

Non-obstetric Causes and Presentations of Acute Abdominal Pain Among Pregnant Women

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Abstract

Objectives: Assess the patient characteristics and presentations of non-obstetric causes of acute abdominal pain among pregnant women.

Methods: Sixty five pregnant patients of different gestational age groups were enrolled in this study who visited Sulaimani Emergency Hospital between 2nd January 2019 and 31st December 2019.

Results: Acute appendicitis is the most common cause of non-obstetric abdominal pain in pregnant women (35.4%) followed by acute cholecystitis (18.5%) and renal stones (12.3%). Miscarriages are most commonly associated with acute pancreatitis with a rate of (50%). The majority of the patients were discharged home well within one month except for one patient (1.5%) who unfortunately died after surgical treatment for acute appendicitis.

Conclusion: Acute appendicitis is the most common non-obstetric cause of acute abdominal pain in pregnant women. While 2nd and 3rd causes were, acute cholecystitis and renal colic consecutively in decreasing frequency.

Keywords: Abdominal pain, pregnancy, appendicitis

Introduction

Acute abdomen defined as a sudden onset of severe abdominal pain of less than 24 hours duration that require urgent intervention to manage the underlying causes.¹

The incidence of non-obstetrical surgical intervention during pregnancy ranges between (0.2–2.2%).¹ Non-obstetric causes of abdominal pain can happen throughout the entire period of pregnancy from early to late stages.¹ The most common reason for surgical acute abdomen is believed to be acute appendicitis followed by biliary cholecystitis.^{2,3,4}

The definitive diagnosis of acute abdomen and its cause may prove difficult and challenging during pregnancy as a result of pregnancy symptoms. Nausea, vomiting and abdominal pain tend to be attributed to the physiological changes of pregnancy.² So, it is important to exclude pathological conditions either related to pregnancy or non-related conditions.⁴ Furthermore, anatomical and physiological alteration in pregnancy can mislead the examining clinician.² This often leads to delay in diagnosis and possibly complications.⁵ A systematic multidisciplinary approach must be developed to deal with acute abdominal pain during pregnancy.⁴

Even though surgical management carry a risk of abortion and early delivery, one should bear in mind that early diagnosis and intervention decrease morbidity and mortality for both mother and fetus.¹ As a result, many authors recommend early intervention as a safer approach compared to those who advocate an initial trial of medical therapy.^{6,7,8}

Acute abdomen is the most common non-obstetric surgical emergency throughout pregnancy period and acute appendicitis being the most common surgical condition occurring 1 in 1500 pregnancies.^{1,9,10} Changes in anatomical landmarks with advancement of pregnancy may cause confusion in diagnosis and delay in management.¹¹

Nausea, vomiting and loss of appetite should alert the clinician especially if they persist beyond the first trimester of pregnancy, as hyperemesis gravidarum should no longer be common after this particular period.¹¹ Appendicitis is as

common in the pregnant women as the non-pregnant females and it can occur throughout all trimesters equally. It is especially common amongst young aged females, which the common age of reproduction.^{12,13}

Negative appendectomy is more common in younger age groups of pregnant females. This can be explained by the fact that Pyelonephritis, salpingitis, ovarian cysts, PID (pelvic inflammatory disease) and cholecystitis are more common in this age group.^{9,10,14,15}

In general, the rate of abortion is about 8.7% in pregnant women with appendicitis this rate may proportionally increase with complicated appendicitis such as perforation and peritonitis from 1.5% to 35.7% respectively.⁹

The most significant symptoms of appendicitis in pregnancy include lower abdominal pain.^{10,16} However, tenderness, rebound tenderness and guarding are not as reliable as the gravid uterus alters the anatomy.¹³ Retrocecal appendicitis may mimic urinary tract infection (UTI) as the inflamed appendix comes in contact with the ureter and may give rise to flank pain and backache.¹³

Acute gallstone cholecystitis is the second most common surgical non-obstetric cause of abdominal pain in pregnant women.¹³

Certain changes happen to the biliary tree during pregnancy which predispose to bile stasis. Both progesterone and Estrogen hormones play a major role in cholestasis and lithogenicity respectively.¹⁷ This leads to sludge formation in up to one quarter of patients. Silent gallstones can be found in up to 2.5–5% of pregnant women.¹ The symptoms can be similar to those who are not pregnant including abdominal pain, nausea, vomiting, and tender right upper abdomen. The sensitivity of ultrasound scans are as high as 97%, which may show increased wall thickness, fluid around the gallbladder, gallstones, dilation of intra and extra hepatic ducts and sonographic Murphy's sign.¹⁸ Intervention is indicated when there is failure of conservative management especially in the first and second trimester of pregnancy. If there is concomitant pancreatitis, the maternal mortality can be as high as 15% and fetal demise can reach 60%.¹⁸

