

Case Report

A Rare Cause of Acute Abdomen in Pregnancy

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Received: February 17, 2022; **Accepted:** March 19, 2022; **Published:** March 26, 2022**Abstract**

For the pain therapy of acute onset abdominal pain a 32-year-old pregnant woman (6th week) was presenting in the emergency Department. It was a successful *in-vitro*-fertilization pregnancy. In the transvaginal ultrasound was a viable intrauterine pregnancy found. After a few hours, the BP dropped and there was found free intra-abdominal fluid. It seemed to be Blood and an urgent diagnostic laparoscopy by the surgical Department was performed. Surprisingly the right fallopian tube as the source of bleeding was identified. The reason was a "second" ectopic pregnancy.

Keeping in mind that hemorrhage from ruptured ectopic pregnancy is the leading cause of pregnancy related maternal death in the first trimester it is important to rule out this condition. Ectopic pregnancy is estimated to occur in 1 to 2 percent of pregnancies and the prevalence of ectopic pregnancy among women presenting to an emergency department with first trimester bleeding, pain, or both is rare. The presented case underlines the importance of excluding a concurrent ectopic pregnancy in women with abdominal pain during their first trimester even in the presence of an intrauterine pregnancy especially if the patient has undergone *in-vitro*-fertilization

Keywords: *In-vitro*-fertilization; Heterotopic pregnancy; Abdominal pain; Tubal rupture; Bleeding

Background

Haemorrhage from ruptured ectopic pregnancy is the leading cause of pregnancy related maternal death in the first trimester and accounts for 4 to 10 percent of all pregnancy related deaths [1,2]. It is important to rule out this condition when a woman during the first trimester of pregnancy presents to the emergency department with abdominal or pelvic pain and/or vaginal bleeding. Useful diagnostic tools are the hCG concentration and the transvaginal ultrasound examination. With the detection of a viable intrauterine pregnancy, the ultrasonographer usually stopped the search for an ectopic pregnancy. The case presented here underlines that there should still be a high level of suspicion for heterotopic pregnancy even if the transvaginal ultrasound reveals a viable intrauterine pregnancy especially if the patient has undergone any assisted reproduction technique.

Case Presentation

A 32 years old Caucasian woman presented to her general practitioner with abdominal pain since a few hours. It was located mostly epigastric with a belt-like spread but also radiating into both lower quadrants. She did not complain about fever, diarrhoea or nausea and there was no vaginal bleeding. After excluding a myocardial infarction or a pulmonary embolism as the primary cause of the complaints, the general practitioner referred the patient to the emergency department of our hospital. There she arrived more than six hours after onset of pain. Asked about her past medical history, she named no previous illnesses but a pregnancy induced hypertension. She stopped smoking 9 years ago, she mentioned to drink alcohol in reasonable amounts from time to time, she did not know of any allergy. The patient's previous medication is shown in Table 1.

The patient was married and had given birth to one child after an *in-vitro*-fertilization procedure (vaginal delivery). Up to yet she was under continuous control by her gynecologist.

She worked as a waitress in a restaurant. Her physical examination showed the following results: blood pressure 110/65 mmHg, heart rate 67/min, temperature 37.2°C, SpO₂ 98% (FiO₂ 0.21), Glasgow Coma Scale 15, orientated, reduced general state, heart sounds rhythmic and clear, no murmurs, cervical veins not dilated, no ankle oedema, vesicular sound of breath, no rales/rhonchi/wheezing or rubs, abdomen soft, direct tenderness in all four quadrants, no muscular defense, normal bowel sounds, no renal angle tenderness, neurological status normal. A basic monitoring (non-invasive blood pressure, ECG, pulse oximetry) and an i.v. line were established and the patient received about 40ml/h normal saline solution. Since the patient was in her 6th (5 + 4/7) week of pregnancy after a successful *in-vitro*-fertilization the department for obstetrics and gynecology was immediately involved. The gynecologist performed a clinical examination and a transvaginal ultrasound study. When the gynecologist found a viable pregnancy in the uterus without signs of threatened abortion and a small amount of free fluid in the pouch of Douglas but normal adnexa's she excluded a gynecological respectively pregnancy-related cause of the symptoms. Within one hour after admission, the laboratory test results were available (Table 2).

