

## GENERAL SURGICAL EMERGENCIES DURING PREGNANCY

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### Abstract

**Background:** Pregnant patients are most important patients as their health can affect not only one life but two lives together. During pregnancy, 0.2% to 1.0% of women required general surgery for non-obstetric problems. The aims and objectives of this study were to study the common causes of acute abdomen in pregnancy and their management. **Methods:** Our study of 200 pregnant patients presenting with non-obstetric general surgical emergencies over a period of 5 years in a tertiary care hospital from the General surgical department of VSGH Hospital, Ahmedabad, India from year 2015 to 2019. **Results:** The mean age of the patients was  $27 \pm 3.5$  years with most of them being in the age group of 26- 30 years. Most commonly affected in the second trimester. Acute appendicitis was the most common surgical emergency in our study group accounting for (44%) of all the emergencies, followed by acute acalculous cholecystitis(20%), acute pancreatitis(16%), cholelithiasis (12%), small bowel obstruction (4 %),trauma(4 %). **Conclusion:** Early detection and early management in pregnancy may resulted in better outcomes for mother as well as her children. Therefore, early diagnosis and appropriate timely intervention would be sufficient to reduce overall implications in pregnant patients during general surgical emergencies.

**Keywords:** Pregnancy, Non-obstetrical surgical emergencies

### Introduction

Acute abdomen is defined as “signs and symptoms of abdominal pain and tenderness, a clinical presentation that often requires emergency surgical therapy<sup>1</sup>.” Non-obstetrical general surgical emergencies are acute appendicitis, acalculous cholecystitis,cholelithiasis,acute pancreatitis, small bowel obstruction, trauma. Pregnancy is state where surgeons are confused with signs and symptoms occurs during surgical emergencies which is overshadowed with physiological changes which occurs during normal pregnancy therefore for the surgeon it is difficult to approach these kind of patients and also pregnancy is restricted state where diagnostic evaluation of pregnant patients are very difficult because of adverse effects of radiation

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occurs to fetus limiting diagnostic choice for the surgeon. Incidence of non-obstetrical general surgical emergencies occurs during pregnancy is approximately 1 in 500 pregnancies<sup>3</sup>. 0.2% to 1.0% of women require general surgery for a non-obstetric cases<sup>3</sup>. The aims and objectives of this study were to study the common implication of acute abdomen during pregnancy requiring emergency surgical intervention and their outcomes.

## Material and Methods

Our study of 200 pregnant patients were presented with non-obstetric general surgical emergencies over a period of 5 years in a tertiary care hospital from the General surgical department of VSGH Hospital, Ahmedabad, India from year 2015 to 2019. Pregnancy is divided into 3 trimesters: 0 to 14th week (first trimester of pregnancy), 15th to 28th week (second trimester) and 29th week and later (third trimester). Out of 200 cases of general surgical emergencies in pregnancy 88 cases were diagnosed with acute appendicitis, 40 cases of acalculous cholecystitis, 24 cases of cholelithiasis, 32 of cases of pancreatitis, 8 cases of small bowel obstruction, 8 cases of trauma. Written and informed consents were taken from the patients for this study. The concerned ethical committee approved the study.

## Results

The mean age of the patients was  $27 \pm 3.5$  years with most of them being in the age group of 26- 30 years. Majority of patients presented in the 2nd trimester.