Early management of gallstone cholecystitis in pregnancy should entail conservative therapy until the acute stage is over, preferably followed by surgical intervention after delivery.¹⁹ The downside of this approach is that, delay in surgical intervention increases the chance of gallstone pancreatitis as high as 13% of these patients.²⁰

There are two approaches of surgical intervention, open and laparoscopic cholecystectomy. The former should be reserved to the third trimester.¹³ Laparoscopic cholecystectomy can be done in the first, second and early third trimesters.²⁰

Bowel obstruction is regarded as the third most common cause of abdominal pain in pregnancy which is not obstetric in nature.^{21,22} Adhesive bowel obstruction due to previous abdominal and pelvic operations comprises up to 60–70% of cases.²³ Followed by volvulus which can be seen in 25% of intestinal obstructions in pregnancy.²⁴ This figure is lower in non-pregnant women (3–5%).²⁵

One of the causes of intestinal obstruction in pregnancy is the enlarged gravid uterus when it becomes an intra-abdominal organ during the second trimester. Similarly, during puerperium when it involutes back to the pelvis.¹ Rare causes of bowel obstruction include intussusception, hernia, malignancy and inflammatory bowel disease.¹

Patient with repeated vomiting and nausea may be misdiagnosed by hyper-emesis gravidarum in second and third trimester with previous abdominal surgeries, so we should be aware of intestinal obstruction in such cases in order to prevent fatal complications.²⁵

Pancreatitis occurs in 1 in 1000–3000 in pregnancy, most commonly in the late third trimester and early postpartum period.²⁶ One explanation of increased pancreatitis in pregnancy can be increased cholestasis caused by pressure from the gravid uterus on the biliary ducts.¹³ The most common causes in decreasing frequency are gallstones (67%), alcohol (4–6%), trauma, viral infections.¹³

Morbidity and mortality of pancreatitis is expected to be as high as 15–40% in pregnancy with an increased risk of abortion of about 60%.¹ Termination of early pregnancy may not optimize maternal outcome whereas in later pregnancy near term, delivery by Caesarian section (CS) for maternal resuscitation is recommended.¹

However gastro esophageal reflux disease (GERD) is more common in comparison with non-pregnant women for a number of reasons including increase intra-abdominal pressure, increase relaxation of lower esophageal sphincter and displacement of gastro-esophageal junction (GEJ). Peptic ulcer disease is not common in pregnant women, but flare ups may happen in patient with preexisting ulcers.²⁶

On other hand there is improvement in peptic ulcer disease in pregnancy due to reduced gastric secretion and gastric motility and increase histaminase release by the placenta.¹ Another presentation of peptic ulcer disease in pregnancy is melena and hematemesis. A condition which can be managed through endoscopic coagulation safely.¹

Ureteric stones are found in approximately 1 in 1500 in pregnancy.²⁷ The diagnosis of which can be difficult as physiological dilation of ureters are found in pregnancy, limited numbers of X-rays, and the fetus obscuring the X-ray view.¹¹

The dilation of ureters can predispose to stasis, infection and stone formation. Stones can occur in each stage of pregnancy equally.¹¹ The majority of kidney stones are managed

conservatively during pregnancy, especially stones smaller than (7 mm) the majority of which pass spontaneously. Surgery is regarded as the last resort for cases of persistent obstruction and superimposed infection.²⁸

Urinary tract infection (UTI) on the other hand, is more common in pregnancy due to relaxation effect of pregnancy hormones on the ureters leading to stasis and infection.²⁷ The most prevalent organism being E-Coli (80%). If UTI is inadequately treated, it can lead to acute pyelonephritis in 20–30% of patients, also may lead to septicemia and sepsis.²⁷ Renal abscess is a rare but can be found in diabetics and immunocompromised patients.⁸

Blunt trauma to the abdomen comprises motor vehicle accidents, falls, and direct assault the abdomen. These account for 7% of all fetal deaths apart from obstetric causes.^{29,30} Only 0.3% of these patients require admission to the hospital.³⁰

The rate of sexual abuse and rape decreases with progression of pregnancy. While physical violence may occur at a rate of 10% of pregnant women.^{31,32}

As far as penetrating trauma is concerned gunshots and stab wounds are the most common causes. Unlike blunt abdominal trauma, maternal mortality is rare.¹³

One special issue with bleeding during pregnancy is Rh iso-immunisation. For which special consideration and attention should be paid. D-immunoglobulin is recommended in all sensitized D negative women with blunt abdominal trauma.³³

Other uncommon causes of pain during pregnancy include inflammatory bowel disease (IBD), diverticular disease, complicated hernia, acute fatty liver disease, hepatitis, and ruptured hydrated cyst of the liver, perforated typhoid ulcer, aortic dissection, mesenteric ischemia, and perforated viscous.^{1,5}

Aim of the Study

To evaluate the prevalence and different causes of non-obstetric abdominal pain during pregnancy. How the presentation can be altered by pregnancy. Discuss the benefit and risk balance of early versus late intervention, and the final outcome.