The ultrasound study of the abdomen was completed within the next hour. While the appendix could not be visualized, there were no signs of cholecystitis or pancreatitis. Liver, gall bladder, biliary tract, spleen and kidneys were in a normal state. The small bowel showed active peristaltic movements but no pathological signs. There was free fluid to be seen in all four quadrants of the

Table 1:

ASS 100mg tablet (Aspirin® cardio)	1-0-0
Labetalol 200mg tablet (Trandate®)	1-0-0
Progesteron 100mg capsule (Utrogestan®)	1/1/2001
Estradiol 2mg tablet (Progynova®)	1-0-1
Magnesium 243,2mg granules (Magnesiocard® 10mmol)	1-0-0
Retinol 1080µg/Thiamine 1,6mg/Riboflavin 1,8mg/Pyridoxine 2,6mg/Cyanocobalamin 4,0µg/Ascorbic acid 100mg/Ergocalciferol 5000.U./Tocopherol 15mg/Biotin 0,2mg/Folic acid 0,8mg/Niacin 19mg/Pantothenic acid 10mg/Calcium 125mg/Magnesium 100mg/Phosphorus 125mg/Iron 60mg/Copper 1mg/Manganese 1mg/Zinc 7,5mg tablets (Elevit®)	1-0-0

Table 2:

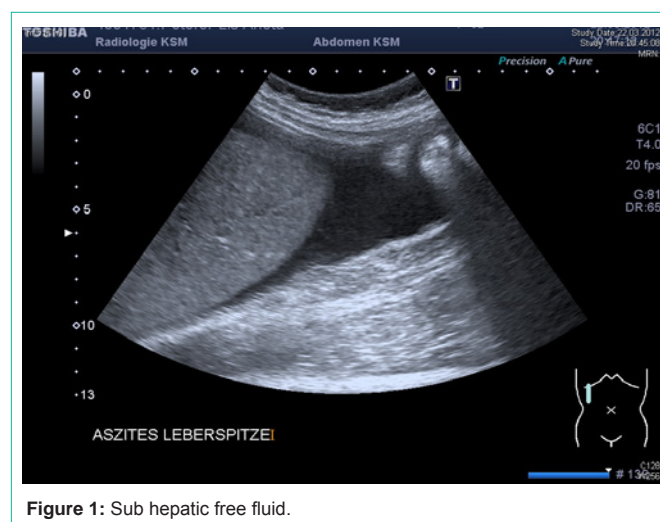
Hemoglobin [g/l]	109
Hematocrit	0.31
RBC [$10^{12}/l$]	3.53
MCV [fl]	87
MCH [pg]	30.9
MCHC [gHb/lEc]	355
RDW [%]	11.2
WBC [$10^9/l$]	8.7
Thrombocytes [$10^9/l$]	229
INR	1.05
PTT [s]	22
D-dimer [mg/l]	1.65
hCG [U/l]	20210
Urea [mmol/l]	5
Creatinine [µmol/l]	66
Total bilirubin [µmol/l]	6
Glucose [mmol/l]	6.6
C-reactive Protein [mg/l]	< 1
AST [U/l]	17
ALT [U/l]	18
CK [U/l]	66
GGT [U/l]	10
Amylase [U/l]	28
Lipase [U/l]	26

abdomen (Figure 1-3). With the absence of fever, the normal WBC and the low CRP not-pregnancy-related inflammatory/infectious causes for the symptoms as appendicitis, diverticulitis, endometritis, urinary tract infection or pelvic inflammatory disease seemed to be very unlikely. Neither the laboratory test results nor the abdominal ultrasound examination showed signs of pancreatitis or cholecystitis or urolithiasis. Furthermore the abdominal and transvaginal ultrasound examination had not revealed signs of endometriosis or a degenerating uterine leiomyoma and with the detection of normal adnexa's ovarian neoplasms or a ruptured or torsed corpus luteum cyst were ruled out (Figure 4).

Not surprisingly, the ECG did not add significant information about the cause of the abdominal pain. Since there were no signs of hemorrhagic shock the free intraabdominal fluid were interpreted as ascites due to an ovarian hyperstimulation syndrome. Additionally

Table 3:

Temperature [°C]	37
FiO ₂	0.21
pH	7.4
pCO ₂ [kPa]	4.3
pO ₂ [kPa]	14.3
Hydrogen carbonate [mmol/l]	20
Base excess [mmol/l]	-4.2
S _a O ₂ [%]	98
Hemoglobin [g/l]	58
Hematocrit [%]	18
Natrium [mmol/l]	133
Potassium [mmol/l]	3.6
Calcium ionized [mmol/l]	1.05
Chlorid [mmol/l]	112
Glucose [mmol/l]	10.1
Lactate [mmol/l]	0.6
Creatinine [µmol/l]	52

