Original Research Article

Acute abdomen in pregnancy due to nonobstetric surgical diseases: a challenge for the surgeon

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Abstract

Background of study: Acute abdomen may occur during pregnancy due to several non obstetric surgical diseases. Diagnosis is often difficult because clinical features may be masked and diagnostic radiology is constrained. Management may be delayed due to hesitancy of the surgeon to operate on the pregnant mother. **Objectives**: To identify the cases presenting with an acute abdomen due to non obstetric surgical diseases in an antenatal population; to note the frequency, incidence, clinical features, and to evaluate the management**Materials and methods**: This was a prospective observational study in a tertiary teaching hospital. The study period extended over one year(January- December 2019). All antenatal patients attending the OPD/ER during the study period were assessed for the presence of acute abdomen due to non obstetric surgical diseases. All such patients were admitted and received initial medical management followed by emergency surgery if indicated. The patients were discharged after clinical resolution and followed up till delivery to note feto-maternal outcome. The institution ethics committee approved the study. The data was analysed by Statististical Package of Social Sciences , version 24.**Results**:54 patients were detected out of 9768 antenatal cases with an incidence of 0.55%. Acute cholecystitis was most frequent(46.29%) followed by acute appendicitis(29.62%). 33 cases(61.11%) were treated medically while 21 cases (38 88%) required emergency surgery.The maternal mortality rate was 1.851% (out of all cases of acute abdomen) and 4.76% among surgically treated patients. Foetal loss was 5.55%(among all cases of acute abdomen) and was 14.28% following surgery. Preterm labour occurred in 9.25% cases of acute abdomen and 14.28% of cases following surgery.**Conclusion**: A multidisciplinary approach, effective diagnostic modalities, and safe surgery are imperative for management of acute abdomen in pregnancy due to non obstetric surgical diseases.

Keywords: Acute abdominal pain in pregnancy, Acute cholecystitis in pregnancy, Acute appendicitis in pregnancy, Non obstetric emergency surgery in pregnancy

Introduction

Acute abdomen during pregnancy presents unique challenges to the attending surgeon. Several surgical diseases unrelated to pregnancy may present with an acute abdomen. [1-4]. Diagnosis is often difficult as classical clinical features may be masked and diagnostic radiology is constrained.[1,3-4].Delayed management due to hesitancy of surgeon to operate on the pregnant mother may aggravate the disease and lead to maternal and foetal complications. [1,2,4].

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Objectives of the study

1. To identify the cases presenting with an acute abdomen due to various nonobstetric surgical diseases in an antenatal population.
2. To estimate the frequency of acute abdomen in pregnancy and to determine the incidence of different surgical diseases .
3. To describe the etiology and clinical features of the surgical diseases.
4. To evaluate the management with documentation of maternal and foetal outcome.

Materials and methods

This study was a prospective hospital based observational study carried out in a tertiary care teaching hospital of West Bengal. The study period extended over one year (January to December 2019).All antenatal patients attending the OPD/ER during the study period were assessed for the presence of acute abdomen due to nonobstetric surgical diseases. All such patients were admitted and written informed consent was obtained from them for clinical examination, diagnostic investigations and surgical management. After diagnosis and appropriate treatment for respective surgical disease, each patient was followed up for rest of her antenatal period up to her delivery to note the maternal and foetal outcome. The institution ethics committee approved the study.

A detailed case history was obtained in each case and documented as follows:

a) Antenatal history :- Gravida/parity, gestational age,any antenatal/obstetric complication during present pregnancy, past obstetric and gynaecological history.
b) History of symptoms related to acute abdomen:- abdominal pain, nausea, vomiting, constipation , urinary symptoms etc.
c) Any past history of any medical or surgical illness. Patients with a pre-existing abdominal surgical disease prior to present pregnancy were excluded from the study.