Acute appendicitis was the most common surgical emergency in our study group accounting for (44%) of all the emergencies, followed by acute acalculous cholecystitis(20%), acute pancreatitis (16%), cholelithiasis (12%), small bowel obstruction (4%),trauma(4%). Ultrasonography was used as the diagnostic modality of choice in 98% of patients. Out of 200 patients 88 were of acute appendicitis for that the mean age of the patients was 27.9 years (range, 19 to 38 years), and 5 patient was younger than 20, the ages of 10 patients were between 20 and 24 , 53 patients were between 25 and 29 , 12 patients were between 30 and 34 , and 8 patients were 35 or older . The number of primiparas was 35 and that of multipara was 53. By gestational age, 9 patients were in the first trimester of pregnancy, 60 were in the second trimester of pregnancy and 19 was in the third trimester of pregnancy. 55 patients underwent surgery within 24 hours of the onset of symptoms, 24 patients within 48 hours , and 9 patients after 48 hours or later. Abdominal pain was reported in all cases. Nausea was reported in 88 cases, and vomiting in 35 cases. In terms of axillary temperature, 63 patients were below  $37.3^{\circ}\text{C}$  and 25 patients were  $37.3^{\circ}\text{C}$  or over. In terms of the location of the maximal tender point, in 63 cases it was observed at McBurney's point, and in 25 cases in the right upper abdominal area . Regarding the number of leukocytes, 16 cases showed less than  $10,000 \text{ mm}^3$ , 40 cases  $10,000$  to  $15,000 \text{ mm}^3$ , 25 cases  $15,000$  to  $20,000 \text{ mm}^3$ , and 7 cases  $20,000 \text{ mm}^3$  or more. A laparotomy was performed in all 76 cases and 12 patients managed conservatively. The appendix was positioned in the right lower area of the abdomen in 55 cases, and in the right upper area in 33 cases. Histopathological findings showed that 68 cases were suppurative, and 8 cases were gangrenous. No maternal death was reported. In the laparotomy group, 15 cases of wound infection were reported. 1 spontaneous abortion was reported.. Among 76 mothers available for follow-up, 14 preterm labor was observed. At 30 and 32 weeks respectively.

The median gestational week was 20 (6–32) weeks. Laparoscopic cholecystectomy was performed in 24 patients of all symptomatic cholelithiasis. All the patients presented with abdominal pain and postprandial fullness with nausea. Vomiting occurred in 16 cases. Tenderness present in 8 cases. All patients of acalculous cholecystitis underwent conservative management. The preterm labor in conservative management and immediate surgery groups were 8 and 0 respectively. Laparoscopic cholecystectomy was performed in 24 patients during

pregnancy. In this group, 16 patients were at the second trimester and 5 were at the third trimester. Of all the patients, 40 cases of acute acalculous were medically treated. 8 patients did not continue follow-up after medical treatment. In 28 of 40 patients who were medically treated, acute cholecystitis developed again in the postpartum period. In 28 patients out of 40 who were treated medically during pregnancy, laparoscopic cholecystectomy was performed after 8 months of delivery.

Thirty two patients of acute pancreatitis were included in the study. Of the 32 women 16 belonged to the group of 20-25 years, 8 belonged to 26-30 years, and 8 was more than 35 years. There was no woman in the age group of 31-35 years, 7 women presented in the second trimester and 22 in the third trimester. Besides having classical symptoms of acute pancreatitis, 8 had pulmonary findings (pleural effusion, basal lung collapse). Hypertriglyceridemia was seen in 8 patients and cholelithiasis in 24 patients. Surgical management (laparoscopic cholecystectomy) was carried out for the underlying cause (cholelithiasis) in 2 patients. 4 preterm births and 2 fetal losses reported.

Total 8 cases of small bowel obstruction were reported, out of 8 patients 6 were treated surgically and no fetal loss and preterm births reported.

**Table 1: Distribution of cases according to Gestational weeks.**

Total patients-200	Percentage
1st trimester-20	10%
2nd trimester-136	68%
3rd trimester-24	22%

**Table 2: Distributions of respondents according to non-obstetrical general surgical cases**

General surgical emergencies	Frequencies (out of total 200 patients)	Percentage (out of total 200 patients)	Trimester wise distribution		
			1st	2nd	3rd
Acute appendicitis	88	44	9	60	19
Acalculous cholecystitis	40	20	4	27	9
Cholelithiasis	24	12	3	16	5
Acute pancreatitis	32	16	3	7	22
Small bowel obstruction	8	4	1	5	2
Trauma	8	4	1	5	2

