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ECTOPIC PREGNANCY AFTER PLAN B EMERGENCY CONTRACEPTIVE USE

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□ Abstract—Background: Pregnancy outcomes after emergency contraceptive use has been debated over time, but review of the literature includes mechanisms by which these medications may increase the chance of an ectopic pregnancy. Such cases are infrequently reported, and many emergency providers may not readily consider this possibility when treating patients. **Case Report:** This is a case presentation of ectopic pregnancy in a patient who had recently used Plan B (levonorgestrel) emergency contraceptive. She presented with abdominal pain and vaginal spotting, and was evaluated by serum testing and pelvic ultrasound. She was discovered to have a right adnexal pregnancy. She was treated initially with methotrexate, though she ultimately required surgery for definitive treatment. **Why Should an Emergency Physician Be Aware of This?:** This case report aims to bring a unique clinical case to the attention of emergency providers. The goal is to review research on the topic of levonorgestrel use and the incidence of ectopic pregnancies. The mechanism of action of this emergency contraceptive is addressed, and though no definite causal relationship is known between levonorgestrel and ectopic pregnancies, there is a pharmacologic explanation for how this event may occur after use of this medication. Ultimately, the emergency provider will be reminded of the importance of educating the patient on the possible outcomes after its use, including failure of an emergency contraceptive and the potential of ectopic pregnancy. © 2016 Elsevier Inc.

□ Keywords—ectopic pregnancy; Plan B; emergency contraceptive; levonorgestrel; mifepristone

INTRODUCTION

There has been debate over the past decade regarding the association between emergency contraceptives and ectopic pregnancies. The brief history of this academic debate included a communication to doctors from the British Chief Medical Officer in 2003 warning that levonorgestrel may pose an increased risk of ectopic pregnancy after drug failure (1). In the late 1990s, the U.S. Food and Drug Administration warned of the chance of an increased rate of ectopic pregnancy with use of daily progestin-only contraceptives; this study did not address rates among emergency contraceptive users alone. Finally, studies appropriately powered to ascertain the risk of ectopic pregnancy in those who have used emergency contraceptives (ECP) showed no increased threat of ectopic pregnancy after ECPs as compared to general population risk of ectopic pregnancy, usually cited to be 2%. A large meta-analysis published in *Obstetrics and Gynecology* in 2010 analyzed 136 studies of women who had used a one-time dose of either mifepristone or

levonorgestrel. The patients were followed for resulting number and location of any subsequent pregnancies after use of the drug. Even under conservative analysis, including pregnancies of unknown location as ectopics, rates of ectopic among both drugs, levonorgestrel at 1.6% and mifepristone 0.8%, were lower than that of the general population (2). The emergency provider, however, must be vigilant in assessing a patient after ECP use, because the medication may fail to prevent pregnancy. The exact mechanism of action of ECPs is somewhat unclear. Previously, it was thought that the medications prevented implantation, but a few recent studies have shown no effect of levonorgestrel on the endometrium (3,4).

The current research highlights three mechanisms of action for levonorgestrel: the delay or prevention of ovulation, the slowing of egg migration due to impaired ciliary function, and discouragement of fertilization by inhibiting sperm function and migration. Thus, it is thought that failure of ECPs occurs when a woman has already ovulated prior to taking the medication. After having ovulated, while the ova is in the fallopian tube, the slowing of ciliary function due to the ECP may make it possible for an ectopic pregnancy to occur after levonorgestrel use (3–7). Because the ECP has no ability to prevent growth of the pregnancy once the ovum is fertilized, the ectopic pregnancy may continue uninhibited and unsuspected. Here we present a case of ectopic pregnancy ensuing after emergency contraceptive use, followed by a discussion on the detection, course, and management of this entity.

