

Acute abdomen and abdominal pain in pregnancy

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Summary Abdominal pain in pregnancy continues to pose a diagnostic and management challenge to the attending obstetrician. Many causes are specific to pregnancy but conditions affecting the non-pregnant woman can also complicate pregnancy. Identifying the cause is influenced by the anatomical and physiological changes of pregnancy. There will be a reluctance to employ abdominal X-rays and laparotomy but these reservations have to be re-evaluated when symptoms fail to settle.

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A degree of abdominal discomfort is felt by most pregnant women, which either settles spontaneously or is controlled with simple analgesics. It is important that the clinician recognizes conditions, both incidental and inherent to pregnancy, that are potentially dangerous to both the mother and fetus and takes appropriate actions. Conditions presenting with pain or signs of acute abdomen in the non-pregnant state can also occur at any stage in pregnancy. Laparotomy in pregnancy is perceived to carry a high risk of miscarriage and preterm labour. It should, however, be realized that the single factor that dramatically affects morbidity and mortality in the pregnant woman with acute abdomen is a delay in diagnosis. As Sir Zachary Cope stated in 1921 'Earlier diagnosis in acute abdomen means better prognosis' and, as a general rule, management of the acute abdomen should not be altered in pregnancy. Identifying the cause of abdominal pain is challenging due to the inherent anatomical and physiological changes in pregnancy. Understanding these changes in pregnancy is necessary for the evaluation of pregnant women with abdominal pain. The incidence of surgical interventions for non-obstetric reasons has been reported to be 0.2–2.2% of pregnancies.

ANATOMICAL AND PHYSIOLOGICAL CHANGES IN PREGNANCY

Significant changes in the topographical landmarks of intra-abdominal organs occur in pregnancy due to the enlarging uterus. The position of the appendix is gradually displaced cephalad and laterally and at term lies closer to the gall bladder. The change in the intra-abdominal relationship of the appendix should be taken into account

when eliciting the McBurney's sign in acute appendicitis. The uterus in later pregnancy also displaces the omentum, which interferes with its function of containing peritonitis. The stretching of the abdominal wall, especially in the multigravida, will also influence signs of peritoneal irritation, such as muscle guarding. From the second trimester, as the gravid uterus forms part of the abdominal cavity, the adnexae lie posterior to it and palpating the ovaries may only be possible by vaginal examination. These changes continue in the postpartum period until complete involution of the uterus and pelvic organs.

Laboratory results have to be interpreted in the light of the physiological changes of pregnancy. The total white blood cell count is elevated to a mean of 9×10^9 /litre in uncomplicated pregnancy with a further rise in labour to a mean of 40×10^9 /litre and this limits its use in diagnosing inflammatory conditions in pregnancy. Since there is a greater plasma expansion than red cell mass, there is a 3–4% fall in haematocrit and this has to be taken into account when assessing blood loss.

Serum amylase levels change in pregnancy making interpretation of results in suspected pancreatitis difficult. However, the rise is more dramatic in acute pancreatitis and cholecystitis.

Hormonal relaxation of the renal collecting system in pregnancy complicates ultrasound interpretation of the renal pelvis and ureters in obstructive uropathy. There are several sonographical features that help differentiate between physiological changes and obstruction. In physiological caliectasis the ureter tapers to a normal calibre at the pelvic brim where it crosses the iliac vessels, whereas an obstructed ureter remains dilated to the level of obstruction. Urine flows into the bladder as 'jets' and can be visualized with the ultrasound. The absence of this 'ureteral jet phenomenon' on the side of suspected obstruction is said to have 100% sensitivity and 91% specificity.

CAUSES OF ABDOMINAL PAIN IN PREGNANCY

Conditions both specific to and incidental to pregnancy may present with abdominal pain. Pregnancy-related causes vary with the trimester (see Table I). The initial step in assessing abdominal pain in pregnancy is a detailed history and abdominal examination and, if indicated, a pelvic examination. The use of diagnostic tools such as ultrasound scanning has aided clinical assessment. If radiographs are essential in clinical decision-making, they should be used with due attention to minimizing the dose of radiation to the fetus.

NON-PATHOLOGICAL CAUSES OF ABDOMINAL PAIN

Round ligament pain

The enlarging uterus stretches the round ligament from the second trimester and is believed to cause pain in the lower quadrant of the abdomen in 10–30% of pregnancies. The pain is either cramping or stabbing in nature.

There is little objective evidence to prove that this physiological change in pregnancy is the source of pain.

