ou histeroscopia. Comparada à cirurgia aberta, a laparoscopia tem demonstrado alguns benefícios devido à sua mínima invasibilidade tais como melhor resultado cosmético, menor tempo de internamento, menor dor pós-operatória e retorno precoce ao trabalho e às atividades regulares. Os avanços recentes da cirurgia laparoscópica têm sido direcionados à tentativa de reduzir o tamanho e o número de portais, ou mesmo eliminar as incisões abdominais para se obter o objetivo de uma cirurgia mais minimamente invasiva. Neste artigo descrevemos a técnica de ligadura tubária endoscópica transvaginal, na tentativa de minimizar a morbidade cirúrgica e oferecer uma abordagem alternativa para a realização da esterilização tubária.

**Palavras-chave:** laparoscopia, esterilização tubária, cirurgia endoscópica transluminal por orifícios naturais, cirurgia transvaginal.

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