Acute Cholecystitis in Pregnancy-Current Update: Narrative Review Article

Abstract

Acute cholecystitis in pregnancy is one of the common non obstetric causes for acute abdominal pain. The management can be divided into conservative treatment and surgical treatment. Conservative treatment involves the use of intravenous fluids and antibiotics,but patients are prone for developing recurrence of symptoms. Surgical treatment involves performing a cholecystectomy either as an open or laparoscopic method. As there is no consensus on the management of acute cholecystitis in pregnancy, we have conducted this review article to look at the role of conservative treatment, the role of laparoscopic cholecystectomy and when is the best time to perform this surgery. The role of percutaneous cholecystostomy is also mentioned in this review.

Keywords-Acute cholecystitis in pregnancy, gallstone disease in pregnancy, conservative treatment of acute cholecystitis in pregnancy, laparoscopic cholecystectomy in pregnancy, cholecystectomy in pregnancy.

Introduction

Acute cholecystitis accounts for the second most common cause for non-obstetric abdominal pain in pregnant patients. The incidence of acute cholecystitis in pregnancy is about 0.2 to 0.5 per 1,000 pregnancies. The global prevalence of gallstone disease in pregnancy is about 3.6%. During pregnancy the elevated serum estrogen and progesterone predispose to gallstone formation. Estrogen is associated with increased viscosity of bile and cholesterol crystal aggregation. Progesterone is associated with gallbladder smooth muscle relaxation and bile stasis.(1–3)

The clinical presentation is the same as for non-pregnant women, which includes pain over the right hypochondrium and associated symptoms like nausea and vomiting. There may also be symptoms of dyspepsia and abdominal distension after eating. Diagnosis is usually confirmed by using blood investigations like full blood count, liver function test and serum amylase and imaging with an ultrasound of the abdomen. Ultrasound has a high sensitivity and specificity in diagnosing acute cholecystitis in pregnancy. (4)

The anatomical and physiological changes that occur during pregnancy make the diagnosis and treatment of acute cholecystitis in pregnancy difficult. The position of the gravid uterus during the respective trimesters of pregnancy makes clinical examination difficult. The presence of leukocytosis and elevated serum alkaline phosphatase during pregnancy make interpretation of blood investigations difficult in making a diagnosis of acute cholecystitis.(5)

The treatment of acute cholecystitis in pregnancy can be divided into medical and surgical treatment. Medical treatment involves admitting the patients, keeping them fasted, starting intravenous antibiotics and analgesics and once the patient's condition had improved, cholecystectomy was often planned during the post-partum period. If a cholecystectomy needs to be done during the pregnancy it is usually performed during the second trimester, with surgery not performed during the first and third trimester due to the risk of threatened abortion and the size of the gravid uterus.(6–8)

Patients who undergo conservative treatment for acute cholecystitis in pregnancy often have a high readmission rate due to recurrent attacks and this can affect the wellbeing of the mother and the fetus. This has been the reason for performing the cholecystectomy earlier to manage this condition.(9)

If cholecystectomy is to be performed in the third trimester of pregnancy, the severity of acute cholecystitis must be graded and if the clinical condition deteriorates thenlaparoscopic cholecystectomy may have to be performed. If the symptoms improve then cholecystectomy may be performed in the post-partum period.(10)

The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) has recommended laparoscopic cholecystectomy in the management of acute cholecystitis in pregnancy has it offers similar benefit to open surgery and it can be safely performed in any trimester of pregnancy if surgery is needed. Technical points like position of the patient, placement of the ports, the use of low-pressure insufflation and intraoperative monitoring of the carbon dioxide are important.(11)

As there is no current consensus on the management of acute cholecystitis inpregnancy, The role of conservative treatment is not welldefined, the ideal time for performing a laparoscopic cholecystectomy is also not defined, either laparoscopic cholecystectomy can be performing in any of the trimesters of pregnancy and what is the consequence of delaying laparoscopic cholecystectomy to the post-partum period. We have conducted this review article looking for answers for all these factors in the management of acute cholecystitis in pregnancy. We conducted a literature review using PUBMED, the Cochrane database of systemic reviews, Google scholar and semantic scholar looking for randomized control trials, non-randomized trials, observational and cohort studies, clinical reviews, systemic reviews, case write ups, and meta-analysis from 19850 to 2023.The following keywords were used, "Acute cholecystitis in pregnancy", "Gallstone disease in pregnancy", "Conservative treatment of acute cholecystitis in pregnancy", "Laparoscopic cholecystectomy in acute cholecystitis in pregnancy "and "Cholecystectomy in pregnancy". All articles were in English, and all articles were assessed by manual cross referencing of the literature. Commentaries and editorials were excluded from this review.OnlyPregnant patients with symptoms on non-obstetric abdominal pain were included in this study.

Discussion

Conservative treatment of acute cholecystitis in pregnancy

Pregnant patients who present with symptoms of acute cholecystitis are often treated conservatively.This involves the use of intravenous antibiotics and analgesics with the addition of intravenous fluids if the patient has persistent nausea and vomiting. There are limitations regarding the type of antibiotic prescribed due to pregnancy with the second and third generation cephalosporins being commonly used due to their safety.(12–14)

The use of analgesia is usually with opioids and paracetamol with non-steroidal anti-inflammatory drugs (NSAIDS) being contraindicated due to risk of complication to the fetus like oligohydramnios and premature closure of the patent ductus arteriosus. Conservative treatment is associated with a high recurrence rate of 40% to 77% and this can be detrimental to the mother and fetal well-being.(15–17)

A retrospective study by Othman et al on conservative treatment in pregnancy concluded that the number of visits of patients to the emergency department were higher in those who had undergone conservative treatment,and the readmission rates were also higher.(18)