Management of round ligament pain is essentially symptomatic. Measures such as analgesics, local heat, bed rest and reassurance are usually sufficient. Failure of the symptoms to respond to such measures should prompt a review of the diagnosis.

Braxton–Hicks contractions

These physiological contractions may cause abdominal discomfort in some women in the latter half of pregnancy. They are, however, irregular in frequency and intensity; there is no preceding 'show' or cervical changes. With persistent pain it is important to rule out premature labour.

PATHOLOGICAL CAUSES OF ABDOMINAL PAIN IN PREGNANCY

Pathological conditions presenting with abdominal pain in early pregnancy are different from those presenting in later pregnancy (see Table I).

Table I Differential diagnosis of abdominal pain in pregnancy

Physiological causes	Pathological conditions
Round ligament pain, incidence = 10–30% of pregnancies	Pregnancy-specific causes: <ol style="list-style-type: none"> 1. Early pregnancy related: <ul style="list-style-type: none"> ● Threatened/inevitable or incomplete miscarriage ● Ectopic pregnancy. Incidence = 1 in 60–1 in 250 pregnancies 2. Late pregnancy complications: <ul style="list-style-type: none"> ● Preterm labour. Incidence = 6–10 in 100 pregnancies ● Placental abruption. Incidence = 0.5–1 in 100 pregnancies ● Fulminating pre-eclampsia ● Uterine rupture. Incidence of upper segment scar dehiscence = 2–3 in 100 pregnancies
Braxton–Hicks contractions	Pregnancy aggravated: <ul style="list-style-type: none"> ● Red degeneration of uterine fibroids ● Torsion of subserous fibroid ● Adnexal torsion ● Urinary tract infections ● Acute pyelonephritis. Incidence = 10–25 in 1000 pregnancies ● Acute retention of urine with a retroverted uterus
Idiopathic	Acute pain due to concomitant pathology: <ul style="list-style-type: none"> ● Acute appendicitis. Incidence = 1:5000 pregnancies ● Renal calculi. Incidence = 1 in 1500 pregnancies ● Acute intestinal obstruction. Incidence = 0.3 in 1000 pregnancies ● Acute cholecystitis and cholelithiasis. Asymptomatic in 3.5 in 100 pregnancies ● Acute pancreatitis. Incidence = 1 in 1000 pregnancies ● Peptic ulcer syndrome ● Intraperitoneal haemorrhage ● Abdominal trauma

PREGNANCY-SPECIFIC CAUSES OF PAIN IN FIRST AND EARLY SECOND TRIMESTER

The most common pathological cause of pain in early pregnancy is miscarriage, the incidence of which has been quoted as 40–75%.

Abdominal pain in early pregnancy may be due to an ectopic pregnancy when the pain is usually localized to the side of the gestation. The reported frequency of ectopic pregnancy varies from 1:60 to 1:250 pregnancies and is probably dependent on the incidence of genital tract pathology and contraceptive practices of the population studied. The presentation of these problems and their subsequent management are beyond the scope of this article.

PRACTICE POINTS

- Differential diagnosis for pregnancy-specific causes of abdominal pain in early pregnancy includes:

Pain due to impending miscarriage
Pain from extrauterine gestation

- The clinical finding of an open cervical os with bleeding is diagnostic of inevitable/incomplete miscarriage.
- The incidence of heterotopic (concomitant intrauterine and ectopic pregnancy) is rare and reported as 1:7000 to 1:30 000 pregnancies.
- When in doubt follow up with B human chorionic gonadotrophin (hCG) levels and pelvic ultrasound to establish whether there is an ongoing intrauterine pregnancy.

LATE PREGNANCY-SPECIFIC COMPLICATIONS

Severe pre-eclampsia

Right upper quadrant pain due to oedema and stretching of the liver capsule is seen in 10% of women with severe pre-eclampsia and is a sign of impending eclampsia. Other symptoms and signs of pre-eclampsia are frequently present. Laboratory evidence of Haemolysis, Elevated Liver enzymes and Low Platelet levels (thrombocytopenia) is diagnostic of the HELLP syndrome, which may complicate severe pre-eclampsia. An ultrasound of the liver helps to confirm subcapsular haemorrhage. Stabilization of the mother, blood pressure (BP) control with antihypertensives, seizure prophylaxis with magnesium sulphate, careful fluid balance, correction of coagulation abnormalities and delivery remain the optimal management.

