

Need for bedside emergency department ultrasonography: case report of a ruptured ectopic pregnancy

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ABSTRACT

Ultrasonography is a useful tool for the immediate evaluation of patients with suspected ruptured ectopic pregnancy, abdominal aortic aneurysm, traumatic intra-abdominal hemorrhage or cardiac tamponade. The 1999 Canadian Association of Emergency Physicians position statement states that bedside emergency department ultrasonography should be available 24 hours per day. This case study illustrates how emergency physicians properly trained in emergency bedside ultrasonography can use this tool effectively to dramatically impact patient care.

Key words: ectopic pregnancy, emergency, bedside ultrasound

RÉSUMÉ

L'échographie est un outil utile pour l'évaluation immédiate de patients chez qui on soupçonne une rupture de grossesse ectopique, un anévrisme de l'aorte abdominale, une hémorragie intra-abdominale traumatique ou une tamponnade cardiaque. Dans sa prise de position de 1999, l'Association canadienne des médecins d'urgence déclare que l'échographie au chevet des patients au département d'urgence devrait être disponible 24 heures sur 24. La présente étude de cas illustre comment les médecins d'urgence formés adéquatement à l'utilisation de l'échographie d'urgence au chevet des patients peuvent utiliser cet outil efficacement et avoir un impact remarquable sur les soins des patients.

Introduction

Ultrasonography is a useful tool for the immediate evaluation of patients with suspected ruptured ectopic pregnancy, abdominal aortic aneurysm, traumatic intra-abdominal hemorrhage or cardiac tamponade.¹ The 1999 Canadian Association of Emergency Physicians (CAEP) position statement states that emergency department (ED) ultrasonography should be available 24 hours per day,² but this standard is difficult to achieve in non-teaching hospitals and rural EDs,³ where such coverage is rarely available. If

ultrasonography is delayed, patient outcomes can be compromised. In the hands of qualified emergency physicians, bedside emergency ultrasonography can make an important difference in the management of ruptured ectopic pregnancy, as illustrated by this case report.

Case report

First presentation

A woman in her mid-20s who was 7- to 8-weeks pregnant presented to a rural ED complaining of abdominal cramps,

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lower pelvic pain and vaginal spotting. Her vital signs and abdominal physical exam were normal. On pelvic examination, the os was closed, the cervical motion was tender and no mass was palpable. The emergency physician performed bedside endovaginal ultrasonography, and the ultrasound showed no gestational sac in the uterus and no free fluid in the pouch of Douglas (Fig. 1).

The patient's hemoglobin was 129 g/L, and the qualitative beta-HCG was positive. Quantitative beta-HCG was not available in this rural hospital. The patient was immediately sent to the radiology department for formal ultrasonography. The results were interpreted as showing an intrauterine pregnancy with low implantation of a live 8-week-fetus. The patient's ovaries were judged to be normal, and no intra-abdominal free fluid was detected. The patient was sent home with a diagnosis of threatened abortion.



Fig. 1. Results of emergency bedside endovaginal ultrasonography, performed at the patient's 1st visit, show no gestational sac in the uterus.

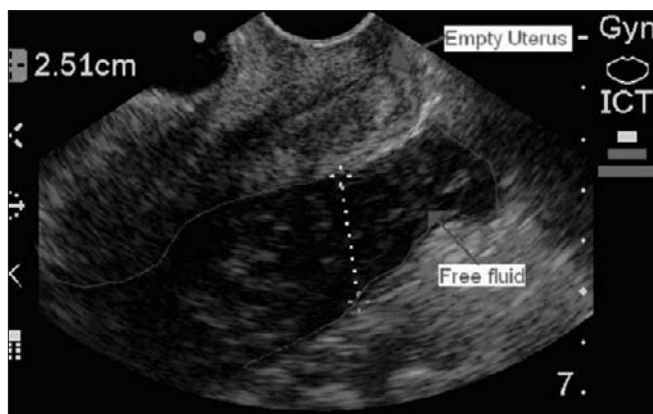


Fig. 2. Results of 2nd emergency bedside ultrasonography, performed at 3rd visit, after patient arrived by ambulance, show a large volume of free fluid in the pouch of Douglas. As in the first emergency bedside ultrasound, no intrauterine gestation was seen on the endovaginal scan.

Second presentation

Twelve hours later, the patient returned to the ED with increased cramping and vaginal spotting. Vital signs and results of the physical examination were again unremarkable. No repeat ultrasonography or blood tests were done, and she was once more sent home.

Third presentation

Seventy-two hours later, at 0300 am, she arrived by ambulance, with weakness and 12 hours of progressively severe abdominal pain. At this time, her blood pressure was 98/64 mm Hg, her pulse was 105 beats/min, and the emergency physician noted diffuse abdominal and pelvic tenderness. Immediate bedside emergency ultrasonography was performed; the results showed a large volume of free fluid in the pouch of Douglas (Fig. 2), the hepatorenal space (Fig. 3) and the splenorenal space (Fig. 4). Again, as in the first emergency bedside ultrasound, no intrauterine gestation was seen on the endovaginal scan.



