

Haemoperitoneum due to Tubal Abortion in a Patient with Negative Urine Pregnancy Test—Case Report and Literature Review

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In general, ectopic pregnancy can usually be excluded by a negative urine pregnancy test result. However, false-negative results can occur. We present a case in which a 17-year-old girl complained of progressive abdominal pain at the fourth week of amenorrhoea. Urine pregnancy test was negative. Emergency laparoscopy was performed because of shock. Haemoperitoneum and tubal abortion were found.

It is obvious that ectopic pregnancy cannot simply be excluded by a negative pregnancy test. Management decision should be based on the clinical presentation and prompt intervention should be carried out in order to avoid detrimental complications of this condition.

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Introduction

Ectopic pregnancy is a gynaecological emergency because it can lead to tubal destruction and haemorrhagic shock. According to the territory-wide gynaecological and obstetrical audit report in 2004 in Hong Kong, there were 1049 out of 75 053 gynaecological admissions (1.4%) due to ectopic pregnancy¹. No mortality was reported in the 2004 report. In the United Kingdom, the incidence was 11.0 per 1000 pregnancies from 2000 to 2002². There were 11 maternal deaths out of the 30 100 ectopic pregnancies, with a mortality rate of 0.4 per 1000 ectopic pregnancies. In order to distinguish it from other causes of acute abdomen such as appendicitis, pelvic inflammatory disease and ovarian cyst complication, the first step is to perform a sensitive urine pregnancy test which would become positive in the presence of beta-human chorionic gonadotropin (β -hCG). Nevertheless, as the β -hCG assay is not 100% sensitive, false-negative results do occur rarely. This poses a clinical challenge in ascertaining the diagnosis. We present a case of haemoperitoneum as a result of tubal abortion with a mildly elevated serum β -hCG level and a negative urine pregnancy test result.

Case Report

A 17-year-old women, primigravida, was admitted through the Accident and Emergency Department because of abdominal pain for 5 days. The abdominal pain was generalised with increasing severity. Her last menstrual period was about 4 weeks prior to admission. There was persistent vaginal bleeding for 1 month. She had dizziness, nausea, and vomiting. There was no history of sexually transmitted disease or pelvic inflammatory disease.

On admission, the blood pressure was 93/51 mm Hg and the pulse was 62 beats/minute. The oral temperature was 37°C. Pallor was noted. There were tenderness, rigidity, and rebound tenderness in the lower abdomen. No shifting dullness was elicited. Vaginal examination showed marked cervical excitation

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Table. Cases of haemoperitoneum due to ectopic pregnancy with negative urine pregnancy test result published in the literature³⁻⁷

Authors (year of publication)	Clinical features	Duration of amenorrhoea	Diagnosis (type of ectopic pregnancy)
Lonky and Sauer (1987) ³	Sudden onset of abdominal pain	13 weeks	Tubal abortion
Maccato et al (1993) ⁴	Abdominal pain, nausea, and vomiting	20 days	Ruptured ectopic pregnancy
Bozoklu et al (1997) ⁵	Abdominal pain and nausea for 12 hours with increasing severity	36 days	Ruptured ectopic pregnancy (with acute appendicitis)
Brennan et al (2000) ⁶	Right lower quadrant pain for 14 hours with increasing severity	4 days	Ruptured ectopic pregnancy
	Intermittent pelvic pain for 2 months with increasing severity	Normal menstruation	Ruptured ectopic pregnancy
Kalinski and Guss (2002) ⁷	Sudden onset of abdominal pain and syncope	6 weeks	Ruptured ectopic pregnancy
Present case (2004)	Abdominal pain for 5 days	4 weeks	Tubal abortion