Placental abruption

Antenatal placental separation presents with acute abdominal pain. This occurs in 0.5–1% of all pregnancies, usually after the second trimester, and in 20% of cases it is entirely concealed. The pain is usually of sudden onset and fetal death may occur. The uterus is tender to palpate with board-like rigidity and inability to palpate the fetal parts. Maternal shock, consumptive coagulopathy and acute renal failure are worrying sequelae. Diagnosis is essentially clinical. Management includes careful monitoring and correction of maternal haemodynamics and coagulation changes. Vaginal delivery is preferred but Caesarean section may be necessary for fetal or maternal reasons. Involvement of senior obstetricians and haematologists has consistently shown a reduction of both perinatal and maternal mortality and morbidity following placental abruption.

Preterm labour

Delivery prior to 37 weeks gestation complicates 6–10% of all pregnancies and remains the single most important cause of neonatal morbidity and mortality. Abdominal pain in preterm labour is characteristic with increasing severity and it may be accompanied by vaginal loss of liquor or bleeding. Clinical findings are diagnostic. Management options depend on the gestational age, presence of other obstetric risk factors and the condition of the fetus.

Acute fatty liver

This condition is a rare complication in pregnancy with a quoted incidence of 1:10 000 pregnancies. When rapidly progressing, maternal mortality may be as high as 75–90%. The pathogenesis is unclear, with the condition usually occurring in later pregnancy and the postpartum period. Pre-eclampsia and hypertension co-exist in 50% of cases. In some cases an inborn error of metabolism causing a deficiency of 3-hydroxyl co-enzyme A dehydrogenase has been implicated.

Symptoms are non-specific with sudden onset of nausea, vomiting, abdominal pain and jaundice. The condition can be differentiated from acute hepatitis by specific virological tests. Fulminating cases rapidly progress to hepatic failure and disseminated (DIC). Treatment is aimed at maintenance of fluid and electrolyte balance and correction of coagulation abnormalities. With early diagnosis, management and immediate delivery the maternal survival figure rises to 72%.

There is no known residual liver damage and recurrence in future pregnancies is rare.

Uterine scar dehiscence and rupture of the gravid uterus

Uterine rupture should be considered when acute abdominal pain occurs in later pregnancy and early labour in women who have uterine scars from previous surgery such as hysterotomy, myomectomy and Caesarean section. The pain may be accompanied by vaginal or intraperitoneal bleeding. Women occasionally present with massive intraperitoneal bleeding and shock. Fetal heart abnormalities are a consistent finding seen in 78% of cases and fetal death may occur. Upper segment scars are reported to give way in 3–4% of subsequent pregnancies, the incidence rising to 32% when scar rupture has occurred in a preceding pregnancy. The corresponding figures for a lower segment scar are 0.25–3% and 4–10%. When scar rupture is suspected an immediate laparotomy is mandatory. If the event happens in the hospital the outcome is generally good, although fetal death, hypoxic ischaemic encephalopathy and hysterectomy are possible sequelae. In women who desire further children primary closure of the rupture site may be attempted. Subsequent pregnancies are closely monitored with delivery by elective Caesarean section planned at 36 weeks.

Torsion of the pregnant uterus

This is an extremely rare complication of pregnancy and usually occurs in the presence of uterine fibroids, adhesions and other uterine structural anomalies. Acute abdominal pain rapidly progresses to maternal shock. Clinical findings may not be specific. The palpation of the cord-like round ligament obliquely across the abdomen with a displaced urethra on vaginal examination is indicative. However, confirmation of diagnosis is at laparotomy. Delivery by Caesarean section with an incision on the posterior uterine wall may be necessary before the torsion is rectified. Recurrence in subsequent pregnancies is rare.

PRACTICE POINTS

In the assessment of abdominal pain in later pregnancy, characteristic findings in acute obstetric emergencies are:

- History of vaginal bleeding or loss of liquor with abdominal pain.
- Maternal cardiovascular effects of bleeding.
- Tense and tender uterus.
- Regular uterine contractions.
- Fetal heart irregularities.
- Evidence of pre-eclampsia.
- Progressive cervical changes.

- Management is based on diagnosis.
- Routine investigations required in women with non-specific abdominal pain are:

Full blood count. Neutrophilia is seen in acute infections along with an elevated C-reactive protein level.

Urinalysis with culture of a midstream sample.

Serum amylase/amylase creatinine ratio in acute epigastric pain.

Abdominal ultrasound helps to identify:

Adnexal masses.

Renal calculi.

Gall stones/acute cholecystitis.

Bowel dilatation in intestinal obstruction.

