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Review on Common Non-Obstetric Acute Abdominal Conditions in Pregnancy: An Update of Management

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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Review Article

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ABSTRACT

Non-obstetric acute abdominal conditions account for admission to the surgical ward, and it involves management by the surgeon and gynecologists. The common conditions are acute appendicitis, acute cholecystitis and acute pancreatitis. Acute appendicitis in pregnancy requires prompt diagnosis and the management has moved towards laparoscopic appendectomy. Acute cholecystitis in pregnancy has seen a trend from conservative management to laparoscopic cholecystectomy being performed during pregnancy to prevent recurrence. Acute pancreatitis in pregnancy is usually managed conservatively with endoscopic retrograde cholangiopancreatography being performed for gallstone pancreatitis. We have conducted this review article to investigate the current management of these conditions.

Keywords: Non-obstetric acute abdomen; acute abdomen in pregnancy; conservative treatment of acute abdomen in pregnancy; laparoscopic appendectomy in pregnancy; laparoscopic cholecystectomy in pregnancy and acute pancreatitis in pregnancy.

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1. INTRODUCTION

Acute abdomen in pregnancy is a clinical condition characterized by severe abdominal pain that occurs within 24 hours and it requires prompt diagnosis and management. It is seen in 5% to 10% of all emergency department admission and surgical intervention is required in 0.5% to 2% of cases. The anatomical and physiological changes that occur in pregnancy make diagnosis and treatment of this condition difficult. The most common non-obstetric surgical condition is acute appendicitis followed by acute cholecystitis and acute pancreatitis [1,1a,1b,1c].

The anatomical changes that occur in pregnancy include the growth of the gravid uterus, include its position being intra-pelvic during the first trimester, reaching the umbilicus during the second trimester and at the epigastric region during the third trimester. This makes clinical examination of the abdomen difficult as the gastrointestinal tract organs are displaced. The physiological changes that occur include the presence of nausea, vomiting, increase in temperature, increase in blood volume, and tachypnea. Biochemical changes that occur include a slight drop in the hemoglobin level, presence of leukocytosis and an increased level of alkaline phosphatase [2].

Radiological imaging that can normally be performed is hampered by the fetus, with its risk of teratogenic effect due to radiation exposure. This is more prevalent during the first trimester of pregnancy. The common imaging modalities that are used include ultrasonography and magnetic resonance imaging. Ultrasonography is effective due to its lack of radiation exposure and its ability to assess the solid organs in the abdomen and the gravid uterus. Magnetic resonance imaging can also be used to diagnose an acute abdominal condition in pregnancy as it is able to give a better diagnosis. Computerized tomography is not used due to the iodized contrast agents that are harmful to the fetus [3].

The most common causes of non-obstetric acute abdominal conditions include acute appendicitis, followed by acute cholecystitis and acute pancreatitis. The other rare causes include choledocholithiasis and intestinal obstruction. The management of these conditions is influenced by the fetus and gravid uterus. These conditions are managed conservatively first, and this leads to recurrence and frequent admission to the hospital. Surgical management should be performed as deferment may lead to a higher risk of fetal loss [4-6].

Laparoscopy was initially contraindicated in the management of acute abdominal conditions in pregnancy, but the Society of American gastrointestinal and endoscopic surgeons (SAGES) concluded that laparoscopy may be safely performed during any trimester of pregnancy when indicated. Additional measures include the position of the patient in the left lateral decubitus position, the placement of the ports and using a lower carbon dioxide pressure for insufflation. Intra-operative carbon dioxide monitoring should also be used during the surgery [7].

As there is no current consensus on the management of non-obstetric acute abdominal conditions in pregnancy, The role of conservative treatment is not well defined, the role of surgical therapy is not defined with regards to which trimester of pregnancy is the best time to perform. The role of laparoscopy in the management of these conditions is not properly defined. We have conducted this review article looking for answers for all these factors in the management of acute abdominal conditions 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 1990 to 2023.The following keywords were used, “Non-obstetric acute abdomen”, “Acute abdomen in pregnancy”, “Conservative treatment of acute abdomen in pregnancy”, “Laparoscopic cholecystectomy in pregnancy “, “Laparoscopic appendectomy in pregnancy” and “acute pancreatitis 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. Only Pregnant patients with symptoms on non-obstetric abdominal pain were included in this study.