**Table 3: Surgical and Obstetrical Outcomes of non-obstetrical emergencies in pregnancies**

General surgical emergencies	No. patients	Surgically managed	Medically managed	Surgical outcomes (wound infection rate)	Obstetrical outcomes (Preterm births)	Fetal losses
Acute appendicitis	88	76	12	15 (20%)	14	1
Acalculous cholecystitis	40	0	40	-	-	-
Cholelithiasis	24	24	0	6 (25%)	8	2
Acute pancreatitis	32	0	32	-	4	2
Small Bowel obstruction	8	6	2	2 (33.3%)	-	-
Trauma	8	8	0	2 (25%)	-	1

**Table 4: Follow up rate and percentage of Surgeries in follow up patients (conservatively managed)**

General surgical emergencies	No. Follow up patients	No. patients in which surgery is required	Percentage of Surgeries in follow up patients
Acute appendicitis	12	4	33.33 %
Acalculous cholecystitis	40	28	70.00 %
Acute pancreatitis	32	12	37.50 %
Trauma	0	0	00.00 %

## Discussion

### Acute appendicitis:

The first case of acute appendicitis complicating pregnancy was reported by Hancock in 1848<sup>2</sup>. Incidence of acute appendicitis in pregnant women is between 0.04% and 0.2%<sup>2</sup>. Acute appendicitis is the most common non-obstetric surgical emergency during pregnancy (1/800 suspected in pregnancies and 1 in 1,000–2,000 confirmed cases in pregnancies)<sup>1</sup>. It accounts for 25% of the non obstetric surgical interventions done during pregnancy<sup>1</sup>. Acute appendicitis

occurs most commonly in the second trimester in pregnancy. Appendicular perforation is more frequent in the third trimester. Classically, acute appendicitis presents as pain around the umbilicus, which later shifts and localizes to the right lower quadrant of abdomen with maximal tenderness at medial  $\frac{2}{3}$  and lateral  $\frac{1}{3}$  at McBurney's point typically accounts for only 50% to 60% of cases. Due to cephalad displacement of the appendix by the gravid uterus women may not present with RLQ pain. Tenderness is difficult to appreciate during pregnancy because the appendix is transpositioned due to uterine enlargement, the peritoneal wall is apart from the appendix. Ultrasonography (USG) has a reported sensitivity of 70%–100% and specificity of 85%–96% for appendicitis in pregnancy. CT has a reported sensitivity of 85% and specificity of 98% in such patients. MRI is most useful in identifying a normal appendix, for ruling out inflammation. The rate of negative laparotomy for suspected appendicitis in obstetric cases is 25–50% compared with 15–35% in general surgical cases. Traditionally, open appendectomy was performed for pregnant women. Currently, Diagnostic Laparoscopy is a procedure of choice for diagnostic as well as for therapeutic reasons. Laparoscopic appendectomy was difficult and contraindicated in the third trimester of pregnancy. After 37 weeks a concomitant cesarean section is rarely indicated at the time of appendectomy.

**Gallbladder disease including acalculous cholecystitis and cholelithiasis:** Gallstone disease is the second most common indication for surgical intervention during pregnancy. Gallstones can be detected in 1 – 3% of the pregnancies<sup>1</sup>. During this period the incidence of symptomatic biliary disease ranges from 0.05% to 8%. Surgery for biliary disease occurs in 1 to 6/10000 pregnancies<sup>1</sup>. Prevalence is unknown because 50% of women are asymptomatics. Elevated serum cholesterol and lipid levels and decreased gallbladder motility due to elevated progesterone and delayed emptying can predispose the formation of gallstones in pregnancy. Estrogen increases cholesterol secretion, progesterone reduces soluble bile acid secretion, increases insoluble bile acid accumulation, leads to stone formation. The symptomatology of acute cholecystitis include Nausea, vomiting, dyspepsia, intolerance of fatty foods, and an acute onset of a colicky or stabbing pain that begins over the mid-epigastrium or right upper quadrant of abdomen. Sudden biliary colicky pain occurs and may radiate to the interscapular area, to the angle of the right scapula, or to the right shoulder. Physical examination reveals right upper quadrant tenderness during deep inspiration (Murphy's sign). In imaging modalities USG is the investigation of choice with a sensitivity of 95%. Classic findings of acute cholecystitis such as gallbladder calculi, wall thickening (>3 mm), pericholecystic fluid, and the sonographic Murphy's sign in USG.

