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CULDOTOMY AS A SURGICAL METHOD FOR TUBAL STERILIZATION AND TUBAL ECTOPIC PREGNANCY TREATMENT

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ABSTRACT

Objective: To evaluate the efficacy and safety of culdotomy in surgical tubal sterilization and extrauterine tubal pregnancy, ruptured or intact.

Methods: This is a prospective study of 11 cases of extrauterine tubal pregnancy and 29 cases of tubal sterilization subjected to transvaginal adnexal surgery via culdotomy from 2009-2014.

Results: We reviewed 29 cases of culdotomic tubal sterilization as well as 11 cases of extrauterine tubal pregnancy of which 5 were intact and 6 were ruptured with hemoperitoneum. Culdotomic transvaginal tubal surgery was performed in all cases. There were no intraoperative or postoperative complications. Two units of blood were transfused in 2 cases of ruptured tubal pregnancy. Cases were selected via history and physical exam; transvaginal ultrasound excluded cases with peritoneal adhesions which make culdotomy impossible.

Conclusion: Culdotomy is a safe surgical method to enter the cul-de-sac (pouch of Douglas) and to perform tubectomy for sterilization as well as for tubal ectopic pregnancy, either ruptured or intact.

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INTRODUCTION

The vaginal method of gynecologic surgery is not viewed with the same importance in all cultures. However, the culdotomic vaginal approach, when it can be accomplished, is a surgical method with several advantages over the abdominal approach. It is a minimally invasive technique comparable to laparoscopy. Culdotomy utilizes a horizontal cut of the posterior vaginal fornix at the level of the cul-de-sac (pouch of Douglas). This method allows direct entry into the pelvic peritoneal cavity (Wang *et al* 2001). It is a surgical approach to the adnexa reported since the beginning of the 19th century (Abrao *et al* 2005; Delvaux *et al* 1993). An overwhelming body of evidence in the literature indicates that minimally invasive surgery not only offers superior cosmetic results but, most importantly, also reduces surgical trauma and blood loss, neuroendocrine stress and inflammatory response, postoperative pain, and recovery time (Wang *et al.*, 2001; Abrao *et al.*, 2005; Decker *et al.*, 1994). Culdotomy meets the criteria for a minimally invasive surgical approach. Colpotomy or culdotomy is also used in both gynecologic adnexal surgery and general surgery to extract large masses resected during laparoscopy (Dozois *et al.*, 2008;

Aubert Agostini *et al.*, 2008; Ferrari *et al.*, 2003, Fraenkel *et al.*, 1930; Gill *et al.*, 2002; Hofmeister *et al.*, 1974). It is also employed during culdoscopy (Hulka J F 1972, Joseph-Claude-Anthelme Recamier 1980).

The first colpotomy is attributed to Dr. J Recamier (Kelly, 1896). Early colpotomy (Maria *et al.*, 2012) was also described in 1835. As a female sterilization method, culdotomy or colpotomy was described for the first time in 1895 by DIA Duhrseen, a German obstetric doctor (McCann *et al.*, 1978). In 1943 Dr. BN Purandare, in India, suggested colpotomy for sterilization through the posterior fornix. (Purandare, 1970; Ott D 1901). The posterior fornix was used for culdoscopy for the first time in 1901 by Dr. Dimitri Osorovich Ott, a gynecologist from St. Petersburg, (Shams *et al.*, 1980; Shirish *et al.*, 2012). For a variety of reasons, morbidity and complication rates were lower in Asia than in Western industrialized nations, (Von Ott, 1903) where they ranged from about 3 to 13% (Wang, 2001). Despite its merits (Wortman and Poitrow, 1967), the transvaginal technique of adnexal surgery is not widely performed by gynecologists especially non-vaginalists, because of unfamiliarity with culdotomy and adnexal surgery and the possibility of complications, such as rectal damage. In our opinion, the lack of popularity for culdotomy is influenced by the commercialization of laparoscopy (Wortman *et al.*, 1973).

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This important procedure is applied in vaginal hysterectomy at our institution and also in the current study.

MATERIALS AND METHODS

After extensive experience in vaginal surgery (947 vaginal hysterectomies from theme 863 without uterine prolapse) and especially in adnexal culdotomic surgery, we began to apply the culdotomic method of tubal sterilization and surgical treatment of tubal ectopic pregnancy. From 2009 to 2015, we performed 2 types of interventions, tubal sterilization (29 cases) and culdotomic surgical removal of ectopic tubal pregnancy (11 cases) from which 5 cases were intact and 6 ruptured, with surgical technique bloodloss 30cc to 150 ml. The first group of 29 was characterized by definitive sterilization tubectomy. Spinal anesthesia was applied in 25 cases with very good results. In 4 cases general anesthesia with intubation was used at the patient's request. First 18 cases, culdotomy was applied, taking from 1 min 20 sec to 3 minutes. Electrocautery was used in 9 cases. Culdotomy was a 3-4 cm horizontal cut of the posterior fornix at a level about 2 cm below the intersection of the two sacrouterine ligaments (Ott D 1901). (Fig 1- Culdotomy).



