

Case report: Atypical ectopic pregnancy and culdocentesis

Still a valuable emergency medicine procedure

Anthony M. Herd, MD, CCFP(EM) John Sokal, MD, CCFP

Culdocentesis has been a valuable procedure for diagnosing ruptured ectopic pregnancy. Ultrasonography is less invasive, more sensitive and specific, and the procedure of choice for stable patients.¹ Culdocentesis can still play a valuable role, however, when ultrasound is not readily available or a patient is too unstable to go to a sonography suite.

We present an interesting case of ectopic pregnancy that had several atypical features. We review the literature, and briefly describe how to perform culdocentesis.

Case report

A 32-year-old woman, gravida 5, para 2, presented with upper abdominal pain and diarrhea of 1 day's duration. Her history included two miscarriages and one therapeutic abortion but no ectopic pregnancy or sexually transmitted diseases. Her latest "miscarriage" had occurred 9 days previously. She went to her obstetrician with moderate vaginal bleeding at an estimated 8 weeks' gestational age.

Based on ultrasound examination, which showed no intrauterine gestation and no free fluid or adnexal masses, she was advised that she had had a completed abortion. Vaginal bleeding ceased the next day, and she was well until the day she came to see us. At the time, we had no additional information.

On initial examination she was pale and afebrile. Initial vital signs were: heart rate at 112

Dr Herd is an Assistant Professor in the Department of Family Medicine at the University of Manitoba, and

Dr Herd and Dr Sokal are on active staff in the Department of Emergency Medicine at the Health Sciences Centre in Winnipeg, Man.

This article has been peer reviewed.

Cet article a fait l'objet d'une évaluation externe.

Can Fam Physician 2001;47:2057-2061.

beats per minute, respiratory rate at 20 breaths per minute, and blood pressure of 90/53 mm Hg. Further examination revealed a soft abdomen with mild epigastric tenderness, but no lower abdominal tenderness and no peritoneal signs.

She received 1 L of normal saline solution, and her blood pressure increased to 104/84 mm Hg. The pain settled without analgesia. Her initial laboratory test results included a hemoglobin level of 123 g/L, and a white blood cell count of $19.9 \times 10^9/L$, with 18% band neutrophils. Her pregnancy test result was not yet available.

Approximately 2 hours later, her abdominal pain became worse. Examination now revealed a very tender upper abdomen without peritonitis. A vaginal examination revealed a closed cervical os with no bleeding and mild adnexal tenderness. Because results of her pregnancy test were still unavailable, we decided to perform culdocentesis, and 5 mL of non-clotting blood was aspirated. A diagnosis of leaking ectopic pregnancy was made, but she quickly developed signs of imminent rupture. Her blood pressure was now 88/56 mm Hg, and her heart rate was 123 beats per minute.

She received aggressive fluid resuscitation and underwent emergency laparotomy through a Pfannenstiel incision. A right salpingectomy was performed, and a paratubal pregnancy and 1.5 L of blood were removed. Her postoperative course was complicated by anemia, which required transfusion and brief ventilatory support. She was discharged in stable condition on the fourth postoperative day.

Discussion

Culdocentesis is a useful procedure to determine whether there is intraperitoneal hemorrhage. If results of a pregnancy test are positive, diagnosis of ectopic pregnancy is almost certain.^{2,3} Negative tap results do not entirely rule out the diagnosis.² Culdocentesis has been used

CME
.....

Atypical ectopic pregnancy and culdocentesis

less frequently in recent years because of improvements in both the availability and technology of ultrasound examination.^{1,4,5} Sonography is less invasive, more sensitive and specific, and the procedure of choice for stable patients.¹ Culdocentesis should be considered when patients are too unstable for ultrasound examination or when it is not readily available.^{1,5} Bedside ultrasound is still unavailable in many Canadian emergency departments, including our own teaching hospital.