Hepatic sub-capsular haemorrhage.

Laparotomy with an appropriate abdominal incision is needed when symptoms are persistent.

CONDITIONS AGGRAVATED BY PREGNANCY

Certain conditions that are incidental to pregnancy are aggravated by the anatomical, metabolic and physiological changes of pregnancy.

Urinary tract infections

These constitute one of the commonest causes for abdominal pain in pregnancy. Symptoms of acute cystitis are seen in 1–5% of pregnant women. Abdominal pain, dysuria, frequency and haematuria of cystitis are relieved with a course of the appropriate antibiotic. Asymptomatic bacteriuria does not usually co-exist and acute cystitis rarely progresses to pyelonephritis.

Acute pyelonephritis

This is seen in 1–2% of pregnancies. The hormonal changes of pregnancy cause urinary stasis and obstruction predisposing the woman to acute pyelonephritis. Treatment of asymptomatic bacteriuria in pregnancy will prevent 70% of these cases. Symptoms of acute pyelonephritis include pyrexia, abdominal and loin pain, urinary frequency and vomiting and the woman invariably needs admission. Management includes intravenous hydration, appropriate intravenous antibiotics and symptomatic control of pain and vomiting. Untreated cases may progress to generalized sepsis and adult respiratory syndrome. Acute pyelonephritis in pregnancy also predisposes the woman to premature labour.

Acute urinary retention

This is usually seen in the early second trimester when a retroverted gravid uterus stretches the urethra obstructing the outflow of urine. The pregnant woman complains of abdominal pain and urinary retention. Abdominal examination reveals a distended bladder, which may be misdiagnosed as an ovarian cyst. The cervix is displaced anteriorly under the pubic symphysis and, on vaginal examination, the pregnant uterus appears to lie in the Pouch of Douglas. An ultrasound scan of the pelvis rules out an incarcerated posterior wall uterine fibroid and any adnexal cysts. Continuous bladder drainage with the woman in semi-prone position usually corrects the problem within a few days. Rarely the uterus has to be repositioned under a general anaesthetic.

Complications of uterine fibroids

The incidence of uterine fibroids in pregnancy vary with the population studied and is relatively uncommon. Roughly 10–40% of women with uterine fibroids will have complications in pregnancy related to the fibroids. Red degeneration of fibroids in pregnancy, as a result of vascular compromise, presents with acute abdominal pain, low-grade pyrexia and leukocytosis. Uterine fibroids often undergo degeneration following delivery due to changes in blood supply to the uterus. Conservative management with bed rest and analgesics is generally adequate. Pain requiring narcotic analgesia occurs in 25% of women in pregnancy with myomas greater than 5 cm in diameter. The condition may recur in pregnancy if multiple fibroids are present. Myomectomy in pregnancy is limited to the removal of necrotic pedunculated fibroids following torsion.

Ovarian cyst accidents

Routine use of the early dating scan in pregnancy has increased the pick-up of asymptomatic cysts of the ovaries, the majority of which are non-neoplastic and eventually resolve.

Differential diagnosis of adnexal masses that persist in pregnancy

The differential diagnosis of adnexal masses persisting pregnancy is:

- Cystic teratoma = 37.4%
- Endometrioma = 14.0%
- Corpus luteum cysts = 12.1%
- Complex/inflammatory cysts = 10.3%
- Hydrosalpinx = 8.4%
- Malignant neoplasms = 0.9%

The anatomical and physiological changes of pregnancy predispose the pregnant woman to acute events in ad-

nexal masses. Simple adnexal masses are liable to torsion in the second trimester and this has been reported in < 1% of patients with masses greater than 4 cm. Changes in the pelvic blood supply and stretching of the ligaments by the enlarging uterus may initiate torsion of the ovarian pedicle and the patient presents with acute abdominal pain and signs of peritoneal irritation. Other cyst accidents such as infarction, haemorrhage into cysts and rupture also present as acute abdomen. A delay in diagnosis increases both fetal and maternal morbidity and mortality and when conservative management fails laparotomy is mandatory when removal of the ovary may be necessary. If the corpus luteum is removed in the first trimester, exogenous progestogenic support of pregnancy should be given.

Simple cysts of the ovary have characteristic sonographic features such as thin walls, they are typically unilocular and intracystic solid elements are absent. Simple cysts of the ovary spontaneously resolve by 15 weeks of gestation. A conservative approach to adnexal cysts in pregnancy, with follow-up scans and assessment postpartum avoids surgical intervention and the potential complication of premature labour. Improvements in laparoscopic surgery have made it possible for the pregnant woman with an ovarian cyst to be managed safely by laparoscopic removal of the mass in the second trimester.