All patients were clinically examined and the clinical findings were noted as follows:

a) Antenatal examination with uterine and foetal palpation, auscultation of foetal heart sounds.
b) Local examination of acute abdomen: clinical signs evident on abdominal inspection, palpation, percussion and auscultation.

Laboratory investigations were carried out as follows:

a)Haematology: Haemoglobin, Total and differential leukocyte count, liver and renal function tests, serum amylase, lipase and electrolytes.

b)Urine examination : routine and microscopic with culture/ sensitivity if indicated.

Diagnostic radiology: routine abdominal ultrasonography (USG) in each case.

All the patients received an initial course of supportive/ resuscitative medical management consisting of stoppage of oral intake, intravenous fluids and antibiotics,selective nasogastric decompression and urinary catheterisation. After resuscitation, emergency surgery was done if indicated.After medical/ surgical treatment , each patient was kept admitted till clinical resolution .After discharge ,each patient was regularly followed up in the OPD till her delivery . The final foetal and maternal outcome was documented at the time of delivery.

The collected data was statistically analysed by Statistical package for social sciences (SPSS) version 24.

Results

The results of the study are shown in Tables I –V. Table I shows the profile of the patients in relation to age, gravida and trimester at the time of presentation.53.7% of our cases were in the age group of 26-30 years. Table II shows the clinical features of the patients during initial presentation.Most(51.85%) patients had localised tenderness and muscle guard suggestive of upper abdominal pathology.None of our patients had features suggestive of obstetric complications.Table III shows the various surgical diseases found in our study. Acute cholecystitis was most frequent(46.29%) followed by acute appendicitis(29.62%). Table IV shows the management of the patients. 33 cases(61.11%) were treated medically while 21 cases (38 88%) required emergency surgery.The outcome of our study is shown in Table V. Most of the pregnancies had an uneventful favourable outcome.

Discussion

Acute abdomen is defined as " any serious acute intra abdominal condition attended by pain, tenderness and muscular rigidity, and for which emergency surgery must be considered." [1,4,5].The clinical presentation and localisation of acute abdominal surgical diseases during pregnancy may be altered and limited because the enlarging gravid uterus displaces and compresses maternal organs.[1]. Due to lifting and stretching of anterior abdominal wall, underlying inflammation has no contact with parietal peritoneum and peritoneal signs (like muscular rigidity) may be absent. [4].While

