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Is the patient pregnant ... or not?

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ABSTRACT

Women of childbearing age with a ruptured ectopic pregnancy may present with abdominal pain in the acute care setting. A negative urine pregnancy test is often used to exclude such a diagnosis but studies have shown that it is not 100% sensitive. We describe a case of a patient with a ruptured ectopic pregnancy who had a negative urine pregnancy test.

1. Introduction

In women of reproductive age-group who present with abdominal pain, pregnancy related complications must always be considered. Ruptured ectopic pregnancy is a leading cause of maternal morbidity in women of childbearing age[1–7].

Patients in this age group presenting with abdominal pain to the emergency department will usually have a urine pregnancy test done. A positive qualitative urine beta-HCG pregnancy test will alert the attending physician to entertain the diagnosis of ectopic pregnancy. However, on those occasions when this bedside test is negative, some may consider the diagnosis of ectopic pregnancy as being less likely and thus consider other diagnoses.

A search of the literature on Medline and the following case report illustrates that a ruptured ectopic

pregnancy cannot be excluded with a negative urine pregnancy test[1–6]. A serum beta-HCG level should preferably be taken if there remains a high index of suspicion of this condition[5–7].

2. Case report

A 32 year old Chinese lady, who is a smoker, with obstetric status G2P2 and a history of gastritis, presented at the Emergency Department (ED) with central abdominal pain and vomiting that started 5 h prior to her presentation.

There was no change in her bowel habits, fever, breathlessness or chest discomfort. She had a regular 28 d menstrual cycle (with bleeding lasting 5–7 d) and her last menstrual period was 25 d prior to presentation. During that menstrual period, she had presented to our department twice for menorrhagia and dysmenorrhea and was treated with a three week course of Norethisterone. During those attendances, her urine beta-HCG test were negative.

On physical examination, there was generalised abdominal tenderness, with guarding. A urine pregnancy test done was negative. A bedside FAST

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(Focused Abdominal Sonographic Test) scan revealed free fluid in the abdomen. Given the clinical suspicion of a ruptured ectopic pregnancy, a serum beta-HCG was ordered, which came back as 45.7 units/L. (Normal local laboratory range: 0–7 units/L). She also had a raised Total White count of 19.95 and a haemoglobin level of 11.5 g.

A transvaginal ultrasound scan failed to show any evidence of intrauterine pregnancy and a decision was made to take the patient for a diagnostic laparoscopy. Upon entering the abdomen, haemoperitoneum was noted, and the omentum was covered with clots. A ruptured 2 cm left sided ectopic pregnancy was noted. The patient underwent an open left salpingectomy and appendectomy.

Her postoperative recovery was uneventful with serum beta-HCG down-trending subsequently. She was discharged on the 5th postoperative day and had a MIRENA Intra-Uterine Contraceptive Device inserted prior to discharge. Histology of the left fallopian tube showed products of conception consistent with that of tubal ectopic pregnancy.

3. Discussion

Ectopic pregnancy continues to be a leading cause of maternal morbidity. It is a gynaecological emergency which can lead to tubal destruction and haemorrhagic shock. In order to distinguish it from other causes of abdominal pain in women of reproductive age-group or in their active child-bearing years (e.g. acute appendicitis, pelvic inflammatory disease, complication of ovarian cysts), the first step is usually to perform a urine pregnancy test.

This is often in the form of a qualitative test assessing the levels of beta HCG in the urine. This is a relatively quick test and is available as a point of care testing modality. Nevertheless, this is not 100.0% sensitive and false negative results can occur. The sensitivity ranges from 87.5% to 100.0% in various studies, with the overall sensitivity quoted at around 96.0% for the diagnosis of ectopic pregnancy. In such situations, front line practitioners may face a clinical challenge in coming to the diagnosis. There is of course the option to pursue a serum beta-HCG, which is sensitive to a lower level of HCG than urine (may be able to detect down to <0.1 IU/L) and is now being accepted more as the gold standard[7–9].

A review of the literature showed that in cases of ectopic pregnancies, all had a low serum beta-HCG

levels. It was also estimated that in up to 1% of ectopic pregnancies, there is undetectable serum beta-HCG levels. The most common explanation postulated for this is the reduction or cessation of hormonal production by the degenerative trophoblasts. Other explanations include the lower mass of chorionic villi producing the hormone or the enhanced clearance of the hormone from the circulation in these cases[1–8].

Serum beta HCG can be detected in urine or blood after implantation, approximately six to twelve days after fertilization. Quantitative blood tests can detect beta-HCG levels as low as 1 mIU/mL, while urine test kits have published detection thresholds of 10 mIU/mL to 100 mIU/mL, depending on the brand[1,6,8–12]. A systematic review published in 1998 showed that home pregnancy test kits, when used by experienced technicians, are almost as accurate as professional laboratory testing (97.4%). When used by consumers, however, the accuracy fell to 75%: the review authors noted that many users misunderstood or failed to follow the instructions included in the kits, resulting in false negatives and false positives[9].

In our patient, the brand of kit used was the 'SURE & EASY' Pregnancy Test Kit, with a lower beta-HCG detection level of 25 mIU/mL or more. These levels in the first morning urine may be reached as early as 10 d after conception, 3 d before the expected menstruation. To confirm negative results, i.e. beta HCG concentration of less than 25 mIU/mL, a reaction time of 10 min is required[10].

Technically, the urine pregnancy test should have been positive given the corresponding serum beta-HCG level. The negative urine pregnancy test result could have been due to a combination of factors including human interpretation error (such as reading the strip less than 10 min from start of test), defective strip, overly dilute urine sample (for example this can happen in such patients when they present with hypotension and shock and would have undergone a period of fluid challenge), or if there is concurrent consumption of immunologically interfering substances such as antibody therapy[1,10–12].

There is also another scenario to consider: that of chronic ectopic pregnancy. In these cases the women will present with mild pelvic pain and irregular vaginal bleeding over several weeks, unlike in acute ectopic pregnancy. These minor symptoms are due to repeated bleeding episodes, from the pregnancy into the fallopian tube (compared to a single catastrophic bleed in situ in acute ectopic pregnancy). These minor repeated bleeding can lead to the formation of a haematocoele[1,6]. In such cases too, there have been case reports of both

the urine and serum beta-hCG being negative^[5,13–15].

To minimize the occurrence of such errors in future, we suggest that all emergency department staff should be well trained in the interpretation of urine beta-HCG results, with completed urine pregnancy test kits being stored with the case notes of patients should further verification, if needed. There should also be a lower threshold for ordering of serum beta-HCG tests in the emergency department despite a negative urine pregnancy test, if clinical suspicion of a ruptured ectopic pregnancy remains high.

Conflict of interest statement

We declare that we have no conflict of interest.

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