**Figure 1:** Sub hepatic free fluid.

to the persisting abdominal pain the patient meanwhile complained about dizziness and light-headedness, and when the systolic blood pressure fell permanently below 100mmHg and the patient collapsed on her way to the toilet she was referred to the intensive care unit for closer observation. On arrival at the intensive care unit 5 hours after hospital admission the following findings could be made: blood pressure 90/55 mmHg, heart rate 70/min, temperature 37.2°C, SpO₂



Figure 2: Perisplenic free fluid.

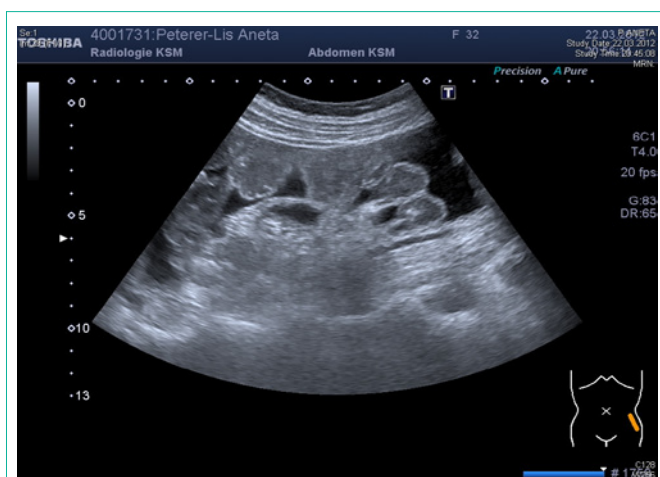


Figure 3: Pelvic free fluid.

98% (FiO₂ 0.21), GCS 15, orientated. Except for the direct tenderness in all four abdominal quadrants, the physical examination remained unremarkable. An arterial catheter was placed into the left radial artery. The arterial blood gas analysis obtained 30 minutes after ICU-admission on revealed a significant haemoglobin decline (Table 3).

The intensivist supposed now the free intraabdominal fluid was blood and the surgical Department planned the patient for an urgent diagnostic laparoscopy. A second i.v. line (14 G) was inserted; the patient received 1000 ml of a balanced electrolyte solution and one unit of packed red cells. The results of the blood count and the coagulation tests available 1-hour after ICU-admission (Table 4) and the result of the ROTEM analysis obtained during the operation (Figure 5) revealed a significantly reduced coagulation capability.

90 minutes after ICU-admission the patient arrived at the operating room. The anaesthesia induction was uneventful. The surgeon removed about 3000ml of blood out of the abdominal cavity. When he found suspicious tissue at the right fallopian tube as the source of bleeding the gynecologist was called and continued the operation with a right-sided salpingectomy. The clinical diagnosis of ectopic pregnancy was confirmed by the histological examination of

Table 4:

Haemoglobin [g/l]	54
Haematocrit	0.15
RBC [10 ¹² /l]	1.73
MCV [fl]	88.4
MCH [pg]	31.2
MCHC [gHb/lEc]	353
RDW [%]	11
WBC [10 ⁹ /l]	9.7
Thrombocytes [10 ⁹ /l]	127
INR	1.35
PTT [s]	30
Fibrinogen [g/l]	1.13

Table 5:

Temperature [°C]	37
FiO ₂	0.21
pH	7.38
pCO ₂ [kPa]	4.8
pO ₂ [kPa]	12.4
Hydrogen carbonate [mmol/l]	21
Base excess [mmol/l]	-3.7
S _a O ₂ [%]	97
Haemoglobin [g/l]	101
Hematocrit [%]	31
Natrium [mmol/l]	134
Potassium [mmol/l]	3.2
Calcium ionized [mmol/l]	1.13
Chlorid [mmol/l]	107
Glucose [mmol/l]	9.7
Lactate [mmol/l]	1.2
Creatinine [μmol/l]	49

the removed tissue later on. During the operation the patient received four units of packed red cells and four units of fresh frozen plasma as well as two grams of fibrinogen (Haemocompletan[®]) in order to re-establish an adequate coagulation capability. Table 5 shows the results of the arterial blood gas analysis after the patient's return to the intensive care unit.

The postoperative examination showed furthermore a viable pregnancy.