ABDOMINAL PAIN IN PREGNANCY DUE TO CONCOMITANT PATHOLOGY

Acute appendicitis

The incidence of appendicitis in pregnancy, 1 in 5000, remains the same as in the non-pregnant state and is the most common non-obstetric reason for surgical exploration of the maternal abdomen. Diagnosis of acute appendicitis is confounded by the physiological changes inherent to pregnancy and explains the high rates of negative laparotomy (25–35%) in pregnancy. Nausea and vomiting are common symptoms of both early pregnancy and acute appendicitis. Pyelonephritis is suspected when the inflamed appendix is in contact with the ureter and causes pyuria. Bacteriuria is, however, absent in appendicitis.

Anatomical changes of the intra-abdominal organs due to the enlarging uterus, displacement of the omentum and physiological leukocytosis make the classical signs of acute appendicitis difficult to interpret in pregnancy. The area of maximum tenderness is variable and is dependent on the location of the appendix.

Ultrasound criteria for the diagnosis of appendicitis are well established with the detection of a thick-walled, non-compressible, blind-ending loop of bowel at the site of maximum tenderness carrying reasonable sensitivity.

Worsening of symptoms, a rising white blood cell count and persistence of pyrexia are highly suggestive.

Delay in diagnosis leading to perforation of the infected appendix increases the risk of maternal septicaemia and premature labour. These events increase fetal morbidity and mortality to as high as 33% and 43%, respectively. Maternal morbidity also rises steeply with peritonitis and septicaemia.

Laparoscopy is the preferred surgical approach in early pregnancy. Abdominal incision in later pregnancy is centred over the point of maximum tenderness. When perforation of an infected appendix has occurred peritoneal irrigation and treatment with appropriate broad-spectrum antibiotics is essential. Routine use of tocolytics is controversial and studies have failed to show obvious benefits.

Acute cholecystitis and cholelithiasis

Alterations of gall bladder physiology in pregnancy predispose to stasis. Sludge within the gall bladder can be seen in up to 25% of pregnant women but this figure decreases to 4% in the same women within 1 year postpartum. Asymptomatic gall-stones are seen in 2.5–5% of pregnant women. Symptoms and signs of acute cholecystitis are the same as in the non-pregnant state and include abdominal pain, nausea, vomiting with right upper quadrant tenderness. The mainstay of diagnosis of gall-stones is ultrasound with an accuracy of 97%. Ultrasound signs of acute cholecystitis include thickening of the wall of the gall bladder with presence of pericholecystic fluid and sonographical Murphy's sign. Cholecystectomy in pregnancy is indicated when conservative management fails. In situations where the condition is associated with acute pancreatitis the maternal mortality increases to 15% and the perinatal mortality can be as high as 60%. Recently a more aggressive policy has been advised and laparoscopic cholecystectomy in pregnancy has been shown to not only be safe but also to help reduce hospital stay and frequency of premature labour.

Acute pancreatitis

This is rare, complicating 1 in 1000 to 1 in 10 000 pregnancies. The problem occurs mainly in later pregnancy and the puerperium and gall-stones frequently co-exist. Chlorothiazide diuretics and conditions predisposing to hyperlipidaemia have also been shown to be responsible.

Nausea, vomiting and severe epigastric pain radiating to the back are typical of acute pancreatitis in both the non-pregnant and pregnant state. Serum amylase is elevated but is not specific to pancreatitis. Amylase levels are also raised in cholecystitis, perforated peptic ulcer, obstructed bowel and thrombosis of the superior mesenteric vessels. It should be remembered that serum

amylase levels fall in early pregnancy and consequently the rise may not be as dramatic as in the non-pregnant state.

To improve accuracy the amylase:creatinine ratio, which is raised in acute pancreatitis, has been used. Absolute amylase levels do not correlate with the severity of the condition. Abdominal ultrasound helps exclude cholecystitis and associated gall-stones.

The morbidity and mortality of acute pancreatitis increases in pregnancy and is as high as 15–40%. Fetal loss could be as high as 60%. Management is conservative with bed rest, analgesia and intravenous hydration. Surgical debridement and drainage of a pancreatic abscess is necessary in unresponsive cases. There is no evidence to substantiate the idea that terminating an early pregnancy improves maternal outcome. However, if the pregnancy is near term, resuscitation of the mother with delivery by Caesarean section is advisable.