Fig. 1. Culdotomy

A 30 x 7 cm gauze was inserted in the pouch of Douglas in order to retract the intestine and omentum. Next, a long handmade retractor (Fig 2 Handmade retractor) was inserted into the pouch manually in order to increase the depth of intestinal retraction. The adnexa were exposed and we searched for the left tube (Fig 3 – Transvaginal tubectomy). In 40% of cases this tube was spontaneously displayed in the visible field. It was exposed well, caught, cut and tied about 1 cm from its exit from the uterine angle. The right tube was searched for next. In 60% of cases, this was reached through a technique of pursuit of the tube and it was caught, cut and tied in the same way as the left tube. After our successful experience with definitive sterilisation tubectomy, we observed that ectopic tubal pregnancy (92% of cases of ectopic pregnancy) has 2 steps (Delvaux *et al.*, 1993) which can both make use of culdotomy: first is the tubectomy and then, in ruptured cases, irrigation of the peritoneum. The first step, culdotomy, was realised by the same method as tubal culdotomic sterilisation. We concluded that the pouch of Douglas is the most dependent point of the peritoneal cavity and allows good drainage of blood from the ruptured ectopic.

In order to avoid the impossibilities for culdotomic tubectomy, the cases with ectopic tubal pregnancy were first diagnosed and after that cases for tubal sterilization were selected for culdotomic intervention. This is described below.

Diagnosis

For cases that were suspected for ectopic tubal pregnancy, a detailed history and physical were performed that evaluated menstrual delay, pelvic pain, vaginal hemorrhage and the pathologies that predispose to extrauterine tubal pregnancy. A careful examination was performed to evaluate for the possibility of anemia from a ruptured tubal ectopic. A vaginal examination was performed to evaluate the adnexa as well as uterine movement to determine suitability for culdotomy. Only those cases with no limit in uterine and adnexal movement were included in the study. Of course the analysis for b-HCG was a great help. Finally, transvaginal ultrasound was used to confirm the presence of tubal pregnancy.



Fig. 2. Handmade retractor



Fig. 3. Transvaginal tubectomy

The tubal gestational sac was seen during ultrasound examination in 5 from 6 cases which were ruptured. A total of 5 additional cases had no free liquid in the pouch of Douglas and were therefore considered unruptured (intact). (Fig 4– Transvaginal exposal of ectopic tubal pregnancy). The 6 ruptured cases had blood in the pouch of Douglas upon puncture. This was then aspirated. In 4 of 6 cases, there was hemoperitoneum from 300 to 500 cc without clinical anemia, while 2 cases had signs of anemia with the same estimate of blood loss. This estimate was realised through pelvic

ultrasound. The patient's general condition, quantity of blood in the peritoneal cavity and hemoglobin index were monitored before and after intervention.



Fig. 4. Transvaginal exposure of ectopic tubal pregnancy

Elapsed time for both culdotomy and tubectomy and irrigation of the peritoneal cavity was recorded. Because the pouch of Douglas is the most dependent point in the peritoneal cavity (with the body in reverse Trendelenberg position) free blood can be evacuated through aspiration and use of gauze pads. After discharge, of the 11 patients contacted by phone, 10 returned to the hospital for a postoperative visit. In the first group, 29 patients were contacted by phone after discharge.

From this group, only 21 returned for a postoperative visit on the 10th day. The 8 remaining patients found it unnecessary to return because they felt quite healthy and were in good physical condition. During the postop check-up, a vaginal ultrasound examination was performed with normal results in all 21 patients. During gynecological examination, a healed culdotomy scar was noted in 20 cases. In only one case, a 0.5 cm open culdotomy incision was seen in the left angle without suppuration or hemorrhage. In all 20 examined cases, normal performance status was achieved at 10 days after surgical intervention. We are conscious that the study needs more cases but the data is promising to support the use of this surgical approach in tubal sterilization and extrauterine ectopic pregnancy.

Conclusion

The effectiveness and safety of the transvaginal surgical approach in gynecologic surgery has been described historically (Wang *et al.*, 2001; Decker and Cherry, 1944; Delvaux, 1993; McCann *et al.*, 1978; Purandare Vaginal, 1970; Ott, 1901; Wang *et al.*, 2001; Wortman and Poitrow, 1967). We believe that culdotomic definitive sterilization and surgical culdotomic treatment of ruptured or non-ruptured tubal ectopic pregnancy is an easily achievable and safe operative technique. It can be performed with inexpensive and simple surgical tools, has certain efficacy, rapid time to full rehabilitation, short length of hospital stay and fulfills all of the criteria for minimal invasivity.

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