Patient, Methods and Materials

A retrospective cross-sectional study was done involving a total number 65 cases who were enrolled in this study in Sulaimani Emergency Hospital between the 2nd of January 2019 and 31st December 2019.

Data collected in Sulaimani Emergency Hospital between the 2nd of January 2019 and 31st December 2019 using questionnaires. The questionnaires included variables such as Patient demographics, Obstetric and Gynecological history, Past Medical and surgical history, Social history, Investigations and imaging, Diagnosis, their Management and Outcome.

While one of the patients who were diagnosed with acute appendicitis during first trimester of her pregnancy had an unfavorable outcome and passed away during the course of her management. An initial operation of appendectomy out site of Sulaimani Emergency Hospital (secondary Hospital far from Sulaimani ER about 180 km in Qalladze) followed by a period of deterioration postoperatively on day three and patient re-admitted to the hospital. Gynecology and obstetrics

consultations were done by the operating surgeon. Under observation of gynecologists during the 10th postoperative day she developed miscarriage. Still her general condition was deteriorating and referred to tertiary center in Sulaimani. She was diagnosed with abdominal sepsis. After resuscitation with intravenous fluids and administration of appropriate antibiotics with continuous monitoring of vital signs, a decision of a laparotomy was made. Abdominal sepsis and leaking appendicular stump was found. Right haemicolectomy and end ileostomy was performed. Washout and irrigation was done. Abdomen closed and patient was closely monitored post operatively and her general condition deteriorated and passed away after about 4 hour from operation.

Inclusion Criteria

1. B-HCG positive or ultrasound positive or both.
2. Abdominal pain, requiring surgical opinion and other intervention.

Exclusion Criteria

Obstetrical causes of abdominal pain which established by gynecologist.

The study was approved of by Sulaimani University and a copy of the obtained approval is attached. (Approval number: 109, date: 4th February 2020).

Statistical Analysis

Data were collected and analyzed by Statistical Package of Social Science (SPSS) program V.22. A *P*-value equal or less than 0.05 is regarded as statistically significant.

Results

Most of our patient housewife (72.3%) followed by teacher (21.5%) and other job (6.2%). Comorbidities less than (10%). Alcoholic and smoking among our patient about (3%). Less than eighty percent of our cases there is no any past medical histories. While 44.6% are first trimester followed by 32.3% second trimester and 23.1% third trimester. Shows in (Table 1).

All of the cases were positive B-HCG. More than 73% of cases with normal WBC. 6.2% among our study associated with DM (diabetes mellitus). Shows in (Table 2).

Diagnosis in this study: More than 35% are appendicitis which is most common diagnosis in this study and the least diagnosis is abdominal wall abscess which is 3.1%. Shows in (Table 3).

More than 60% of the cases treated conservatively while other 40% treated surgically and discharged well apart from one case (1.5%) passed away. Shows in (Table 4).

Appendicitis mostly presented with first trimester, cholecystitis presentation is equal in both 1st and 3rd trimester which is higher than 2nd trimester, while in renal colic and pancreatitis is common in 1st trimester. *P*-value were significant (<0.05) Shows in (Table 5).

Discussion

The result revealed that acute appendicitis is the most common non-obstetric surgical cause of acute abdominal

Table 1. Socio-demographic characteristic of the study participants. (65 patient)

Variables		Frequencies & Percentages
Occupation	Housewife	47 72.3%
	Teacher	14 21.5%
	Other job	4 6.2%
Co-morbidities	Present	6 9.2%
	Absent	59 90.8%
Alcohol consumer	Yes	2 3.1%
	No	63 96.9%
Smoking history in our sample	Yes	2 3.1%
	No	63 96.9%
Past medical history	Immunizations	9 13.8%
	Allergies	4 6.2%
	Hospitalizations	2 3.1%
	None	50 76.9%
Gestational age/week	1st trimester	29 44.6%
	2nd trimester	21 32.3%
	3rd trimester	15 23.1%
Total		65 100%