2. DISCUSSION

2.1 Acute Appendicitis in Pregnancy

Acute appendicitis is the most common cause of the non-obstetric acute abdomen in pregnancy. It is seen in 1 in 650 pregnancies per year and is most common in the second trimester. The

classical presentation of pain over the right iliac fossa is rarely seen due to the presence of the gravid uterus with pain being felt over the flank or right hypochondrium. Tenderness over McBurney's point on clinical examination of the abdomen is less prominent due to stretching of the anterior abdominal wall by the gravid uterus [8].

Blood investigations are not sensitive to use in the diagnosis of acute appendicitis in pregnancy with the physiological leukocytosis that occurs makes this not sensitive to diagnose acute appendicitis. The elevation of the C-reactive protein that progresses with pregnancy also hinders its role in the diagnosis of acute appendicitis. Other investigations like the neutrophil to lymphocyte ratio and the lymphocyte to C-reactive protein ratio are also not sensitive to make a diagnosis of acute appendicitis in pregnancy [9-11].

There should be no delay in the diagnosis of acute appendicitis in pregnancy as the rate of complications like perforation is about 12%-40%. Prompt diagnosis and treatment is essential to prevent these complications like perforation and abscess formation [12].

Imaging is often employed to help in the diagnosis of acute appendicitis in pregnancy but the risk of radiation exposure to the fetus has made ultrasonography the first line investigation of choice. The sensitivity of ultrasound in the diagnosis of acute appendicitis in pregnancy ranges from 60% to 80% and its specificity is from 80% to 100%. This often leads to a high false positive results hence further different imaging modalities may be required [13-15].

Magnetic resonance imaging is the best nonionizing imaging modality that can be used to diagnose acute appendicitis in pregnancy and with a sensitivity and specificity of up to 95%, it is slowly becoming the first line imaging modality of choice in pregnant patients [16,17].

A systemic review and meta-analysis on the diagnostic performance of magnetic resonance imaging for the detection of acute appendicitis in pregnancy by Motavaselian et al, showed that the pooled sensitivity and specificity were 92% and 98% and they concluded that magnetic resonance imaging could be used as a first line investigation to diagnose acute appendicitis in pregnancy. This was also confirmed by a systemic review which was conducted by Cho et al. [18,19].

The treatment of acute appendicitis in pregnancy is appendectomy and it can be performed as an open or laparoscopic method. The World Society of Emergency Surgeons (WSES) has recommended laparoscopic appendectomy in acute appendicitis in pregnancy as it is associated with a shorter hospital stay and reduced surgical site infection [20].

Laparoscopic appendectomy was compared to open appendectomy in the management of acute appendicitis in pregnancy and it was found to be safe, effective, associated with early mobilization and reduced hospital stay. There was a decreased risk of pre-term labor and no increased risk of abortion [21–24].

There have been several systemic reviews and meta-analyses that compared laparoscopic appendectomy versus open appendectomy in the management of acute appendicitis in pregnancy. These studies concluded that although laparoscopic appendectomy was safe and effective, but it was associated with an increased risk of fetal loss when compared to open appendectomy, but this can be explained by the fact that almost all the cases in these studies were operated in the first trimester [25-28].

There is insufficient evidence to recommend conservative treatment for acute appendicitis in pregnancy as there are very few studies and though their results are favorable, it is not recommended as a primary form of therapy [29].

Table 1. The Odd's ratio for fetal loss following laparoscopic appendectomy for acute appendicitis in pregnancy

Study	year	Study type	N=numbers	Odds Ratio
Wilasrusmee et al. [25]	2012	Meta-analysis	3415 Laparoscopic appendectomy-599, Open appendectomy-2816	1.91
Frountaz et al.	2019	Meta-analysis	6276 Laparoscopic appendectomy- 1963, open appendectomy-4313	2.11

2.2 Acute Cholecystitis in Pregnancy

Acute cholecystitis in pregnancy is the second most common cause of non – obstetric abdominal pain in pregnancy and its incidence is about 0.2 to 0.5 cases per 1,000 pregnancies. The elevated levels of estrogen and progesterone during pregnancy lead to stasis and supersaturation of bile as well as gallbladder stasis. The presence of these factors leads to cholelithiasis and subsequently cholecystitis [30,31].