CASE REPORT

A 21-year-old woman (gravida 2 para 1001), whose last menses was 11 days prior, presented to the Emergency Department (ED) with a chief complaint of right lower quadrant abdominal pain, vomiting, and vaginal spotting. The onset of pain was 1 day prior, and she noted it was worse with eating and moving. When asked, she stated she was not pregnant, as she took levonorgestrel as emergency contraception after intercourse 1 month prior.

The patient's past medical history included chlamydia fully treated 5 years earlier, and preeclampsia with her first pregnancy. She had no past surgical history. Review of systems was negative beyond the nausea and vomiting, and vaginal bleeding, as previously noted. The patient's initial vital signs showed a heart rate of 58 beats/min, blood pressure 100/57 mm Hg, temperature 35.8°C, respiratory rate 18 breaths/min, and oxygen saturation 100% on room air. Her physical examination revealed abdominal tenderness to palpation with voluntary guarding in her right lower quadrant, and tenderness to palpation at the right adnexa on pelvic examination. Her laboratory values were as follows: chemistry panel unremarkable, complete blood count unremarkable with hemoglobin

13.3 gm/dL (reference range 11–14.5 gm/dL), liver function panel unremarkable, urine pregnancy test positive, quantitative beta-human chorionic gonadotropin (HCG) 1501 mIU/mL (reference range 1–3 mIU/mL).

A bedside ultrasound performed by the emergency physician revealed no evidence of an intrauterine pregnancy, a large amount of free fluid in the pelvis (see Figure 1), and no free fluid in Morrison's pouch. With presumption of ectopic pregnancy, the patient proceeded to detailed pelvic ultrasound, which demonstrated a right adnexal ectopic with yolk sac (see Figure 2). The Obstetrics and Gynecology service was consulted, and at their recommendation, the patient was treated with intramuscular methotrexate 80 mg in the ED and discharged. Follow-up was recommended at the Obstetrics department in 4 days for clinic appointment and repeat beta-HCG testing.

Four days later, the patient developed shortness of breath and substernal pleuritic chest pain during her follow-up visit. She presented to the ED for evaluation. She reported nausea, but no abdominal pain and no vaginal bleeding. Her vital signs on this second visit were heart rate 78 beats/min, blood pressure 106/71 mm Hg, temperature 36.4°C, respiratory rate 16 breaths/min, and oxygen saturation 100% on room air. Her physical examination revealed clear lungs, heart regular rate and rhythm, and abdomen with mild right lower quadrant tenderness. Her laboratory values were as follows: chemistry panel unremarkable, white blood cell count 6.3 K/ μ L (reference range 4–10.8 K/ μ L), hemoglobin 11 gm/dL (reference range 11–14.5 gm/dL), and beta-HCG 3242 mIU/mL (reference range 1–3 mIU/mL). Her imaging included a computed tomography scan with angiography of the chest that demonstrated no signs of pulmonary embolus. A pelvic ultrasound revealed a right adnexal ectopic pregnancy measuring 1.4 cm \times 1.4 cm \times 1.7 cm, no pelvic free fluid,

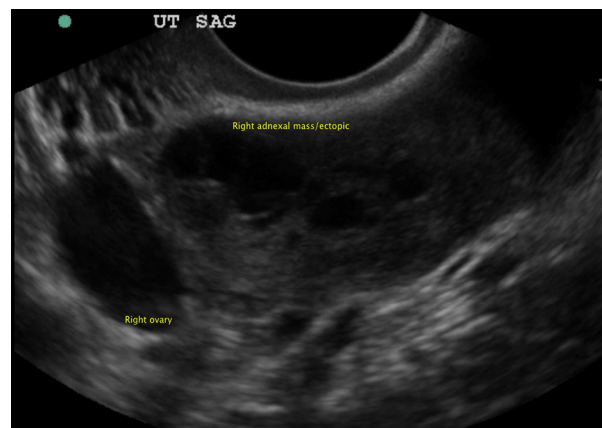


Figure 1. Transvaginal ultrasound of case report patient, showing a right adnexal mass adjacent to the right ovary, diagnosed as an ectopic pregnancy.

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