Table 2. Laboratory investigations of the study participants. (65 patient)

Type of laboratory investigations		Frequencies & Percentages
B-HCG	Positive	65 100%
	Negative	0 0.0%
WBC	Normal	48 73.8%
	High	17 26.2%
FBS	Normal	61 93.8%
	Abnormal	4 6.2%
Total		65 100%

Table 3. Diagnosis of the study participants. (65 patient)

Diagnosis	Frequencies & Percentages
Appendicitis	23 35.4%
Cholecystitis	12 18.5%
Renal stones	8 12.3%
Pancreatitis	6 9.2%
UTI	6 9.2%
Intestinal obstruction	4 6.2%
Blunt abdominal trauma	4 6.2%
Abdominal wall abscess	2 3.1%
Total	65 100%

pain during pregnancy. About one third of patients out of a total of 65 cases proved to have acute appendicitis and underwent operation.

This finding is consistent with the results of previous local and international studies.^{1,8,10,11,13,21,34,35} A previous Iraqi study conducted in Basrah concluded similar results.⁵ Studies from neighboring countries drew similar conclusions. A research carried out in the Kingdom of Saudi Arabia also proved acute appendicitis to be the most common cause of acute abdomen among pregnant women excluding obstetric causes.² The research by El-Amin et al., revealed that 2/3rd of patients had acute appendicitis out of a total of 60 pregnant ladies with acute abdomen.² Other international studies corroborated the fact that appendicitis is the most common surgical non-obstetric cause of abdominal pain the pregnant lady.^{1,8,10,11,13,21,34,35}

The majority of research conducted in the United State of America (USA) reached similar findings regarding the prevalence of acute appendicitis as the leading cause of acute abdomen in the pregnant patients.^{10,11,21,34,35} The majority of who underwent surgical operation to remove the inflamed appendix as part of the management plan and further confirmation of the diagnosis.¹⁰

While one of the patients who were diagnosed with acute appendicitis during first trimester of her pregnancy had an unfavorable outcome and passed away during the course of her management.

Acute gallstone cholecystitis is established to be second most common cause of acute abdominal pain in pregnancy. In this study we realized that more than 1/5th was diagnosed to have acute gall stone cholecystitis. Several research papers

from the UK claimed that acute gall stone cholecystitis is the second major cause of surgical acute abdominal pain in pregnant women.^{1,8,27} The work by Nair et al., claimed higher rates of gallstone disease (25%) compared to our results of 18.5%.¹ Similarly, a Croatian study by Augustin and his colleagues corroborated these findings.¹³

As far as neighboring countries are concerned, the findings are interestingly similar. The work by El-Amin et al., which was carried out in the Kingdom of Saudi Arabia (KSA) showed the exact same number of patients with acute gallstone cholecystitis during pregnancy.² Both our study and theirs concluded that the prevalence of acute cholecystitis is 18.5% among pregnant ladies. However, the study from Basrah by Dahhan et al., revealed a smaller proportion of pregnant ladies with acute gallstone cholecystitis.⁵ Only 10% of their subjects manifested to have cholecystitis.

Renal stones are regarded as the third major cause of abdominal pain in pregnant ladies according to our research. About 12.3% of our subjects were proved to have renal stones on US scans of the Kidneys, Ureters and Bladder (KUB). A significant rate of 8 subjects out of a total of 65 was demonstrated to have kidney stones. Once again, this is in accordance with the findings of other Iraqi studies conducted before.⁵ Our findings are in keeping with other papers conducted in the USA which also concluded that renal stones were the third major cause of abdominal pain in such ladies.^{11,27}

Urinary tract infection (UTI) occupying the fourth place on the rank. A significant range more than 1/10th out of 65 of our subject was identified with UTI.

It is mentioning that pancreatitis patients coming with 4th place in diagnosis of non-obstetric abdominal pain in pregnant women and had a more severe and eventful course during hospital stay for example half of the patient who were diagnosed with acute pancreatitis ended up with miscarriage this is in contrast to the UTI patients one of whom was reported to have abortion.

The study by Pinas-Carillo et al., claimed that pancreatitis is rare in pregnancy but can be potentially life threatening both to the fetus and mother.⁸ However, in current work concluded that a prevalence of 9.2% in our locality. In fact half of our patients with pancreatitis ended up with miscarriage but the mothers were discharged well within one month of the episode of pancreatitis.

