Culdoscopy for general surgeons and gynecologists

Kuldoskopija za kirurge in ginekologe

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Abstract

Culdoscopy is a form of Natural Orifice Translumenal Endoscopic Surgery (NOTES), used for diagnostic and selected operative gynecological procedures. Advances in flexible technology will render major intraabdominal operations possible. Minilaparoscopy Assisted Natural Orifice Surgery (MANOS) is a synergetic combination of operative culdoscopy and minilaparoscopy for major surgery, and consitutes an easy evolutionary step for experienced laparoscopists.

Key words. *Culdoscopy, minilaparoscopy, NOTES.*

Izvleček

Kuldoskopija je ena od oblik endoskopske kirurgije skozi naravne telesne odprtine (Natural Orifice Translumenal Endoscopic Surgery (NOTES), ki se uporablja v diagnostičnih in izbranih operativnih ginekoloških postopkih. Tehnološki napredek prožnih inštrumentov bo omogočil izvedbo večjih operacij na trebušnih organih. Minilaparoskopsko asistirana kirurgija skozi naravne telesne odprtine (Minilaparoscopy Assisted Natural Orifice Surgery (MANOS) je dopolnjena kombinacija operativne kuldoskopije in minilaparoskopije, primerna za večje kirurške posege. Je enostaven razvojni korak za izkušenega laparoskopista.

Ključne besede. Kuldoskopija, minilaparoskopija, NOTES.

If you are a general surgeon or a gynecologist who thinks that culdoscopy is surgery of the past, you definitely should read this article from the beginning to the end. The reason is that the concepts of natural orifice transluminal endoscopic surgery (NOTES) could well become the next most important contribution to a minimally invasive approach, used in some intraperitoneal general operations and gynecological pathologies, such as cholecystectomies, appendectomies, splenectomies, oophorectomies etc. and you do not wish to be left behind.

Major university centres, dedicated medical societies, task groups and the industry are devoting a lot of their time and energy to developing this revolutionary new approach that focuses on transgastric peritoneoscopy (1), but also includes transvaginal endoscopic approach to some of the above mentioned procedures, leaving no scars in the abdomen. This work is associated with innovations in flexible technology and radio-controlled robots. Task groups are evaluating the safety level of these procedures, and recommendations and guidelines for proper training are being drawn. Even though you think that you are far away from all that, this article will show you that as an experienced laparoscopist you are nearer than you think to the hybrid procedures of NOTES, such as culdolaparoscopy. Transvaginal surgery via colpotomy is a well-known gynecological approach, which consists of making an incision in the posterior cul-de-sac to operate and extract specimens via a vaginal route. Colpotomy is used during laparoscopy for specimen extraction, avioding additional abdominal scars (2,3).

Professor Von Ott first described transvaginal endoscopy under the name of ventroscopy at the meeting of the Society of Gynecology and Obstetrics of San Petersburg (Russia) in 1901. He performed colpotomy with the patient in the Trendelenburg position, while inserting a tube through the vagina into the pelvic cavity and illuminating the pelvis and abdomen (4). A few years later, several optical instruments related to cystoscopy began to be used for visualization of the thorax, abdomen and pelvis via a vaginal route. Dr. Emanuel Klaften presented colpolaparoscopy at the meeting of the Vienna Medical Society, in Austria in 1937. He designed an optical instrument fitted with a light and a 90-degree angle vision. The device had shutters that opened and closed for protection from being tainted by humidity or blood during the introduction into the posterior cul-de-sac. Several diagnostic procedures and a few operations were performed using this technique (5). Dr. A. Decker and Dr T. Cherry described transvaginal endoscopy done in the knee chest posture under the name of culdoscopy in 1944. The first operations were done at the Knickerbocker Hospital in New York (USA).

Culdoscopy has been used for transvaginal endoscopy for more than 25 years in thousands of cases worldwide. It was used with local or general anaesthesia. Patients received antibiotic prophylaxis and antiseptic vaginal preparations. Complications were rare and were mostly associated with extraperitoneal rectal perforation that required prolonged antibiotic treatment (6). During the 1960's, gynecologists began to use laparoscopy because it affords better visualisation than culdoscopy. Laparoscopy is more traumatic than culdoscopy, but offers the avantage to explore the pelvis and the abdomen, and to use additional ports. Culdoscopy was abandoned for three decades. Meanwhile, laparoscopy benefited from technological advances, such as optic fibers, video, novel instruments, lasers, flexible technology and robots. A revival of transvaginal endoscopy occurred in 1998 thanks to technological advances and independent work on transvaginal hydrolaparoscopy and culdolaparoscopy. A transvaginal hydrolaparoscopy is an outpatient or office procedure, done under local anaesthesia with a microculdoscope, approximately 3 mm in diameter, which uses normal saline solution at body temperature as a distension medium. The liquid maintains the structures in a better anatomical position than laparoscopy. It affords good visualization of the ovary, fallopian tubes and pelvic cavity. It is used for diagnosis and minor surgery, mostly for infertility (7). A flexible endoscope is also used for culdoscopy replacing laparoscopy. The advantage of the flexible instrument over the rigid one is that it allows for changing the visual angle to up to 180 degrees; and that it provides visualization of the pouch of Douglas, the anterior face of the uterus and broad ligaments, all of them blind spots for rigid culdoscopy. Culdolaparoscopy is a hybrid procedure, combining operative culdoscopy, a natural orifice surgery, with laparoscopy and minilaparoscopy.