The symptoms of acute cholecystitis are pain over the right hypochondrium, fever and on abdominal examination, Murphy's sign will be positive. In pregnancy due to the presence of the gravid uterus, the symptoms of abdominal pain may be present in the flank and Murphy's sign may not be present due to the displacement of the organs by the uterus [32].

Elevated total white cell counts, and C. Reactive protein are all features of acute cholecystitis but in pregnancy the physiological elevation of these parameters makes the diagnosis of acute cholecystitis in pregnancy difficult. Ultrasound is the initial investigation of choice in acute cholecystitis in pregnancy and it can detect gallstones and inflammation of the gallbladder [33-36].

The management of acute cholecystitis in pregnancy is initially conservative treatment with intravenous fluids, intravenous antibiotics and analgesics followed by an elective laparoscopic cholecystectomy in the post-partum period. But due to recurrent attacks and readmission it is now recommended that laparoscopic cholecystectomy be performed during pregnancy to reduce this [37-41].

Laparoscopic cholecystectomy can be safely performed for acute cholecystitis in pregnancy. The best time to perform this operation is during the second trimester as the risk of fetal loss and pre-term labor are reduced during this period. The World Society of Emergency Surgeons (WSES) also recommends laparoscopic cholecystectomy for acute cholecystitis in pregnancy [42-44].

Several systemic reviews and meta-analyses have been done to compare laparoscopic cholecystectomy versus open cholecystectomy in pregnant patients with acute cholecystitis. These studies concluded that laparoscopic cholecystectomy was safe, effective, and associated with reduced complications. The rate of pre-term labor and fetal loss was low. The conversion rates were less than 5% but most of the cases were conducted during the first and second trimester [45,46].

2.3 Acute Pancreatitis in Pregnancy

Acute Pancreatitis in pregnancy is the third most common cause of acute non-obstetric abdominal pain in pregnancy. It is seen in 1 in 5,000 cases and most seen in the first trimester. The etiology of acute pancreatitis in pregnancy are gallstones, alcohol, and hypertriglyceridemia. The clinical presentation is the presentation of severe upper abdominal pain, and the diagnosis is confirmed by the measurement of serum amylase or lipase with is elevated by more than three times the normal limit. Acute pancreatitis is classified by the revised Atlanta criteria into mild, moderate, and severe. The severity assessment is by The Ranson's or Glasgow criteria. Imaging is primarily by ultrasound with magnetic resonance imaging being considered when further imaging is required [47-49].

The management of acute pancreatitis in pregnancy will depend on etiology, general management involves the use of intravenous fluids and monitoring of vital signs. For patients with hypertriglyceridemia includes lowering the serum triglycerides and control of lipid intake. Patients who present with gallstone pancreatitis will require the use of endoscopic retrograde cholangiopancreatography. There are modifications that need to be done to account for the pregnancy, which include positioning the patient in the lateral position, careful use of sedatives, to use bipolar current when performing a sphincterotomy, and to consider not using contrast and placement of a stent [50-53]. Endoscopic retrograde cholangiography is otherwise a safe and effective procedure that can be performed in gallstone pancreatitis and the best time to perform it is during the second trimester. To limit the risk of radiation exposure, measures like lead shielding to cover the patient, limiting fluoroscopy time and smallest possible field [54-56].

3. CONCLUSION

Acute appendicitis and acute cholecystitis account for the most common non obstetric acute abdominal conditions which is seen by the surgeon. For acute appendicitis in pregnancy, the

delay in diagnosis is often due to the difficulty in interpreting blood investigation and obtaining imaging modalities like ultrasound. The access to magnetic resonance imaging is a problem in certain hospitals. The decision to operate often falls on the treating surgeon with consultation with the gynecologist. Laparoscopic appendectomy should be performed, when possible, without delay as the risk of complications like perforation are higher in these patients.

Patients who present with acute cholecystitis during pregnancy are more likely to be managed conservatively and laparoscopic cholecystectomy being performed electively in the post-partum period. The recurrence rate is high, and this will account for frequent readmission to the hospital and may be detrimental to the fetus. Laparoscopic cholecystectomy should then be performed especially in the second trimester to treat this condition and prevent these complications.

Acute pancreatitis in pregnancy is often managed conservatively with endoscopic retrograde cholangiopancreatography being performed in gallstone pancreatitis. The etiology of acute pancreatitis is important, to prevent recurrence.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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