A nationwide analysis of the morbidity associated with the conservative management of acute cholecystitis in pregnancy was conducted byRios-Diaz et al. A total of 6390 patients were included in this study and they concluded that conservative treatment was associated with increased fetal-maternal complications, prematurelabor,increased caesarean section rates and poor fetal health.(19)

A review of the management of complicated gallstone diseasein pregnancy by Date et al concluded that up to 27% of patients failed to respond to conservative treatment and the maternal and fetal mortality was similar between patients who had undergone conservative or surgical treatment. Another review by Lu et al comparing conservative treatment versus surgical treatment for acute cholecystitis in pregnancy also showed a recurrence rate of 38%, with patients in the second trimester exhibiting the highest recurrence rate..(20,21)

Surgical management of acute cholecystitis in pregnancy

The surgical treatment of acute cholecystitis in pregnancy is cholecystectomy which can be performed as an open or laparoscopic procedure. The timing of surgery is important with the second trimester being the best time to perform it to obtain the best response. The risk of spontaneous abortion is higher during the first trimester and premature labor is high if surgery is done during the third trimester. Laparoscopic cholecystectomy is not a contraindication for patients who are pregnant, and the second trimester is the best time to perform it as trocar placement can be done without interference to size of the uterus.(22–30)

A meta-analysis was conducted by Athwal et alon the safety of surgery for symptomatic gallstone disease in pregnancy. A total of 470 patients were included in this study and the pre-term delivery rate was 6.8% and there was no significant difference with regards to the maternal and fetal mortality rates. This meta-analysis concluded that cholecystectomy can safely be performed in pregnancy.(31)

A systemic review and meta-analysiswereconducted bySedaghat et al comparing laparoscopic versus open cholecystectomy in the surgical management of acute cholecystitis in pregnancy. A total of 10,632 patients were included and laparoscopic cholecystectomy was associated with reduced maternal and fetal complications. The conversion rate was 3.8% and the length of the hospital stay was 3 days. This meta-analysis concluded that laparoscopic cholecystectomy was safe to perform but it could not tell when the best time was to perform surgery as most of the cases were operated on the first and second trimester.(32)

A systemic review on laparoscopic cholecystectomy during pregnancy was conducted byNasioudis et al.A total of 590 patients were included in the study, The majority of the operations were performed during the second trimester and the post operative complication rates were 4% and the conversion to open cholecystectomy was 2.2%.The preterm delivery rate was 5.7% and this study showed that laparoscopic cholecystectomy can be safely performed in acute cholecystitis in pregnancy.(33)

Laparoscopic cholecystectomy in pregnancy should be performed with the patient in the supine position, port placement should be with the open Hassan technique, pneumoperitoneum should be maintained with a pressure of 8-12mmHg, and tocolytics should be administered and fetal heart rate monitoring be done.(34,35)

Laparoscopic cholecystectomy was found to be safe in pregnancy as it was associated with reduced short term fetal adverse effects, the operative time was shorter, length of hospital stay was reduced and there was a reduced requirement for blood transfusion. There was also a reduced risk of miscarriage. Other factors that can affect the outcome are independent factors like age above 35 years, thepresence of jaundice and biliary peritonitis,.(36–40)

Table Ⅰ： Table showing the conversion rates, preterm delivery rates and complication rates of patients who underwent laparoscopic cholecystectomy in pregnancy.

Study	**Year**	**Study type**	**N=numbers**	**Conversionrate (%)**	**Preterm delivery rate (%)**	**Complication rate (%)**
Sedaghat	2016	Systemic	10,632	3.8%	8.7%	9.6%

et al		review and meta-analysis				
Nasioudis et al	2016	Meta-analysis	590	2.2%	5.7%	4%

Percutaneous cholecystostomy in acute cholecystitis in pregnancy

Percutaneous cholecystostomy can be used to stabilize a pregnant patient who presents with acute cholecystitis. It can be used in the first trimester to enable elective cholecystectomy to be performed in the second trimester. For pregnant patients who present with acute cholecystitis in the third trimester it can be used as a bridge to post-partum cholecystectomy. There are limited studies on the use of percutaneous cholecystostomy in acute cholecystitis in pregnancy, primarily case reports and case series. Large scale studies may need to be done to look at its efficacy.(41–45)

Conclusion

The management of acute cholecystitis in pregnancy has seen a trend towards early laparoscopic cholecystectomy because of the high recurrence rate of conservative treatment. Laparoscopic cholecystectomy is not a contraindication for performing it in pregnant patients. The position of the gravid uterus makes placement of the port difficult, so surgeons who perform this operation will require some amount of experience in performing a laparoscopic cholecystectomy. Most general surgeons are still reluctant to perform surgery during pregnancy despite the evidence collaborating the safety of surgery in pregnancy.

Conservative treatment is still a popular form of therapy for acute cholecystitis in pregnancy as most hospitals may not have additional monitoring for the fetus and mother, hence this is a deterrent for performing laparoscopic cholecystectomy in pregnancy. Most patients will ultimately get the cholecystectomy performed in the post-partum period.

Percutaneous cholecystostomy may be used as a bridging procedure to stabilize patients but it is not a popular form of treatment due to the problems of inserting the catheter and the contraindication of performing a tube cholangiography due to the radiation risk to the fetus.

Moving forward laparoscopic cholecystectomy in pregnancy is best to be performed in the second trimester has the risk to both the mother and fetus are the lowest. Pregnant patients with cholelithiasis should be counselled about the risk of complications of gallstone disease and the treatment options. Morelarge-scale studies are needed to establish if surgery is the best form of treatment for acute cholecystitis in pregnancy.

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