Renal calculi

Renal stones complicate approximately 1 in 1500 pregnancies. Symptoms of lumbar pain and microscopic haematuria are frequently confused with acute pyelonephritis. Acute appendicitis is a differential diagnosis when pain is limited to the right quadrant. Ultrasound findings are complicated by the fact that dilatation of the renal collecting system also occurs in 60–90% of pregnant women as a result of hormonal changes. Ultrasound is confirmatory should a calculus be identified or ureteric obstruction noted. Other ultrasound indices such as altered renal vascular resistance and the absence of the ureteral 'jet phenomenon' (urinary jets into the bladder) help confirm diagnosis. Management is essentially conservative with hydration and analgesia.

Acute intestinal obstruction

This rare complication, with an incidence ranging from 0.0014–0.0034%, is an important non-obstetric indication for surgical intervention in pregnancy. Roughly 60–70% of cases of intestinal obstruction in pregnancy are a result of adhesions following previous surgery and occur as the uterus enlarges into the abdominal cavity in the second trimester and also in the puerperium when involution of the uterus takes place. Volvulus is the other important cause and is more common in pregnancy. Rarer causes of intestinal obstruction include intussusception, hernia, malignancy and inflammatory bowel disease. Diagnosis is often delayed, since symptoms of intestinal obstruction are mistaken for the nausea and vomiting of pregnancy and hyperemesis gravidarum or the abdominal pain for threatened miscarriage. Persistence of symptoms calls for further investigations. Fluid-filled loops of bowel on abdominal ultrasound examination

should be evaluated with radiographical series. Once confirmed, resuscitation of the patient with intravenous fluids and nasogastric decompression of the bowel is to be followed by laparotomy through an appropriate incision. Delay in diagnosis can lead to bowel necrosis and subsequent perforation and peritonitis.

Peptic ulcer syndrome

Most women with peptic ulcer syndrome show significant improvement in pregnancy due to reduced gastric secretion and motility, and histaminase secreted by the placenta. Complications of peptic ulcers, such as perforation, should be suspected in these women when signs of acute abdomen are present with worsening symptoms. Bowel perforation is diagnosed by the presence of sub-phrenic gas on an erect abdominal X-ray film. Surgical correction is necessary as in the non-pregnant state. Endoscopic coagulation of a bleeding ulcer may also be carried out in pregnancy.

Intraperitoneal bleeding

Diagnosis of intraperitoneal bleeding in pregnancy is often made at laparotomy for suspected obstetric complications such as placental abruption or uterine rupture. Changes in pelvic vascular hydrostatic pressure during pregnancy predispose the woman to the rupture of ovarian and broad ligament veins. Women present with acute abdominal pain, shock and fetal compromise. Maternal mortality of up to 50% has been reported. Fetal mortality is high and quoted as 80–95%. Rupture of a splenic artery aneurysm occurs more frequently in the pregnant state, with 20% of all splenic arterial bleeds occurring in pregnancy because of haemodynamic changes. Blood volume replacement and prompt repair of the offending vessel reduces maternal mortality but the fetus invariably succumbs to the haemodynamic collapse of the mother.

Abdominal trauma

The complications of abdominal trauma in pregnancy depend on its severity. The most common causes of abdominal injury are either a fall or a road traffic accident. Women may present with only abdominal discomfort or with signs of placental abruption and, in severe cases, with uterine rupture. Resuscitation of the pregnant woman and, when indicated, a prompt laparotomy significantly reduces maternal mortality. Fetal mortality depends on the extent of trauma and blood loss.

Other causes

Inflammatory bowel disease, e.g. Crohn's, ulcerative colitis and diverticular disease of the bowel, when present in pregnancy mimics other intra-abdominal pathology

due to the anatomical and physiological changes of pregnancy. These conditions usually predate pregnancy and management options are specific.

PRACTICE POINTS

- Approximately 40–50% of women with abdominal pain in pregnancy have no identifiable pathology.
- Management of acute abdominal pain in pregnancy should follow the same principles as in the non-pregnant state.
- Anatomical and physiological changes in pregnancy will influence the clinical evaluation.
- Should it be necessary, essential investigations such as abdominal ultrasound or X-rays are to be carried out with care to minimize fetal exposure.
- Delay in diagnosis increases maternal and fetal morbidity and mortality rates.
- Exploratory laparoscopy/laparotomy is necessary when conservative management fails.
- Laparoscopy in pregnancy has been shown to be safe. Positioning of the patient and care with ventilation is essential.

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