the clinical signs are often blunted, classical symptoms may be masked by physiological symptoms of pregnancy like nausea, vomiting, constipation and abdominal discomfort.[1-4].So the clinical picture may be distorted making diagnosis delayed and difficult. In our study, 54 patients were detected with acute abdomen due to non obstetric surgical diseases out of 9768 antenatal patients studied over 1 year with an incidence of 0.55%.Literature has reported an incidence varying from 0.2% up to 0.39%.[6-9]. 53.7% ofourcases were in the age group of 26-30 years while 83.32% of our patients were aged between 20-30 years. Other studies havealso reported most cases to be in the age group of 20-30 years.[10-13]. Most(42.59%) of our patients presented as 2nd gravida though certain other studies report primigravida as most commonly affected. [10].Most(50%) of our patients presented in the 2nd trimester.Some authors have found patients to be mostly affected in the 2nd trimester [10] while others have reported patients of all trimesters to be equally affected.[8,9]. All the patients in our study presented with acute abdominal pain while more than half of the patients(55.55%) had upper abdominal pain. Most(51.85%) patients had localised tenderness and muscle guard suggestive of upper abdominal pathology while others had features suggestive of lower abdominal pathology or diffuse peritonitis. Other authors have also reported somewhat similarly with upper abdominal pain as the most frequent clinical presentation.[11].Use of conventional imaging algorithms in pregnancy is constrained by the potential risk of harm from ionizing radiation. Antenatal exposure to ionizing radiation has been associated with foetal anomalies, intrauterine growth retardation and childhood cancers.[1,3-4]. Therefore ionizing radiation is to be used only when medically indicated with minimal exposure when possible, without compromising patient care. [1,4].Abdominal ultrasonography (USG) remains the initial imaging of choice in the evaluation of acute abdomen in pregnancy.[1-4]. It is a versatile technique, does not involve exposure to ionizing radiation,is readily available and relatively inexpensive. [1,3,4,14,15]. It also helps to establish gestational age and assess foetal wellbeing.[1,3,4]. However it is highly operator dependent and deeper intraabdominal structures may be difficult to visualize in presence of an enlarged gravid uterus.[1,3]. In our study routine abdominal USG was sufficient for diagnosis.We did not use abdominal Xrays and CT scan thus avoiding exposure to ionizing radiation.Other authors have successfully used USG for establishing diagnosis.[8,9]. The disease found most frequently(46.29%)was acute calculous cholecystitis with an overall incidence of 2.55 in 1000 pregnancies.Pregnancy is a lithogenic condition because oestrogen increases cholesterol synthesis and progesterone impairs gall bladder motility.[1-4]. Literature suggeststhat biliary tract disease is the second most common general surgical condition encountered during pregnancy, with a reported incidence of cholecystitis as 1 in 1000 pregnancies. [1,2,4]. Other studies have also found gall stone pathology to be the most common presentation comprising of 25%-40% cases of acute abdomen.[10,11]. In our study all the patients presented with usual clinical features and were diagnosed by USG.Indeed, USG is reportedly 95% sensitive for detecting gallstones.[1,3,4,14,15]. The next common disease (29.62%) in our study was acute appendicitis with an overall incidence of 1.63 in 1000 pregnancies. Literature has reported acute appendicitis as the most common nonobstetric surgical emergency in pregnancy occurring in 1 in 1500 pregnancies.[1]. Acute appendicitis should be included in the differential diagnosis of every pregnant woman who presents with right sided abdominal pain.[1]. Other studies have reported acute appendicitis second most common following acute cholecystitis as a cause of acute abdomen in pregnancy with a reported incidence of 5 %-15%.[10,11]. Acute appendicitis is most common in 2nd trimester (42%), followed by 1st trimester(32%) and 3rd trimester (26%). [1]. In our study too, most cases of acute appendicitis (61.53%) presented in 2nd trimester. Abdominal pain in right lower quadrant is regarded as most common symptom regardless of gestational age with only a slight difference (86% in 1st trimester vs 85% in 3rd trimester).[1]. All the patients in our study presented with typical clinical features of appendicitis. USG could diagnose almost all the cases though few cases were diagnosed intraoperatively.USG has a reported sensitivity of 67%-100% and a specificity of 83%-96% for appendicitis in pregnancy.[14,16]. In our study acute intestinal obstruction (AIO) was the 3rd most common (7.4%) with an overall incidence of 1 in 2442 pregnancies). Acute intestinal obstruction is the 3rd most common non obstetric surgical emergency in pregnancy. [1].It occurs most commonly in 3rd trimester due to mechanical effects. [3].Adhesions resulting from prior abdominal/pelvic surgeries are most frequent (53%-60%)cause for AIO in pregnancy followed by volvulus (25% of cases).[1-4].75% of our patients with AIO presented in 3rd trimester. All of our patients reported with usual features like colicky abdominal pain, vomiting, etc. as reported in literature.[1-4]. USG done in all cases suggested AIO.

