

Instruments and Techniques

Culdocentesis Followed by Saline Solution–Enhanced Ultrasonography: Technique for Evaluation of Suspected Ectopic Pregnancy

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ABSTRACT **Study Objective:** To evaluate the use of a technique consisting of culdocentesis followed by saline solution–enhanced pelvic ultrasonography in cases suspect for ectopic pregnancy in which an accurate diagnosis could not be made using routine transvaginal ultrasound.

Design: Retrospective clinical study (Canadian Task Force classification III).

Setting: Academic medical center.

Patients: Twenty patients with an initial diagnosis of pregnancy of unknown location.

Interventions: In 20 patients with symptoms of early pregnancy and serum quantitative human chorionic gonadotropin concentration, ectopic pregnancy could not be confirmed or ruled out. Transvaginal ultrasound-guided culdocentesis was performed, and 300 to 400 mL of normal saline solution was injected into the posterior cul-de-sac and pelvis. Transvaginal ultrasound was repeated with particular attention to the floating fallopian tubes

Measurements and Main Results: Using this technique, a tubal pregnancy was visualized in 15 of 20 patients, and ectopic pregnancy was ruled out in 5 patients. In all patients, appropriate management was provided according to the final diagnosis, and consisted of either methotrexate, laparoscopic salpingostomy or salpingectomy, or expectant management in patients with abnormal intrauterine pregnancies.

Conclusion: Ultrasound-guided culdocentesis followed by saline solution–enhanced pelvic ultrasound can be considered as a diagnostic tool in patients with suspected ectopic pregnancy in whom other methods fail to demonstrate this diagnosis. *Journal of Minimally Invasive Gynecology* (2010) 17, 754–759 © 2010 AAGL. All rights reserved.

Keywords: Culdocentesis; Diagnosis; Ectopic pregnancy; Transvaginal ultrasound

Ectopic pregnancy is the most common cause of pregnancy-related death in the first trimester, and is reported in about 2% of pregnancies [1–4]. Early diagnosis is essential, and enables medical therapy rather than surgery. As many as 45% of ectopic pregnancies are misdiagnosed at the initial emergency department visit [5].

Common symptoms include abdominal pain, vaginal bleeding, and amenorrhea [3,6]. However, the diagnosis of

ectopic pregnancy cannot always be confirmed or excluded by any constellation of history or physical findings [5–7]. Uterine curettage has been used to differentiate ectopic pregnancy from miscarriage in women with pregnancy of unknown location, and serum progesterone concentration less than 5 ng/mL or 3 ng/mL or abnormally increasing human chorionic gonadotropin concentration (hCG) has been used to deem a pregnancy abnormal; however, this approach may still meet patient resistance to curettage [8–15]. Furthermore, the presumption that when there is no evidence of intrauterine pregnancy there is an ectopic pregnancy has not been justified in almost 40% of cases [9]. Therefore, performing uterine curettage or giving methotrexate may lead to terminating ongoing intrauterine pregnancy in an estimated 0.5% to 12.3% of cases [13]. Culdocentesis has historically been used in evaluation of ectopic pregnancy [16–20]. However, because of its low sensitivity and low

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negative predictive value [21,22], its usefulness as a sole diagnostic method has been questioned.

Transvaginal ultrasound (TVUS) seems to be the single diagnostic tool for positively identifying ectopic pregnancy [8,9,12–16]. Use of TVUS for detection of ectopic pregnancy was found to be 73.9% to 85.9% sensitive and 84.0% to 99.9% specific [8,12–16]. Owing to high sensitivity and false positivity at hCG values less than 1500 mIU/mL, its accuracy might be in question in these early cases [8,19,23,24].

In cases of suspected ectopic pregnancy in which TVUS is nondiagnostic and uterine curettage is either not acceptable to the patient or contraindicated because of serum progesterone concentration or rate of increase in hCG concentration, a co-author (T.Y.) has been using a combination of TVUS-guided culdocentesis, saline solution instillation into the pelvis, and TVUS in an office setting to better evaluate the tubes. Herein, the technique is described, and the results of such evaluation, which we have called culdocentesis plus saline solution-enhanced pelvic ultrasound (CSEPU) are summarized.