The primary goal in the management of acute cholecystitis is when to intervene surgically. Medical therapy includes eliminating oral intake, nasogastric suction, correction of electrolyte abnormalities, and analgesia. Conservative approach is associated with higher relapse rates in the range of 45%–75%. A decision analysis study performed by Jelin et al showed that there was a higher risk of fetal death (7%) among those patients who underwent nonoperative management than in those who underwent laparoscopic cholecystectomy (2.2%)<sup>2</sup>. Laparoscopic cholecystectomy was superior to nonoperative management during the first and second trimesters. Complications of common bile duct stones, such as cholangitis or pancreatitis, endoscopic retrograde cholangiopancreatography with sphincterotomy and stone extraction to relieve pancreatitis can be safely performed with minimal risk of ionizing radiation exposure to the fetus first and then Elective cholecystectomy will be performed in postpartum period.

**Acute small bowel obstruction:** Small bowel obstruction in pregnancy is extremely rare to the extent that incidence is 1 to 2/4000 pregnancies; the underlying cause is adhesions in two third cases<sup>1</sup>. Volvulus is the second most common cause, occurring in 25% of cases compared

with only 4% of the nonpregnant population<sup>1</sup>. Most commonly occurs in 16th–20th week, the 36th week, and immediate puerperium. In dynamic type peristalsis works against a mechanical obstruction (e.g. adhesions/stricture) and in adynamic type there is no mechanical obstruction and peristalsis is absent or inadequate (e.g. paralytic ileus)<sup>7</sup>. Intestinal obstruction in pregnant women is mostly caused by: adhesions (55%), intestinal torsion (25%), colorectal carcinoma (5%), hernia (1.5%), appendicitis (0.5%) and others (13%). Adhesions occur more frequently in advanced pregnancy (6% - I trimester, 28% - II trimester; 45% - III trimester, 21% - puerperium). The symptoms include abdominal pain (98%),nausea,vomiting (82%) and constipation (30%).For diagnosis plain abdominal radiographs have been reported to be positive in 82%–100% of pregnant women with intestinal obstruction. A conservative approach was tried initially with nasogastric decompression,nil per oral,intravenous fluids and intravenous antibiotics. Surgical intervention like Midline Laparotomy needed when there are signs of fetal distress and strangulation and if obstruction occurs in the third trimester, concomitant CS can be performed.

**Acute pancreatitis:** Acute pancreatitis (AP) is rare in the pregnancy. The incidence of AP in pregnancy is approximately 1 in 1000 to 1 in 10,000 births<sup>1</sup>. Cholelithiasis and congenital or acquired hypertriglyceridemia are the most common causes of pancreatitis in the pregnancy. Pancreatitis most commonly occurs in the third trimester. As such, gallstones are responsible for 75% of cases of pancreatitis in pregnancy. Very rarely, it can be associated with (HELLP) syndrome. The maternal mortality rate is 1%, and the rate of preterm delivery is about 20%. The classical presentation is sudden-onset nausea, vomiting, and mild to severe midepigastic pain, left upper quadrant pain radiating to the back and sometimes relieved on leaning forward, anorexia, decreased bowel sounds, low-grade fever, and associated pulmonary findings should raise the suspicion of acute pancreatitis same as non-pregnant women. Management is usually conservative with nasogastric decompression and aspiration, bowel rest, maintaining hydration, electrolyte correction, and analgesics. Surgical intervention for underlying causes such as for gallstones laparoscopic cholecystectomy performed and for cbd stones ERCP with sphincterotomy and stenting done.

