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# Laparoscopic cholecystectomy due to acute calculous cholecystitis in 16 weeks' *in vitro* fertilization and embryo transfer pregnancy: Report of the first case

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## ABSTRACT

The most common causes of acute abdomen during pregnancy are acute appendicitis followed by acute cholecystitis. The case presented is a 33-year-old patient in 16 weeks' *in vitro* fertilization and embryo transfer pregnancy who developed acute cholecystitis. Previously there were two unsuccessful cycles, one complicated with ovarian hyperstimulation syndrome. Due to clinical deterioration during intravenous antibiotic therapy laparoscopic cholecystectomy was performed and acute cholecystitis found. The postoperative course was uneventful. During the first 24 h tocolysis with intravenous fenoterol in addition to peroral atenolol  $2 \times 50$  mg was administered. Postoperative course was uneventful with further normal pregnancy. Elective cesarean section was made in term pregnancy (39 weeks) with singleton with Apgar 10/10. Current guidelines do not recommend prophylactic tocolysis in pregnant population with acute abdomen but there is no mention of the IVF-ET subpopulation of patients. Also, there are no guidelines for thromboprophylaxis in such patients with increased risk of thromboembolic accidents. To our knowledge this is the first case report of a laparoscopic cholecystectomy during IVF-ET gestation.

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**KEY WORDS:** Cholecystitis, *in vitro* fertilization, laparoscopy, pregnancy, tocolysis

## Introduction

*In vitro* fertilization and embryo transfer (IVF-ET) is prone to some serious obstetric and gynecologic complications during pregnancy, especially heterotopic pregnancy<sup>[1,2]</sup> and injury of adjacent pelvic organs.<sup>[3]</sup> On the other hand, acute surgical conditions in normal pregnancy increase maternal and fetal morbidity and mortality. Unfortunately, due to the rare occurrence of surgical acute abdomen in IVF-ET pregnant patients there are no recommendations and guidelines for such situations. To our knowledge there is no case report of a patient

with acute cholecystitis during IVF-ET pregnancy treated with laparoscopic cholecystectomy.

## Case Report

A 33-year-old afebrile female, gravida 1 para0, was admitted to the Department of Internal Medicine due to one-day history of biliary colic. She did not have such symptoms previously. Her 16 weeks' pregnancy was induced by IVF-ET (third cycle) after five years of unsuccessful natural conception. One cycle was complicated with ovarian hyperstimulation syndrome treated with heparin and albumin. Laboratory findings were as follows: White blood cells (WBC)  $13.9 \times 10^9/L$ , C-reactive protein (CRP) 11 mg/L, Hgb 119 g/L. Alkaline phosphatase, gamma glutamyltranspherase, aspartate transaminase, alanine transaminase, lactate dehydrogenase and total bilirubin levels were normal. Abdominal sonography revealed dilated gallbladder with multiple 5-mm calculi and 5-mm gallbladder wall. Fourteen years ago she had reactive arthritis on the second and third finger of her right hand due to cervical ureaplasmaurealyticum treated with doxycycline. Her Body Mass Index (BMI) was

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26 and she smoked till pregnancy for 16 years, 20 cigarettes a day (1-2 cigarettes a day in pregnancy) but did not drink alcoholic beverages and did not use medications or have any allergies. The next day due to increase in WBC to  $18.9 \times 10^9/L$  and CRP to 45 mg/L at the temperature of  $37.3^\circ C$ , abdominal surgeon was consulted and due to clinical deterioration the operation was indicated, and the patient received intravenous cephazolin 1 g preoperatively.

Lower leg pneumatic compression device was placed prior to operation. Four-trocar laparoscopic cholecystectomy in left lateral tilt French position was performed which revealed dilated gangrenous gallbladder covered with greater omentum. The Hasson open technique was used for the insertion of the first 10-mm trocar supraumbilically (the uterine fundus was 2 cm below the umbilicus). The three other trocars were inserted in typical positions. Pneumoperitoneum was maintained with carbon dioxide ( $CO_2$ ) for an average intraabdominal pressure of 12 mmHg. Harmonic scissors (produce vapor-free gas) were used, avoiding the potential effects of carbon monoxide. Gallbladder was distended with thickened edematous wall. After clipping division of cystic artery and cystic duct the gallbladder was removed and put in a plastic bag. After copious lavage the abdominal drain was inserted in subhepatic space and the specimen extracted through supraumbilical incision. The operation lasted 50 min. Opening of the gallbladder revealed multiple yellow (cholesterol) stones 5 mm in diameter. During the operation maternal  $CO_2$  was monitored and was in normal range.

Immediately after completion of the operation the gynecologist recommended tocolysis for 24 h with intravenous fenoterol with addition of peroral atenolol  $2 \times 50$  mg. There was no additional postoperative thromboprophylaxis. The drain was removed on the first postoperative day and during two days she received intravenous cephazolin  $3 \times 1$  g and ketoprofen  $3 \times 100$  mg. On the first postoperative day she started peroral feeding and had formed stool on the second postoperative day. The patient was afebrile and on the second postoperative day she was in good condition transferred to the Gynecology and Obstetrics Clinic for further pregnancy monitoring. Further pregnancy was normal and the patient had elective cesarean section during term pregnancy (39<sup>th</sup> week) of a male singleton (breech presentation, 3880 g, 52 cm) with Apgar 10/10.

### Discussion

Around 1% of births is by assisted reproductive technology.<sup>[4]</sup> The complications of IVF may be related to the procedure itself or underlying problems that caused the subfertility, maternal age, obesity, hyperoestrogenism, and medical factors. Another group of complications are acute abdominal conditions during IVF pregnancy. Most case reports describe acute abdomen developing as a direct consequence of the procedure of IVF presenting in few hours to few days. There are only several case reports of localized or diffuse peritonitis in patients (weeks or months) after IVF pregnancy. These patients (case reports) could be divided into obstetric/gynecologic or surgical group. In the obstetric/gynecology group there were cases of ruptured

pyosalpinx<sup>[5]</sup> and several cases of tubo-ovarian or pelvic abscesses,<sup>[6-8]</sup> and in the surgical group there were three cases of acute appendicitis.<sup>[9-11]</sup>

There is no published case (PubMed search) of laparoscopic cholecystectomy due to acute cholecystitis in a patient with IVF pregnancy. Authors' opinion is that some of the patients in the largest studies dealing with cholecystectomy (open and laparoscopic) in pregnancy might have had ovulation induction with IVF but that fact was not mentioned.

The case presented could imply that indications for emergency cholecystectomy should be the same as in non-pregnant and pregnant patients without ovulation induction therapy. The first question is should patients conceived with IVF receive prophylactic tocolysis in acute abdomen? Current recommendations (including *Society of American Gastrointestinal and Endoscopic Surgeons* 2011 revised recommendations) are that tocolysis should be limited to obstetrical indications (premature contractions) and not administered prophylactically. But these recommendations do not include or specify IVF-ET pregnancies. Another question is should thromboprophylaxis be selective in IVF patients with acute abdomen and what is an adequate dose. Special concern, as in our patient, was previous ovarian hyperstimulation syndrome with higher incidence of thromboembolic incidents.<sup>[12]</sup> Our patient had lower leg pneumatic compression device prior to and during the operation without postoperative thromboprophylaxis.

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