

# Operative management of acute cholecystitis in pregnancy: Case report

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## Abstract

**Introduction:** Acute cholecystitis is the second most common non-obstetric surgical disease during pregnancy. There have been several trials comparing operative and non-operative management in the past.

**Purpose:** To present a clinical case from our practice and to compare clinical management with worldwide standards.

**Materials and methods:** A 42-year-old patient in the 20<sup>th</sup> gestational week presented to our department with complaints of pain in the epigastrium and RUQ, as well as a single incidence of vomiting, during the last two days.

**Results:** We operated 15 h after admission and did a standard laparoscopy. The patient was discharged on the 4<sup>th</sup> postoperative day.

**Conclusion:** A review of the available literature shows the prevalence of early laparoscopic cholecystectomy, while non-operative management has proven to have higher complication rates. Laparoscopic surgery in pregnancy has proven to be safe for both mother and fetus. In our case, the patient was operated on within the first 24 hours of admission. We did not observe any complications during her stay and follow-up.

## Keywords

acute cholecystitis, laparoscopic surgery, pregnancy, mini-invasive approach

## Introduction

Acute cholecystitis is amongst the most common surgical diseases managed by the general surgeon. It affects between 10–15% of the population (Gilo et al. 2009). Risk factors for the development of cholelithiasis and subsequent cholecystitis include female sex, high BMI, dyslipidemia, as well as race (Knab et al. 2014). Patients with acute

cholecystitis present with pain in the RUQ, nausea, vomiting, and anorexia. On the physical exam, we can conclude the presence of fever, rebound tenderness in the RUQ, and a positive Murphy’s symptom. The gold standard for treatment is laparoscopic cholecystectomy (Mendez-Sanchez et al. 2006).

The formation of biliary stones is potentiated by pregnancy. It has been ascertained that between 10–15% of the

pregnant patients have biliary sludge – newly formed in 30%. About 6% of the patients have gallstones – new in 2%. Two to four weeks postpartum, 38–61% of the sludge and 15–28% of the gallstones disappear (Augustin and Majerović 2007; Diegelmann 2012).

The purpose of this case report is to present a case from our clinical practice and compare our management with the latest guidelines.

## Materials and methods

The patient is a 42-year-old female G3 P2 in the 20<sup>th</sup> gestational week. She was brought to the hospital by the emergency services with complaints of pain in the epigastrium and RUQ, as well as a single incidence of vomiting, during the last two days. She was referred to a surgeon after an OBGYN consultation.

At the time of the initial exam, the patient was afebrile and hemodynamically stable. The abdomen is painful upon palpation in the RUQ and epigastrium, with rebound tenderness. She was admitted to the Department of General Surgery for observation.

Initial medical treatment included i.v fluids, spasmolytics, and analgesics. Abdominal ultrasound and laboratory were repeated. Due to the unsatisfactory result of the medical treatment, clinical signs of local peritoneal irritation, and the result of the repeated ultrasound, it was decided to move on to surgical treatment.

Preoperatively, the patient was consulted with an OBGYN, a cardiologist, and an anesthesiologist.

She was positioned on her back, with the operating table rotated to the left.

**Table 1.**

42yG3 P2 20 <sup>th</sup> gest.w.	
<b>History</b>	<ul style="list-style-type: none"> <li>• Pain in RUQ and epigastrium from 2 day</li> <li>• Sweating</li> <li>• Single incidence</li> <li>• of vomiting</li> </ul>
<b>Physical exam</b>	<ul style="list-style-type: none"> <li>• Afebrile</li> <li>• RR 100/60 Fr 85/min</li> <li>• Abdomen – painful upon palpation in RUQ and epigastrium with rebound tenderness</li> </ul>
<b>Current therapy</b>	Nataspin H, Magnerot, Rotaspin, Vit. D, Espumisan

**Table 2.** Clinical laboratory.

	Upon admission	Repeated labs.	1 POD	2 POD	3 POD
Hbg/l	118	108	110	102	105
Leu ×10 <sup>9</sup> /l	12.8	14	13.7	13.6	11.1
CRPmg/dL (0.00–0.05)	–	0.74	–	11.48	–

**Table 3.** Ultrasound.

Upon admission	Controm US	3 POD
No pathology detected	Gallblader – 42 mm long, wall 3 mm thick, no sighns of gallstones	Small collection of freely moving fluid in the subhepatic space with small hypochoic elements in the coaction and distal in the lateral canals with anechoic structure.
	Small freely moving perivesical fluid collection	No sighns of forming of limited liquid collections.

The first port was inserted above the umbilicus using the Hasson technique. The following two ports were placed under video control – one in the epigastrium and one in the mid-axillary line to the left.

After careful revision of the abdominal cavity, a gangrenous cholecystitis, pericholecystitis and local sero-fibrinous peritonitis wereverified intraoperatively.

Standard laparoscopic cholecystectomy was then performed. One abdominal drain was placed in the subhepatic space.