The patient could be discharged from the intensive care unit and transferred to a normal ward the same day and left the hospital fully recovered 4 days later. A follow up 3 weeks after the event showed the intrauterine pregnancy still to be viable.

Discussion and Conclusions

From the emergency physician's point of view every woman in reproductive age presenting with abdominal/pelvic pain and/or amenorrhea and/or vaginal bleeding should be tested for pregnancy

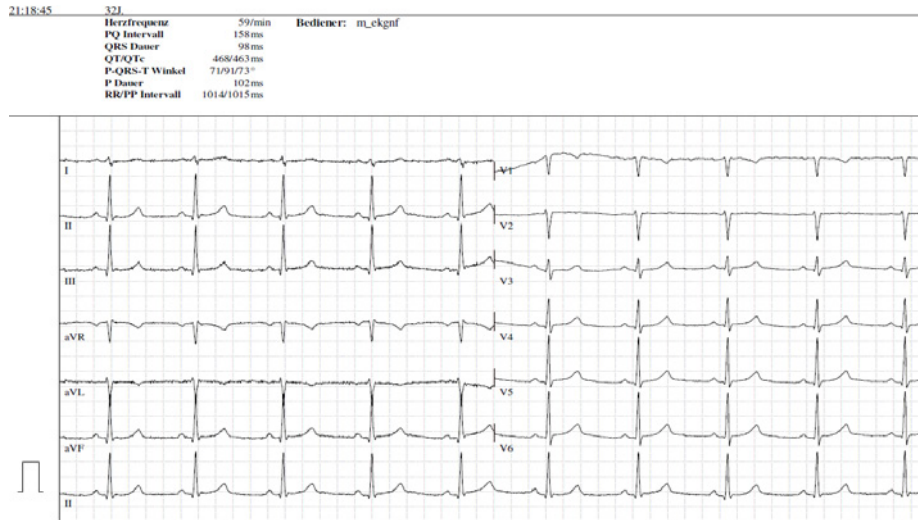


Figure 4: ECG.