USG is reportedly very helpful in detecting dilated intestinal tract with mechanical obstruction, suspected strangulation etc.[14-17]. 2 of our cases had an intraoperative diagnosis of intestinal adhesions while 1 of them had a sigmoid volvulus. We had only 3 cases of acute pancreatitis with an incidence of 5.5% among acute abdominal cases with an overall incidence of 1 in 3256 pregnancies.Literature has reported the incidence of pancreatitis as 3/10,000 pregnancies [1] while somestudies have reported a variable incidence(2%-6%) of pancreatitis as an acute abdomen inpregnancy.[10,11]. Gall stones are the commonest etiology of acute pancreatitis with most cases presenting in the third trimester[1,3,4]. All the patients of our study too had gall stone pancreatitis and presented in the third trimester. Our patients had usual clinical features of acute pancreatitis with raised serum amylase and lipase and the diagnosis could be established using USG .2 of our cases presented with perforative peritonitis. USG suspected pneumoperitoneum in our cases similar to some other studies which have reported USG to be a more sensitive modality than plain radiography for diagnosis of pneumoperitoneum.[15]. The sites of perforation were established intraoperatively,and were found to be in the ileum and in Meckel's diverticulum respectively.We had 2 cases of nephrolithiasis with an incidence of 3.7% among all the cases of acute abdomen similar to the incidence reported by other authors.[10-12] Our patients reported with usual clinical features[1,3,4] and were diagnosed by USG.33 (61.11%) of patients with acute abdomen recovered with medical treatment while the remaining 21 (38.88%) cases required emergency surgery with an overall (0.21%)incidenceof nonobstetric surgery out of all antenatal cases studied. Literature has reported that 1-2% of pregnant women require surgical procedures and nonobstetric surgery is necessary up to 1% of pregnancies each year.[1].Other authors have reported a variable percentage of nonobstetric surgeries(0.15%-0.75%) among antenatal cases.[8,9,18-20]. Our patients of cholecystitis were treated medically with complete clinical resolution. Traditionally elective gallbladder surgery is delayed until postpartum and surgery is advised if medical therapy is not tolerated and /or the attacks are recurrent. [1-4,21].Nowadays some authors however advice primary surgery.[1].All the cases of pancreatitis too recovered uneventfully without any complications like pancreatic abscess/SIRS etc. Similarly the cases of nephrolithiasis had satisfactory recovery with medication. None of them had indications of stone removal as reported in literature.[1-4,8-13].All the cases of acute appendicitis in our study had emergency surgery.Treatment for suspected acute appendicitis in pregnancy is emergent appendicectomy.[1].It is to be performed as soon as the diagnosis is seriously considered to avoid maternal and foetal mortality and morbidity. [1-4,8-11].Acute appendicitis was the commonest (76.19%) indication of surgical intervention in our study. Other authors have also reported appendicectomy to be the most common nonobstetric surgical intervention in pregnancy.[8-12]. The 2 cases of perforative peritonitis and 3 of our cases of intestinal obstruction needed emergency surgery.Emergency surgery performed in the 2nd trimester has less risk of spontaneous foetal loss and premature labour compared to surgery in other trimesters.[1-4]. Most(47.6%) of our surgeries were performed in the 2nd trimester.Certain other authors have also reported the performance of emergency surgery most commonly in the 2nd trimester .[11,12].For our surgical procedures, the choice of anaesthesia was guided by indication, nature and site of surgery. Our patients had appendicectomy under regional anaesthesia while patients of intestinal obstruction and perforations were administered general anaesthesia.Regional anaesthesia reduces exposure of foetus to potential teratogens, avoids potential risk of failed intubation and aspiration and provides excellent postoperative analgesia.[1,4,22].However there is no conclusive evidence regarding superior safety for regional anaesthesia and general anaesthesia is frequently used. [22].Intraoperative foetal heart monitoring is to be performed and interpreted for early foetal compromise or distress.[1,3]. Uterine contractions are to be monitored intraoperatively using external tocodynamometer with use of tocolytics if indicated.[3,22].In our study with careful intraoperative monitoring our surgeries were performed uneventfully with satisfactory recovery from anaesthesia.We used epidural analgesia and paracetamol for post operative analgesia as recommended in literature.[3,4,22].Postoperative tocometry is advocated with use of tocolytics if uterine contractions are detected to prevent preterm labour. [1,3,4].We did postoperative monitoring but did not need to use tocolytics in any of our patients.Of the patients managed with nonsurgical medical treatment,only 2 patients had preterm labour and delivery during follow up at a later period while 3 had intrauterine growth retardation(IUGR) with delivery of low birth weight baby long after recovery from acute abdomen.So these adverse events seemed to be unrelated to the acute surgical disease.Of the surgically treated patients,there was 1 maternal death with foetal death in utero due to generalised sepsis with