Table 4. **Type of the management and outcome of the study participants. (65 patient)**

Variables		Frequencies & Percentages	
Management	Conservative	40	61.5%
	Surgical	25	38.5%
Morbidity	Discharged well	64	98.5%
	Passed away	1	1.5%
Total		65	100%

Table 5. **Association of the diagnosis with gestational age. (65 patient)**

Diagnosis	Gestational age/week			Total No. (%)	P-value
	1st trimester No. (%)	2nd trimester No. (%)	3rd trimester No. (%)		
Appendicitis	14 (48.3)	5 (23.8)	4 (26.7)	23 (35.4)	0.043
Cholecystitis	5 (17.2)	2 (9.5)	5 (33.3)	12 (18.5)	
Renal (colic)	1 (3.4)	5 (23.8)	2 (13.3)	8 (12.3)	
Pancreatitis	4 (13.8)	2 (9.5)	0 (0.0)	6 (9.2)	
UTI	1 (3.4)	3 (14.3)	2 (13.3)	6 (9.2)	
Intestinal obstruction	2 (6.9)	2 (9.5)	0 (0.0)	4 (6.2)	
Blunt abdominal trauma	2 (6.9)	0 (0.0)	2 (13.3)	4 (6.2)	
Abdominal wall abscess	0 (0.0)	2 (9.5)	0 (0.0)	2 (3.1)	
Total	29 (100)	21 (100)	15 (100)	65 (100)	

On the other hand Nair et al., concluded that more than half of pregnant ladies with pancreatitis (60%) would eventually lead to fetal loss (miscarriage).¹ The maternal morbidity is around 15–40%.¹

Intestinal obstruction is another cause of non-obstetric of acute abdomen in pregnant ladies with a rate of 6.2% in the work. The vast majority of our patients with intestinal obstruction were believed to have adhesive small bowel obstruction. three out of four patients had history of previous abdominal operations.

Pinas-Carrillo and Chandrahara also concluded that adhesive small bowel obstruction was a common cause of acute abdominal pain in pregnant women followed by Inflammatory Bowel Disease such as Crohn's disease and Ulcerative Colitis.⁸ Other research papers claimed that volvulus is a common cause of bowel obstruction.¹ Other less common causes include hernia, intussusception, cancer and IBD.¹

Trauma, especially blunt abdominal trauma is another rare cause of acute abdominal pain in pregnant women. In our study 4 patients (6.2%) were found to have abdominal pain due to blunt abdominal trauma such as road traffic accident and fall on ground. Half of our patients with blunt abdominal trauma ended up in abortion. The research by Nair et al., demonstrated similar results as they listed fall from height and road traffic accidents as the leading cause of blunt abdominal trauma.¹

Abdominal wall abscess was found in 2 patients in the study which is 3.1%. They were both diabetic. This finding is unique to our work as none the research papers that we reviewed has shown abdominal wall abscess as a cause of acute abdominal pain in pregnant women.

Fetal mortality during pregnancy is highly improved during the last 50 year, associated with about 1.5% or less in non-complicated appendicitis but the ratio is increased when complication like perforation or peritonitis occurs in 36% of the patient.¹⁶ The complication is usually high during the 3rd trimester of pregnancy which become double 69% while the ratio is about 31% in 1st and 2nd trimester of pregnancy.³⁶ So in conclusion any delay in diagnosis and management of suspected acute abdomen in pregnancy will cause advancement of the disease and leading to peritonitis and sepsis if not

correctly managed, causing premature labor and abortion.^{16,17} In trauma patient fetal mortality depend on the severity of the trauma.¹

According to the current study 10 out of 65 pregnant patient developed abortion during the course of management, half of patients with pancreatitis developed abortion (3 out of 6 cases) which is the most common cause of fetal loss in the study.

Similarly half of the blunt abdominal trauma patient ended up with miscarriage (2 out of 4). While for the acute appendicitis the ratio of abortion is 3 out of 23 patients, one out of 12 cases of cholecystitis ended up with abortion, and finally 1 out of 6 patients with urinary tract infection ended up with abortion.

Conclusion

The prevalence of non-obstetric acute abdominal pain during pregnancy is 0.023 in Sulaimani Emergency Hospital between January the 2nd 2019 and December the 31st 2019. The most common cause of acute abdominal pain is acute appendicitis 35.4% followed by acute cholecystitis 18.5% and renal colic 12.3%. The presentation can be altered according to gestational age as a result of pregnancy related symptoms and conditions such as nausea and vomiting in early pregnancy and labor pain in late pregnancy. Early rather than late intervention is preferable in order to avoid catastrophic peritonitis and sepsis which may in turn result in fetal loss or maternal mortality.

Recommendation

We encourage developing a systematic approach to managing pregnant women with abdominal pain based on standard measures and international guidelines of management with promotion of training in all related fields and specialties.

Conflict of Interest

None. ■

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