It has proved to be an easy procedure when in the hands of an experienced laparoscopist (8). Patient selection is similar to that for laparoscopy: the criteria include an easy access to the posterior vaginal fornix and no posterior cul-de-sac obliteration. The patient receives prophylactic antibiotics and a bowel preparation. The operating room should be equipped with two mobile monitors that serve the operating surgeon and the assistant. The surgeon can move from the lateral position to operate between the patient's legs. The patient is placed in a modified dorsolithotomy position and in Allen-type telescopic stirrups. The vagina is cleansed with an antiseptic, and a foley catheter and a uterine manipulator are placed into the bladder and the uterus. The procedure is done with laparoscopic instruments no larger than 5 mm (preferably 3 mm) in diameter. The vaginal port consists of a plastic rod, 10 mm in diameter and 46 cm in length (Port-Saver TM manufactured by ConMed) mounted in an insufflation cannula, 12 mm in diameter and 15 cm long (Figure 1-2). Vaginal port placement is done under laparoscopic or minilaparoscopic surveillance. The uterus is pushed with the uterine manipulator anterior and cephalad, exposing the pouch of Douglas. The rod is placed against the posterior vaginal fornix, and the end of the rod is seen as a protrusion in the centre of the cul-de-sac. At the tip of the protrusion, an incision is made with a minilaparoscopic spatula or hook. Then the rod is introduced into the pouch of Douglas using gentle yet steady pressure, and the cannula is slid over. When in place, the vaginal port fits tight and is well sealed. The pnemoperitoneum is not lost; it is multifunctional and can be used for insufflation, visualization, operation and extraction. The vaginal port can be used to place 10-mm scopes, and larger or longer instruments, such as clip appliers, endoscopic gastrointestinal anastomosis clamps, morcelators, large bipolar clamps, and an irrigator. Extraction of large specimens is possible because in most cases the vagina stretches to permit the delivery of solid specimens measuring up to 8 cm. The colpotomy is closed vaginally using chromic sutures. I have performed successfully more than 100 procedures, including appendectomies, cholecystectomies, myomectomies, oophorectomies, ovarian cystictomies and salpingoophorectomies (9).

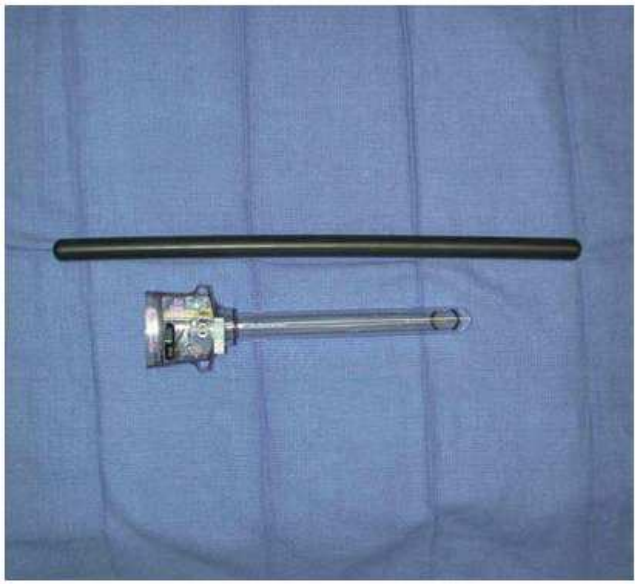

Figure 1
A plastic rod, 46 mm in length and 10 mm in diameter, and an insufflation cannula 15 mm long and 12mm in diameter

Figure 2
A loaded cannula with the rod is used to be introduced vaginally against the posterior vaginal fornix.

We should be prepared for changes in minimally invasive surgery, such as the revolutionary NOTES. Meanwhile, until proper technology and

guidelines become available, minilaparoscopy assisted natural orifice surgery (MANOS), such as culdolaparoscopy, can be used. The possibility of using this approach to assist flexible transgastric peritonescopy (10) has been suggested by our limited laboratory experience with gastroscopy combined with laparoscopy and minilaparoscopy. The advantages of this synergistic effect have been successfully used for some other surgical indications in humans (11). As minimalists, we wish to limit the number and size of the abdominal trocars in order to decrease the risk of hernias and improve cosmetic results. In minilaparoscopy and laparoscopy, specimen extraction can therefore be done via colpotomy. Gynecologists occasionally use colpotomy to remove specimens, but surgeons rarely use vaginal extraction for removing the appendix, gallbladder, spleen, tumor of the stomach or the large bowel, and urologist infrequently remove the kidney via colpotomy. In many cases they were frustrated by the loss of the pneumoperitoneum. Culdolaparoscopy, which uses a sealed vaginal port, avoids the problem of the lost pneumoperitoneum, since an endoscopic bag can be easily introduced via the vaginal port for extraction, and the pneumoperitoneum can be reinstated, when needed. Even after the vaginal port has been completely removed, it is very easy to place the vaginal port back and reestablish the pneumoperitoneum, in most cases using the vaginal port for insufflation. Hopefully, this paper will convince you of the advantages of extraction via the vaginal port. Also remember that culdolaparoscopy goes beyond that: think of the vaginal port both as an entrance and an exit port, and do not forget that all ports, abdominal or vaginal, are multifunctional. It is with this in mind that you will be able to use any port and its function according to the requirements or stage in each case. Thereby you can overcome what so far has been considered limitations of minilaparoscopy or operative culdoscopy. The transvaginal endoscopy, commonly known as culdoscopy, constitutes a less complicated entrance into the peritoneal cavity than the transgastric approach. Yet, its use is limited to women with no obliteration of the pouch of Douglas or the vaginal fornix. Culdoscopy can become the great NOTES. Until flexible instruments, radio directed robots, guidelines and training programmes become available and affordable, hybrid procedures, such as culdolaparoscopy, can benefit patients and prepare surgeons for the advances to come.

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