Postoperatively, the patient was again consulted with OBGYN.

The postoperative medical therapy included i.v fluids, empirical antibiotics treatment (cefoperazone 2×2 g), spasmolytics, analgesics, LMWH and Cormagne-sin 800 mg/24 h at a continuous infusion.

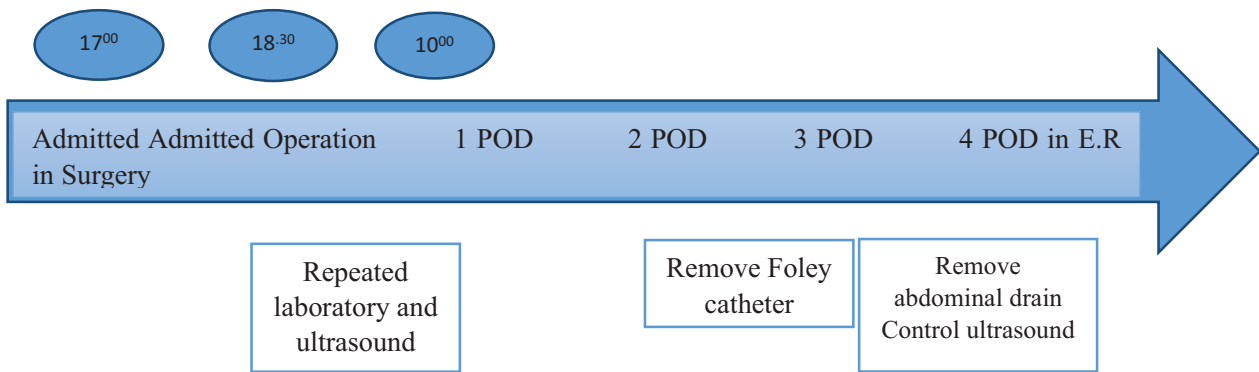
During her stay in the clinic, we did not observe any complications. Daily consultations with a cardiologist and an OBGYN. The patient complained of pain and nausea during the first two days. The urethral catheter was removed on the 2<sup>nd</sup> POD. The abdominal drain was removed on the 3<sup>rd</sup> POD. The patient was discharged on 4<sup>th</sup> POD in a satisfactory general condition and referred to an OBGYN for follow-ups.

## Discussion

Acute cholecystitis is the second most common non-obstetric surgical condition after appendicitis in pregnant patients. Presence of gallstones has been verified in 30% of the patients. The incidence of symptomatic gallbladder disease is between 0.05% to 0.8%. Acute cholecystitis can be observed in 0.1% of the patients (Gilo et al. 2009). There is no difference in the frequency between pregnant and non-pregnant patients.

When discussing acute cholecystitis during pregnancy, the physiological changes that occur should also be taken into consideration (Mendez-Sanchezet et al. 2006; Diegelmann 2012). The serum levels of progesterone and estrogen are elevated and lead to relaxation of the smooth muscle tissue, including that of the gallbladder (Augustin and Majerović 2007). Its lowered contractility leads to slower or incomplete post-prandial gallbladder emptying, stasis, and retention of sludge (Behar 1999).

Transient changes in the biliary system have been observed that lead to 50% increase in biliary secretion, as well as changes in the composition of the bile. The levels of cholesterol increase, while the percentage of chenodeoxycholic acid decreases. As increase in the aggregation of the cholesterol crystals and the viscosity of the bile has been noted (Mendez-Sanchezet et al. 2006).



**Figure 1.** Timeline.

The gravid uterus is considered an abdominal organ from the 12<sup>th</sup> gestational week onwards. With the progression of the pregnancy, it increases in volume and displaces and compresses the viscera (Diegelmann 2012).

The differential diagnosis for acute cholecystitis should include acute appendicitis, acute pancreatitis, pyelonephritis, HELLP syndrome, acute fatty liver in pregnancy, acute myocardial infarction, preeclampsia, pneumonia, and herpes zoster.

The signs and symptoms of acute cholecystitis on pregnant and non-pregnant patients are similar. However, it should be noted that complaints of nausea, vomiting, and abdominal pain are frequent in the healthy pregnant population. Murphy's symptom is observed with less frequency and is not as characteristic in pregnant patients (Augustin and Majerović 2007). With the progression of the pregnancy the anatomical position of the viscera changes. The abdominal wall is weaker and the signs of peritonitis develop slower. All of that can cause difficulty during the physical examination.

The obstetric examination and the evaluation of the fetal vitality are required. The diagnostics and treatment of these patients should be done by a multidisciplinary team.

CBC, AST, ALT, Alkaline phosphatase, amylase, lipase, and total bilirubin should be checked. Laboratory values such as WBC, Amylase, Alkaline phosphatase total bilirubin are not as indicative, however, due to being elevated during a normal pregnancy (Augustin and Majerović 2007).