multiorgan failure on 5th postoperative day following perforation repair.Death seemed to be related to magnitude of surgical disease and not due to surgical procedure itself. Though intestinal obstruction and acute pancreatitis are associated with considerable maternal mortality rate (MMR) ,ranging from 10-20% and 0-37% respectively[1-4],we had no maternal mortality in those cases. There were 3 cases of preterm labour and delivery and 3 other cases of IUGR with low birth weight baby which occurred after complete postoperative recovery after several weeks of emergency surgery. 2 cases of spontaneous abortion occurred ; both of them in the 1st trimester following 1-2 weeks after appendicectomy. 2 out of 3 cases of preterm labour were also following appendicectomy..Literature has reported a foetal mortality of 1.5%-35% in acute appendicitis and appendicular perforation with risks of preterm labour(13%-40%) and preterm delivery (4%-40%) respectively.[1-4].Other studies have also reported that spontaneous abortion/ foetal loss occurred more in Ist trimester and following peritonitis. [18].Few studies havealso reported preterm labour after appendice-ctomy.[12]. The MMR of our study was 1.851% out of all cases of acute abdomen with a MMR of 4.76% among surgically treated patients. The overall MMR due to surgical acute abdomen was 0.01% among all the studied antenatal patients.Other authors have reported maternal death rate varying from 0.006% upto 5% in cases requiring antenatal nonobstetric surgery.[1,12,23,24].The foetal loss in our study was 5.55% among all cases of acute abdomen and 14.28% following surgery with an overall figure of 0.03% among all antenatal patients.Other studies have reported a fetal loss following surgery ranging from 5%-25%. [12,13,18,19,23,24].We had preterm labour in 9.25% cases of acute abdomen and in 14.28% of cases following surgery with an overall incidence of preterm labour due to acute abdomen being 0.05% among all antenatal patients.Other studies have reported anincidence of preterm labour following nonobstetric surgery varying from 5%-35%.[12,13,24]. In general however surgery in acute abdomen isreported to be usually safe and maternal and foetal complications occur if there is a delay in diagnosis or management.[8-12,17-22].Our surgical patients had few post operative morbidities like wound infection which resolved with wound dressings and antibiotics. Other authors have also reported wound related complications among their surgical patients.[12,13].A variety of surgical diseases presented with an acute abdomen during pregnancy. Though the acutely ill patients could not always give an accurate history of symptoms ,a careful physical examination revealed usual clinical features suggestive of respective pathologies. Indeed we could establish the clinical diagnosis in almost all cases and confirmed with diagnostic radiology avoiding ionizing radiation. We felt that as soon as diagnosis is established, appropriate management is to started evaluating both the mother and foetus. The condition of mother should always take priority because effective treatment of the mother will benefit the mother as well as the foetus. When emergency surgery is indicated,the surgeon should not hesitate to operate fearing obstetric and foetal complications.Early surgery is usually safe and will salvage the situation while delaymay cause both maternal and foetal hazards. If felt necessary the clinician in charge should seek additional professional help and support for prompt decision making and timely intervention. Ideally , the general surgeon, the Obs-Gyn specialist and a foetal medicine specialist should work as a team to deal with this challenging situation successfully.

Table 1 : Profile of patients at the time of presentation

	Number of patients (54)	Percentage
Age in years:		
21-25	16	29.62
26-30	29	53.70
31-35	07	12.96
36-40	02	3.70
Gravida:		
Primigravida	17	31.48
2nd gravida	23	42.59
Others	14	25.92
Trimester:		
Ist trimester	15	27.7
IInd trimester	27	50
IIIrd trimester	12	22.22

45 (83.33%) patients were in the age group of 21-30 years.