Fig. 3. Results of 2nd emergency bedside ultrasonography, performed at 3rd visit, show free fluid in the hepatorenal space.

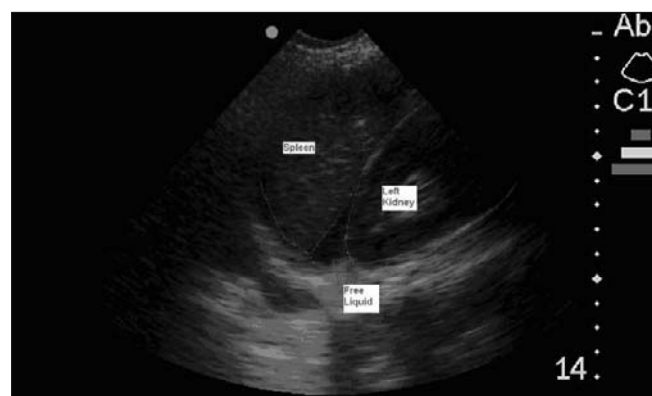


Fig. 4. Results of 2nd emergency bedside ultrasonography, performed at 3rd visit, show free fluid in the splenorenal space.

A diagnosis of ruptured ectopic pregnancy was made, blood was cross-matched, and the surgeon and operating room staff were called in. Less than one hour after arrival in the ED, the patient was transferred to the operating room for an immediate laparotomy. In the OR, the surgeon found a large amount of blood in the abdomen and extracted an 8-week-old fetus with an intact gestational sac from the ruptured and bleeding left fallopian tube (Fig. 5). The patient's hemoglobin levels, before and after surgery, were 102 g/L and 73 g/L respectively.

Discussion

Ultrasonography is the diagnostic tool of choice in the diagnosis of first-trimester pain or bleeding.^{1,4} The CAEP position statement on ultrasonography in the ED states that ultrasonography should be available 24 hours per day for emergency patients, particularly those being evaluated for cardiac tamponade, abdominal aortic aneurysm, abdominal trauma or ectopic pregnancy. It also states that focused or limited bedside ED ultrasonography may be performed by technicians, radiologists, or appropriately trained, qualified and experienced emergency physicians.²

In many Canadian hospitals, the availability of ultrasonography is limited. Our rural hospital radiology department staff only perform ultrasonography on weekdays from 0800 to 1500, and there is no after-hours on-call schedule. Consequently, in September 2001 our hospital granted several properly trained emergency physicians privileges to perform bedside ultrasonography in the ED.⁵ Since then, bedside emergency ultrasonography has been performed close to 500 times.

This case illustrates the importance of the availability of 24-hour ED ultrasonography. Because radiology departments can rarely provide this level of service, more and more emergency physicians are acquiring the training and skills to perform bedside ultrasonography so that they can



Fig. 5. Eight-week-old fetus extracted by the surgeon from the patient's ruptured and bleeding left fallopian tube.

provide better patient care. It is even more important for physicians in rural practice to acquire these skills. Since the introduction of ED ultrasonography, patients have benefited from enhanced safety, and rural physicians are much less dependent on radiology departments (which are sometimes over 100 kilometres away) to provide answers to simple specific questions such as: Is there a pregnancy in the uterus? Is there free fluid in the abdomen? Is there dilation of the abdominal aorta? or Is there a pericardial effusion?

Ectopic pregnancy is a potentially lethal condition that accounts for 4% of maternal mortality in Canada.⁶ The patient discussed here had evidence of significant blood loss and cardiovascular instability, and ED bedside ultrasonography facilitated rapid definitive care. When she arrived at the ED by ambulance, had her diagnosis been delayed by the need to obtain the results of a formal ultrasound, definitive care could have been delayed long enough for shock, disseminated intravascular coagulation, cardiovascular collapse or death to occur.

It is interesting that, at this patient's first visit to the ED, which was 3 days before her fallopian tube ruptured, the results of the formal ultrasonography performed in the radiology department were interpreted as showing an intrauterine pregnancy. This was likely an error. However, it is possible that the patient had a heterotopic pregnancy with simultaneous intrauterine and ectopic gestations, and that she aborted the intrauterine fetus some time between her first and third visit to the ED. This hypothesis is extremely unlikely, however, because in the absence of fertility agents, heterotopic pregnancy occurs only once every 8000 to 30 000 pregnancies, and because it is difficult to miss an 8-week-old fetus on endovaginal ED scanning.¹ Had this been a case of heterotopic pregnancy, the initial ED bedside ultrasound, performed at her first visit, would have most probably identified the intrauterine pregnancy.

Conclusion

In rural settings that lack 24-hour access to formal ultrasonography, ED bedside ultrasonography can play a major role in helping physicians to diagnose ruptured ectopic pregnancy, therefore facilitating rapid intervention. Appropriate training and skills in performing bedside ultrasonography can help emergency physicians improve care and optimize patient outcomes.

Competing interests: None declared.

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