* β -hCG denotes beta-human chorionic gonadotropin

tenderness. The uterus was ill-defined and tender. The adnexae could not be thoroughly assessed because of pain. Urine pregnancy test (SureStep™ hCG pregnancy test, Applied Biotech Incorporation, San Diego, CA; sensitivity 20 mIU/ml) was negative. The differential diagnoses included ovarian cyst complication and surgical causes. The haemoglobin level was 8.9 g/dL (mean cell volume was 95.3 fL). In view of the florid peritoneal signs and anaemia, haemoperitoneum was suspected and emergency diagnostic laparoscopy was decided. Ultrasound examination was not performed to avoid delay in treatment. During laparoscopy, 1000 ml blood clots were found inside the pelvic cavity. The left fallopian tube was distended at the ampullary region with active bleeding from the fimbrial end. However, there was no evidence of tubal rupture. The right fallopian tube, the ovaries and the rest of the abdominal and pelvic cavities were normal-looking. An operative diagnosis of left tubal pregnancy with tubal abortion was made. Left salpingectomy was performed in view of the persistent bleeding from the fimbrial end. The total estimated blood loss was 1600 ml and two units of blood were transfused during the operation. The operation was otherwise uneventful. The left fallopian tube was cut open after the operation and suspected gestational products were noted. Serum β -hCG level was checked immediately after the operation. It was 27 mIU/ml.

Urine pregnancy test was checked again and it became weakly positive (with a faint test line). The postoperative haemoglobin level was 6.0 g/dL and two more units of blood were transfused. The patient recovered well after the operation. The diagnosis of left tubal pregnancy was confirmed by histopathological examination, which showed the presence of a few degenerative chorionic villi and some trophoblastic cells mixed with blood and fibrin in the tubal epithelium.

Discussion

A search in PubMed for case reports in English, using keywords 'ectopic pregnancy', 'rupture', 'shock', 'haemoperitoneum', 'negative pregnancy test', 'undetectable', 'human chorionic gonadotropin', and extending the search to relevant articles cited in the references of these case reports, yielded six case reports³⁻⁷ (Table). All of them had a low serum β -hCG level, which could explain the negative results of the urine pregnancy test. In fact, it is estimated that up to 1% of ectopic pregnancies are associated with undetectable serum β -hCG level³. The most common postulated mechanism for the low β -hCG level is the reduction or cessation of hormonal production by the degenerative trophoblasts. Other possible explanations include the small mass of chorionic villi producing the hormone, and the enhanced clearance of the hormone from the circulation.

Lowest preoperative haemoglobin level (g/dL)	Blood loss (ml)	Treatment	Serum β -hCG* level (mIU/ml)
Not mentioned	1200	Laparotomy	5
Not mentioned	1500	Laparotomy and salpingectomy	<5
Normal	20-25	Laparotomy, salpingectomy, and appendectomy	0
11.7	>750	Salpingotomy	Negative
9.0	500	Salpingectomy	Not mentioned
8.8	3000	Laparotomy and salpingectomy	7
8.9	1600	Laparoscopic salpingectomy	27

In a normal pregnancy, the serum β -hCG level is estimated to be 50 mIU/ml in the week after conception, and it rises to 500-10 000 mIU/ml by the fourth week of amenorrhoea^{8,9}. Our urine pregnancy test kit (SureStep™) is a qualitative 2-site sandwich immunoassay used to determine the presence of β -hCG in urine with the use of monoclonal antibodies. It is positive if the urinary β -hCG level is equal or more than 20 mIU/ml. However, if the urine is too dilute, or if there is concurrent consumption of immunologically interfering substances such as antibody therapy, the test result may be invalid. We postulate that the initial urine pregnancy was negative because of the vigorous fluid challenge for the hypovolaemic state causing urine dilution, especially when the level of the serum β -hCG was only mildly elevated. The relatively low serum β -hCG level was probably due to the early gestation of the ectopic pregnancy, and the loss of the ability of the β -hCG production of the placental bed

in the process of degeneration and abortion. When the patient became haemodynamically stable and the fluid balance was achieved after the operation, the urine was less diluted and therefore the pregnancy test became weakly positive.

This is the second report of haemoperitoneum due to tubal abortion associated with a negative pregnancy test (Table). It demonstrates again that even if urine pregnancy test is negative, complications of ectopic pregnancy can still occur. When a patient of childbearing age complains of abdominal pain, a urine pregnancy test should be performed to exclude ectopic pregnancy. However, if the clinical suspicion is high, particularly in the presence of unstable haemodynamic condition or unequivocal peritoneal signs, surgical intervention should not be delayed in the presence of a negative urine pregnancy test.

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