Results of culdocentesis will be positive in more than 90% of ruptured ectopic pregnancies.^{6,8} A positive test result is one in which more than 0.5 mL of non-clotting blood is aspirated from the posterior cul-de-sac.⁶ Blood obtained from the peritoneal cavity does not clot due to the presence of fibrinolytic proteins in the peritoneal fluid. Non-clotting blood is also aspirated in more than 60% of unruptured ectopic pregnancies^{2,6,8}; intermittent episodes of small-volume bleeding can lead to pooling of blood in the cul-de-sac, without development of peritoneal signs.^{2,9}

Aspiration of clotting blood likely indicates that the blood is from a venous source and that the peritoneal cavity has not been entered. Rarely, rapid and massive intraperitoneal bleeding can overwhelm the endogenous fibrinolytic system, and clottable blood is aspirated. A "dry" tap might occur up to 10% of the time, even when there is intraperitoneal blood. The "false-negative" rate for culdocentesis is reportedly as high as 15%.¹⁰ Many authors argue against its use,^{10,11} but false-negative results might reflect misinterpretation in some cases.¹² A dry tap or aspiration of clotted blood, or large-volume serous fluid, are indeterminate and should not exclude the diagnosis if suspicion is high.^{2,6}

False-positive results occur about 5% of the time, usually due to a ruptured hemorrhagic corpus luteum.⁶ Complications are rare¹³ but include uterine perforation leading to hemorrhage¹⁴ or pneumo-myometrium¹⁵ and perforation of the rectum¹⁶ or other pelvic organs.¹⁷ Inadvertent puncture of a coexisting corpus luteum cyst can also lead to complications, including further confusing the diagnosis.⁶

Culdocentesis was used in this case for a variety of reasons. Given the patient's presentation with upper abdominal pain and diarrhea and a recent ultrasound examination interpreted as a completed abortion, the diagnosis was uncertain right up until rupture. Second, her pelvic examination was not particularly helpful, and results of the pregnancy test were unavailable until after the diagnosis was already made. Finally, and perhaps most importantly, bedside ultrasound examination was not readily available, and we believed

Editor's key points

- Ultrasound is the preferred method of diagnosing ruptured ectopic pregnancy.
- When ultrasound is unavailable, culdocentesis is still a useful diagnostic technique.
- Culdocentesis has a false-negative rate of 10% to 15% and a false-positive rate of about 5%. Complications are rare.

Points de repère du rédacteur

- L'échographie est la méthode privilégiée pour le diagnostic d'une grossesse ectopique rupturée.
- Lorsque l'échographie n'est pas accessible, la culdocentèse représente encore une technique diagnostique utile.
- La culdocentèse présente un taux de résultats faux-négatifs de 10% à 15% et un taux de résultats faux-positifs d'environ 5%. Les complications sont rares.

she was too unstable to be transported to a sonography suite.

Technique

A bimanual examination should be performed before culdocentesis to determine uterine position and to assess for pelvic or cul-de-sac masses.¹⁸ During speculum examination, a uterine tenaculum is used to grasp the posterior cervix and lift it anteriorly, exposing the posterior fornix. The mucosa is cleaned with a disinfectant, and the submucosa can be anesthetized with lidocaine solution.

A narrow-gauge, long sterile needle, such as a spinal needle, on a syringe is used. With traction on the tenaculum, the tip of the needle is inserted at the apex of the posterior fornix and advanced gently but firmly, while applying continuous suction on the syringe. Within a few millimetres, the cul-de-sac will be entered, and fluid should be easily aspirated if present. If the tip of the needle is carefully controlled and advanced only as far as necessary, complications should be minimal.