Abdominal ultrasound has been shown to have high sensitivity for detecting acute cholecystitis – 85% in pregnant and 95% in non-pregnant patients (Gilo et al. 2009). MRI can also be employed with 77% sensitivity.

There are two main treatment strategies – non-operative (NOM) and operative (OM) management the latter, which includes open (OC) and laparoscopic cholecystectomy (LC).

There has been much debate on the optimal course of action in such cases. According to the

Society of American Gastroenterologists and Endoscopic Surgeons' (SAGES) latest guidelines revised in 2022 “*Laparoscopic cholecystectomy is the treatment of choice in the pregnant patient with symptomatic gallbladder disease, regardless of trimester (++; weak)*”. A consensus that is shared by Ball et al. 2019a “Evidence-Based Guideline on

Laparoscopy in Pregnancy Commissioned by the British Society for Gynecological Endoscopy”.

Laparoscopic surgery, as a whole, has been proven to have no higher adverse birth outcomes in pregnant patients, compared to those who had not undergone surgery (Ball et al. 2019a, 2019b). The American Society of Anesthesiology 2019 came up with a consensus that stated that there is no evidence that anesthesia has any effect on the fetus in utero (Nonobstetric Surgery During Pregnancy 2019).

Laparoscopic cholecystectomy in pregnancy has been proven to be safe (Rios-Diaz et al. 2020). Historically surgeons and obstetricians advocated for initial NOM and only in the cases it failed – a prompt surgery (Casey and Cox 1996).

In comparing non-operative management (NOM) with operative one (OM), is important to note the specific obstetric complications that may arise – fetal loss, preterm delivery, abortion, amniotic infection, and antepartum haemorrhage (Cosenza et al. 1999) There is no overall difference in mortality rate between non-pregnant and pregnant patients that have underwent LC (Silvestri et al. 2011).

A group compared NOM, OC and LC. They concluded that NOM had a statistically significant higher rate of maternal and fetal complications compared to operative management. And LC had a statistically significant lower rate of surgical, maternal and fetal complication compared to OC (Kuy et al. 2009).

It was concluded that NOM group has a higher rate of complication compared to OM group. A higher rate of recurrent symptoms, frequent E.R. visits and readmissions in patients that underwent NOM, ante and postpartum was reported (Othman et al. 2012; Jorge et al. 2015). Up to 38% of the patients were reported to have had suboptimal outcome in the NOM group (Lu et al. 2004). Another study reported that up to a quarter of the NOM group failed to respond to the treatment and required subsequent surgery (Date et al. 2008). A higher incidence of fetal mortality was ascertained in the NOM group compared (Jelin et al. 2008).

Cheng et al. (2021) did a longer study that reported LC within the first 24 h after admission is connected with lower maternal and fetal complications.

The operative technique is more or less standard, however, there are some technical considerations. There is no concrete consensus on the port placement in the reviewed

literature. Most authors show a preference for the Hasson technique compared with Veress due to the hypothetical risk of trauma to the uterus. There is no study that proves that, however (Othman et al. 2012). The Veress' needle has been reported to be safe in creating pneumoperitoneum in LUQ (Ball et al. 2019a, 2019b).

The patient should be placed in left lateral position (Ball et al. 2019a, 2019b; SAGES 2022) or the table rotated to the left (Hani 2007) so to avoid compression of the vena cava and the aorta.

Lower pressure between 10–12 mmHg (Balinskaite et al. 2017; Ball et al. 2019a, 2019b) should be used for the pneumoperitoneum. Some authors allow CO<sub>2</sub> pressure up to 15 mm Hg (Upadhyay et al. 2007; SAGES 2022).

Pre- and post-operative monitoring of fetal heart sounds in advised (Ball et al. 2019a, 2019b; SAGES 2022).

The use of fetal monitoring intraoperatively is advised. The use of tocolytics is not shown to reduce contractions and preterm labour (Ball et al. 2019a, 2019b; SAGES 2022).

Intraoperative monitoring of CO<sub>2</sub> so to avoid hypo- and hypercapnia that can lead to fetal acidosis. Noninvasive monitoring of ET-CO<sub>2</sub> has proven enough and there is no need to utilize invasive monitoring of arterial pCO<sub>2</sub> (Ball et al. 2019a, 2019b; SAGES 2022).

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## Conclusion

Acute cholecystitis is the second most common non-obstetric surgical disease during pregnancy. Clinical diagnosis is complicated due to normal physiological changes that pregnant women undergo. Ultrasound or MRI is required.

While there is no concrete consensus regarding the management of acute cholecystitis, recent publications lean towards early laparoscopic cholecystectomy. Non-operative management has proven to have high complication rates. Laparoscopic surgery has proven to be safe in any trimester of pregnancy with favorable outcomes.

In our case, the patient was operated on 15 h after admission and stayed for 4 days post-op. We did not observe any complications during her stay. Upon discharge, she was referred for followup by her obstetrician.

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