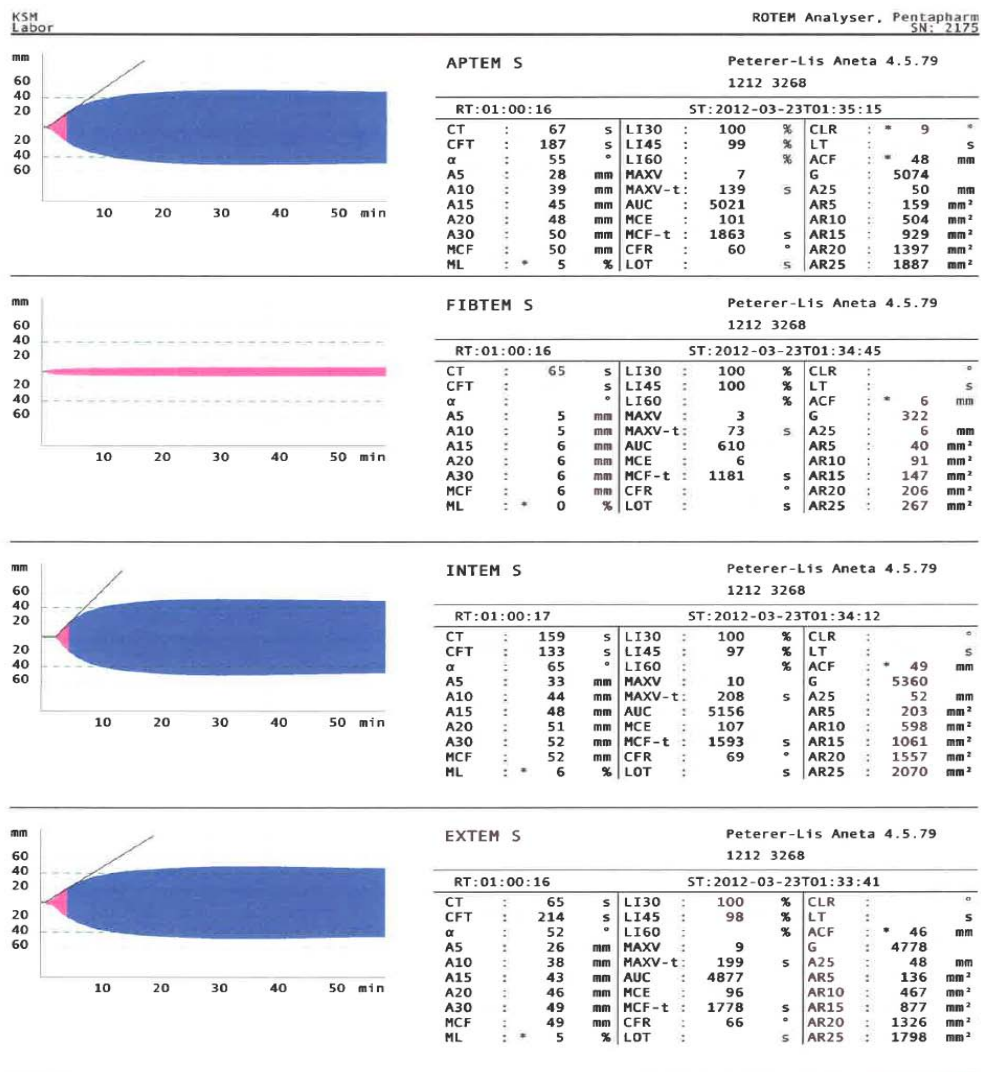


Figure 5: ROTEM.

using a hCG test. In heterotopic pregnancy the serum hCG concentration primarily reflects the intrauterine pregnancy and is not useful distinguishing between intrauterine and ectopic pregnancy. Once pregnancy is established (in our case it was well known), its location can be determined by (transvaginal) ultrasound examination [3-6]. Keeping in mind that haemorrhage from ruptured ectopic pregnancy is the leading cause of pregnancy related maternal death in the first trimester it is important to rule out this condition. Ectopic pregnancy is estimated to occur in 1 to 2 percent of pregnancies [7,8] and the prevalence of ectopic pregnancy among women presenting to an emergency department with first trimester bleeding, pain, or both ranges from 6 to 16 percent [9]. If the transvaginal sonogram reveals an intrauterine pregnancy the careful investigation for a concurrent ectopic pregnancy may hardly occur, since heterotopic pregnancy used to be rare, estimated to occur in 1 in 30,000 pregnancies [10]. The patient presented here has risk factors for an ectopic pregnancy like (cessated) smoking (odds ratio 2.3-3.9) and infertility (odds ratio 1.1-28) [11-14]. The higher incidence of ectopic pregnancy in the infertility population may be due to the increased incidence of tubal abnormality in this group of women but also due to an association between the use of fertility drugs and ectopic pregnancy [15-17]. With the advent of assisted reproduction techniques the overall incidence of heterotopic pregnancy has risen to approximately 1 in 3900 pregnancies [18-21]. An analysis in the United States from 1999 to 2002 reported an incidence of 1.5 heterotopic pregnancies per 1000 women conceiving through assisted reproduction techniques, including superovulation, intrauterine insemination, and *in vitro* fertilization [22]. So when the gynecologist detected echogenic fluid in the posterior cul-de-sac (pouch of Douglas) the possibility of an additional ectopic pregnancy should have been considered. The presence of free fluid within the abdomen was obviously a sign of tubal rupture. Falsely labeling it ascites associated with ovarian hyper stimulation syndrome delayed the decision for a surgical evaluation. When the patient was referred to the intensive care unit with signs of hemodynamic instability and there was a significant haemoglobin decline it was the intensivist who insisted on surgical evaluation and treatment. With the ectopic pregnancy found in the fallopian tube (just like in 90 percent of those cases [23,24] the performed laparoscopic salpingectomy was the standard surgical approach. The 45-fold increased incidence of heterotopic pregnancy after artificial reproduction techniques compared to normal conception is probably better known to reproductive medicines [25-28] than to emergency physicians. The presented case underlines the importance of excluding a concurrent ectopic pregnancy in women with abdominal pain during their first trimester even in the presence of an intrauterine pregnancy especially if the patient has undergone *in-vitro*-fertilization. With a diagnostic laparoscopy at an earlier stage, the amount of transfused blood probably could have been reduced or blood transfusion and restoration of coagulation capability with all their disadvantages (and costs) could have been totally avoided. The impact of a minimally invasive procedure like a laparoscopy together with the appropriate anaesthesia to the coexistent intrauterine pregnancy is very limited and surely preferable to hemorrhagic shock followed by urgent anaesthesiological and surgical intervention. Furthermore, the laparoscopic detection of an ectopic pregnancy before rupture offers the advantage of avoiding salpingectomy by using alternative removal techniques.

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