Conclusion

Culdocentesis has been supplanted by ultrasound as the procedure of choice for diagnosing ectopic pregnancy and for good reason. Culdocentesis does have an appreciable false-negative rate, can often give indeterminate results, and can lead to complications. As this case illustrates, when ultrasound is not readily available, culdocentesis can still be a vital diagnostic

modality. Family and emergency physicians should be able to perform this procedure in locales where ultrasound and specialist support are not quickly and easily available.¹³ ❀

Correspondence to: Dr Anthony M. Herd, GF-201, Health Sciences Centre, 820 Sherbrook St, Winnipeg, MB R3A 1R9; telephone (204) 787-2934; fax (204) 787-5134; e-mail aherd@hsc.mb.ca

References

- Chen PL, Sickler GK, Dubinsky TJ, Maklad N, Jacobi RL, Weaver JE. Sonographic detection of echogenic fluid and correlation with culdocentesis in the evaluation of ectopic pregnancy. *Am J Roentgenol* 1998;170(5):1299-302.
- Romero R, Copel JA, Kadar N, Jeanty P, Decherney A, Hobbins JC. Value of culdocentesis in the diagnosis of ectopic pregnancy. *Obstet Gynecol* 1985;65(4):519-22.
- Tariq TA, Korejo R. Culdocentesis in diagnosis of disturbed ectopic pregnancy still a useful procedure in developing countries. *J Pak Med Assoc* 1992;42(1):5-6.
- Schwab RA. Ultrasound versus culdocentesis in the evaluation of early and late ectopic pregnancy. *Ann Emerg Med* 1988;17(8):801-3.
- Brennan DF. Ectopic pregnancy—Part II: diagnostic procedures and imaging. *Acad Emerg Med* 1995;2(12):1090-7.
- Elliot M, Riccio J, Abbott J. Serous culdocentesis in ectopic pregnancy: a report of two cases caused by coexistent corpus luteum cyst. *Ann Emerg Med* 1990;19(4):407-10.
- Tuomivaara L, Kauppila A, Puolakka J. Ectopic pregnancy—an analysis of the etiology, diagnosis and treatment in 552 cases. *Arch Gynecol* 1986;237(3):135-47.
- Mittal S, Grover V, Dhall K, Dhall GI, Gupta AN. Culdocentesis in tubal pregnancy. *Aust N Z J Obstet Gynecol* 1985;25(1):54-5.
- Cartwright PS, Vaughn B, Tuttle D. Culdocentesis and ectopic pregnancy. *J Reprod Med* 1984;29(2):88-91.
- Glezerman M, Press F, Carpman M. Culdocentesis is an obsolete diagnostic tool in suspected ectopic pregnancy. *Arch Gynecol Obstet* 1992;252(1):5-9.
- Stovall TG, Ling FW. Ectopic pregnancy. Diagnostic and therapeutic algorithms minimizing surgical intervention. *J Reprod Med* 1993;38(10):807-12.
- Abbot J, Emmans LS, Lowenstein SR. Ectopic pregnancy: ten common pitfalls in diagnosis. *Am J Emerg Med* 1990;8(6):515-22.
- Eisinger SH. Culdocentesis. *J Fam Pract* 1981;13(1):95-101.
- Duff P, Sparks J, Hawlay C. Extensive intraperitoneal hemorrhage from uterine laceration. An unusual complication of culdocentesis. *J Reprod Med* 1983;28(3):221-2.
- Roberts CE, Athey PA. Sonographic demonstration of air in the myometrium. A complication of culdocentesis. *J Ultrasound Med* 1992;11(1):7-9.
- Anasti J, Buscema J, Genadry R, Woodruff JD. Rectal serosal hematoma: an unusual complication of culdocentesis. *Obstet Gynecol* 1985;65(3 Suppl):72S-73S.
- Granat M, Gordon T, Issaq E, Shabtai M. Accidental puncture of pelvic kidney: a rare complication of culdocentesis. *Am J Obstet Gynecol* 1980;138(2):233-5.
- Wells EC. Abnormal uterine bleeding. In: Pearlman MD, Tintinalli JE, editors. *Emergency care of the woman*. New York, NY: McGraw-Hill Companies Inc, 1998. Chap 38. p. 488-9.