Materials and Methods

Institutional review board approval was obtained for this review. All patients had a positive serum hCG concentration in the early first trimester, with symptoms of either vaginal spotting or bleeding with adnexal tenderness or abnormal increase in hCG concentration during infertility follow-up. All patients had previously undergone nondiagnostic TVUS at a tertiary scan facility by an independent sonographer, which was performed again at our institution. In no patient was an intrauterine gestational sac or extrauterine sac or mass detected at TVUS. All patients gave informed consent. All TVUS and saline solution-instilled ultrasound studies were performed by the same physician (T.Y.) on 2 different ultrasound machines, Voluson 730 Pro with 7-MHz vaginal probe (GE Healthcare, Little Chalfont, Buckinghamshire, England) and Accuvix XQ with 6.5-MHz vaginal probe (Medison America, Inc., Cypress, CA).

We have calculated the sensitivity, specificity, and positive and negative predictive values of the procedure in diagnosing ectopic pregnancy. The vagina was cleaned using povidone iodine, and the posterior fornix was anesthetized using 6 to 8 mL of 1% lidocaine, and 1 minute was allowed to elapse before inserting the needle. No tenaculum was placed on the cervix. An 18-gauge 15-inch-long needle (Echotip; Cook Medical Inc., Bloomington, IN) was inserted into the needle guide of the transvaginal transducer probe (Fig. 1A). The transducer was inserted into the vagina in an inverted position to bring the distal end of the needle guide in contact with the posterosuperior aspect of the vaginal wall. The posterior vaginal wall was indented, and the posterior cul-de-sac was entered under TVUS guidance (Fig. 1B). Any fluid present was aspirated and evaluated for nonclotting blood. If no nonclotting blood was detected, the needle was kept in the posterior cul-de-sac, and 5 to 10 mL of normal saline solution

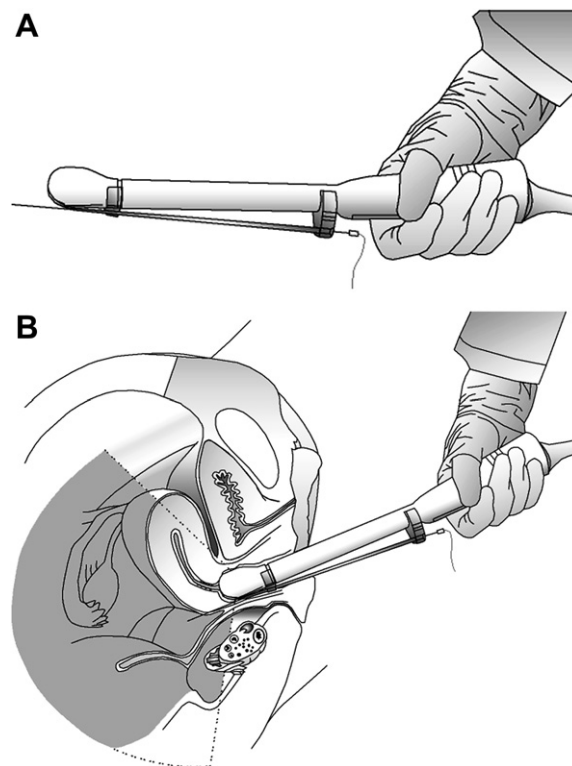


Fig. 1. Culdocentesis plus saline solution-enhanced pelvic ultrasound technique. A, An 18-gauge needle is inserted into the transvaginal probe. B, The posterior vaginal wall is indented, and the posterior cul-de-sac is entered under ultrasound guidance.

was instilled to ensure proper positioning. After the needle was properly placed, 300 to 400 mL of normal saline solution was rapidly injected. Transvaginal ultrasound was then repeated with particular attention to the fallopian tubes now floating in copious fluid and easily identified by their fimbriated ends (Fig. 2). Any dilatation of the tube with heterogeneously echogenic contents, which sometimes contained a small gestational sac with or without an early embryonic pole, was considered evidence of tubal pregnancy. The ovaries could also be separately identified, and extraovarian clots juxtaposed to tubal fimbriae were reported. The procedure was completely performed in the office setting. After the procedure, the patient was discharged to home, and doxycycline, 100 mg twice a day for 3 days, was prescribed.

Results

For this review, 20 patients with gestational age ranging from 5 to 9 weeks in whom the CSEPU sequence was performed were identified (Table 1). Patient mean (SD; 95% CI) body mass index was 26.9 (5.6; 23.5–39.3). All patients had symptoms of ectopic pregnancy such as spotting, adnexal pain or tenderness, or abnormal increase in hCG concentration. All were determined to be hemodynamically stable. Initial hCG concentrations and gestational weeks in patients with a final diagnosis of ectopic pregnancy were 1693 (2473; 112–9800) IU/L and 49.2 (7.9; 43–68) days, respectively, and in patients with a final diagnosis of intrauterine pregnancy

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