**Abdominal trauma in pregnancy:** Trauma is the leading non-obstetric cause of death in pregnancy. Common causes include road traffic accidents, falls, and domestic violence. Fetal loss is around 75% even for minor trauma. Sudden acceleration–deceleration forces can lead to abruptio placenta. Tocodynamometry monitoring is recommended for minor trauma. Kleihauer–Betke test should be performed to identify fetomaternal hemorrhage by determining the amount of fetal hemoglobin that has passed into the maternal circulation in major trauma. It can present with sudden-onset severe localized or diffuse abdominal pain which gradually leads to circulatory shock. The primary focus is to resuscitate the patient and then should focus on non-obstetric/obstetric injuries and fetal condition. Management is most often surgical intervention like urgent laparotomy with evacuation of hematoma.

### **Other GI conditions**

#### **Peptic ulcer:**

Peptic ulcer disease is usually not common in pregnancy, with incidence ranging from 1 to 6 in every 23,000 pregnancies<sup>2</sup>. Mechanisms are reduced gastric secretion along with increased placental histaminase (diamine oxidase) secretion. Perforation and bleeding are life threatening complications of peptic ulcer disease. In 10%–20% of the patients, free gas may not be seen on X-ray. In such situations, CT may be more sensitive to detect free gas. For management Laparotomy is preferred surgical intervention for PUD with perforation. In cases of massive

peptic ulcer hemorrhage, endoscopic control should be attempted initially, and if this fails, laparotomy should be performed without delay.

#### **Urolithiasis:**

Symptomatic urolithiasis is not common during pregnancy. Physiological changes like increase in glomerular filtration proportional to an increase in blood volume coupled with urinary stasis can predispose to formation of urinary calculi. Symptoms are severe colicky flank pain, nausea, and vomiting in the absence of peritoneal signs. In pregnancy USG images are obscured by gravid uterus for diagnosis, in such cases, a single-shot intravenous pyelogram can be performed. In 85% cases spontaneously calculi are removed. If not removed, then consult a urologist for further management.

#### **Intra-abdominal hemorrhage:**

Hemoperitoneum is a life-threatening condition, but it is fortunately rare. Rupture of splenic artery aneurysm and rupture of the dilated high-pressure veins of the ovary and broad ligaments at the time of labor are most common causes. It can manifest as sudden-onset severe localized or diffuse abdominal pain with rapid progression to circulatory shock. Splenic artery aneurysm rupture usually occurs in the third trimester. According to Trimble and Hill's hypothesis, two factors like weakness in the arterial wall and an increase in blood pressure, are contributory for development of aneurysms<sup>2</sup>. The mortality rate following rupture is 25% in nonpregnant adults, and it drastically increases to 75% in pregnant women and is associated with a fetal mortality rate of 95%. Management is most often surgical. Urgent laparotomy with evacuation of hematoma, ligation of offending veins, and splenectomy with ligation of the splenic artery with concomitant caesarean needed to identify source of bleeding.

#### **Conclusion**

Acute abdomen in pregnant patients is perceived as a threatening and most challenging situation for surgeons. Because they may not manifest with classical presentations. Cases of acute appendicitis and cholecystitis were most commonly diagnosed and operated cases during pregnancy. Non Ionizing examinations are preferred as the first line of radiological investigation. Investigations using ionizing radiations, such as X-ray and CT scan should not be withheld if there is a definite clinical indication and there is no other alternative, especially in life-threatening conditions. Laparoscopic surgery is as safe as laparotomy in both cases. patients. Although surgery may have some risk for low birth weight or premature death, surgeries were not major risk factors for outcomes of pregnant mothers and fetal outcomes. A conservative management in cases of biliary diseases were associated with high recurrence rates requiring surgical management later. A multidisciplinary approach is indispensable for

accurate and early diagnosis and management of pregnant women presenting with acute abdomen.

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