Table 2: Clinical features during initial presentation

Clinical features	Number of patients	Percentage
A.Symptoms:		
1. Abdominal pain	54	100
a)Site of pain:		
i)Upper abdomen	30	55.55
ii)Lower abdomen	19	35.18
iii)Whole abdomen	05	09.26
b)Character of pain:		
i)Dull aching	34	62.96
ii)Colicky	20	37.04
2.Vomiting		
a) >3 episodes	36	66.66
b) <3 episodes	18	33.33
3.Constipation/obstipation	9	16.66
4.Vaginal bleeding/discharge	-	-
5.Less/No foetal movement	-	-
B.Signs:		
1.Abdominal tenderness		
a)Upper abdomen	28	51.85
b)Lower abdomen	16	29.62
c)Diffuse	02	11.11
d)None	04	07.40
2.Muscle guard/rigidity		
a)Upper abdomen	28	51.85
b)Lower abdomen	16	29.62
c)Diffuse	02	03.70
d)None	08	14.81
3.Antenatal examination		
a)Normal findings	54	100
b)Abnormal findings	-	-

Table 3: Surgical diseases presenting with acute abdomen

Surgical disease	Number of patients	Percentage
Acute calculous cholecystitis	25	46.29
Acute appendicitis	16	29.62
Gall stone pancreatitis	03	5.55
Acute intestinal obstruction	04	7.40
Perforative peritonitis	02	3.70
Acute gastritis	02	3.70
Renal colic	02	3.70

Table 4 : Management of surgical diseases

Management disease	Number of patients	Percentage
Surgical Management	21	38.88
Open Appendicectomy Appendicitis	16	29.63
Laparotomy with adhesiolysis Acute intestinal obstruction	02	3.70
Laparotomy with sigmoidectomy Acute intestinal obstruction and resection-anastomosis	01	1.85
Laparotomy with repair of perforation		
Perforation of ileum	01	1.85
Perforation of Meckel's diverticulum	01	1.85
Medical Management	33	61.11
Acute cholecystitis	25	46.29
Acute pancreatitis	3	5.55
Acute gastritis	2	3.70
Renal colic	2	3.70
AIO	1	1.85

Of 21 Surgeries , 6(28.5%) surgeries were performed in 1st trimester, 10(47.6%) surgeries in 2nd trimester and remaining 5(23.8%) in 3rd trimester. Open appendicectomy was the commonest (76.19%) of all the surgeries performed.

Table 5: outcome of management

Parameters	**Surgical management** 21 cases	**Medical management** 33 cases
1.Duration of hospital stay	10-14 days	4-5 days
2.Postoperative morbidity		
a) Wound infection	6 cases	--
b) Respiratory tract infection	2 cases	
c) Urinary tract infection	1 case	
3. Outcome of pregnancy		
a) Uneventful pregnancy and term delivery.	12 cases	28 cases
b)Preterm labour	3 cases	2 cases
c)IUGR	3 cases	3 cases
d)Maternal mortality	1 case	- -
e) Spontaneous abortion	2 cases	--
f) Intrauterine foetal death	1 case (with the maternal death).	

Maternal Mortality Rate: 1.851%(Out Of All Cases Of Acute Abdomen) And 4.76%(Out Of All Surgically Treated Cases). Foetal Loss:5.55%(Out Of All Cases Of Acute Abdomen) And 14.28%(Out Of All Surgically Treated Cases). Preterm Labour : 9.25%(Out Of All Cases Of Acute Abdomen) And 14.28%(Out Of All Surgically Treated Cases).

Conclusion

A multidisciplinary approach , sound clinical judgement, effective diagnostic modalities, prompt and appropriate decision making and safe surgery when indicated are imperative in the modern era for management of acute abdomen due to nonobstetric surgical diseases in pregnancy with a favourable foeto - maternal outcome.

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