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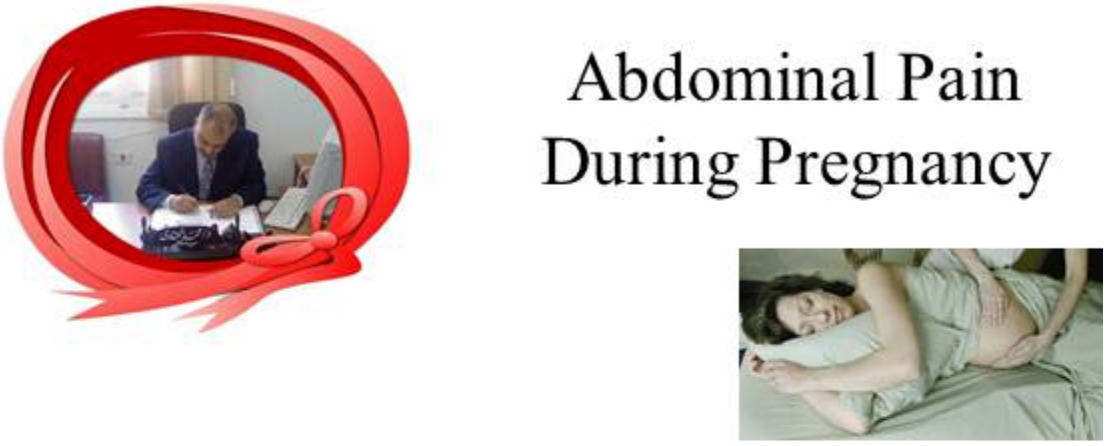
Educational Tutorial

Abdominal Pain During Pregnancy

By Samir Aziz, MD | August 17, 2011



Pain

Definition

It is a varying degree of unpleasant sensation,

It may be acute with rapid onset and ends in days

or chronic that recurs or persists for more than six months.

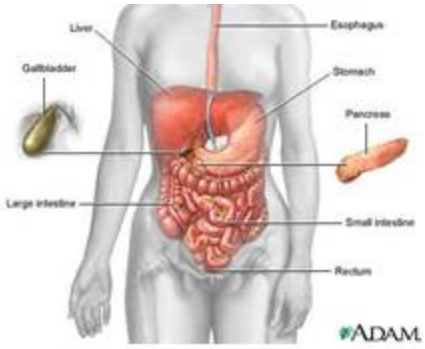
There are three basic types of pain – Visceral , Somatic and referred .

- Visceral pain comes from outer covering of abdominal viscera which are innervated by autonomic nervous fibres , pain is due to distension or muscular contraction of a viscera

  It is typically vague , dull and nauseating , percieved in areas corresponding to embryonic dermatome origin
- Somatic pain comes from parietal peritoneum which are innervated by somatic nervous fibres pain is due to irritation from inflammation ,infection , chemical

  It is typically sharp and well localised
- Referred pain is pain percived distant from its source and result from convergence of nerve fibres at spinal cord

Abdomen



- The abdomen is roofed by the diaphragm, which separates it from the thorax (chest).
- At the front and sides is the abdominal wall, of skin, fat and muscle,
- at the back, the spine (vertebral column) ;.
- It is completely filled with the abdominal organs:
- These are all covered by a thin membrane, continuous with that which also lines the inside of the abdominal wall (peritoneum).
- The abdominal cavity and its peritoneal lining are continuous below with those of the pelvis.

CAUSES OF ABDOMINAL PAIN DURING PREGNANCY

- **(A) Pregnancy Related Pain:**
- Early pregnancy
  - Abortion: Inevitable, incomplete or septic abortions
  - Vesicular mole: when expulsion starts.
  - Ectopic pregnancy: pain precedes bleeding.
- Later pregnancy
  - Braxton-Hicks Contraction
  - Round Ligament Pain
  - Pressure symptoms
  - Cholestasis of pregnancy
  - Placental abruption
  - Placenta percreta
  - Acute Fatty Liver
  - Pre-eclampsia , HELLP
  - Spontaneous rupture of the liver
  - Uterine rupture
  - Chorioamnionitis
  - Acute Polyhydramnios
  - Labor (Term , Preterm)

- **(B)Conditions associated with pregnancy**
- Rupture of rectus abdominus muscle
- Torsion of the pregnant uterus
- Acute urinary retention due to retroverted gravid uterus

MusculoSkeletal (Pubic Symphysis pain-sacroiliac – back pain)

Red degeneration of myoma

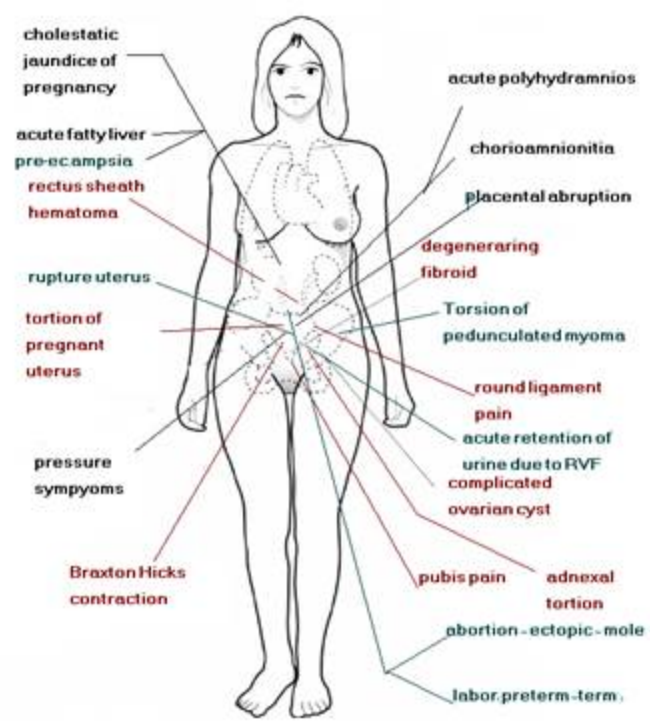
Torsion of pedunculated myoma

Ovarian cyst rupture

Adnexal torsion

- **© Non-Pregnancy Related Pain**
- GastroIntestinal
  - Acute appendicitis
  - Peptic ulcer
  - Gastroenteritis
  - Hepatitis
  - Inflammatory Bowel Complication (Crohn's & Ulcerative Colitis)
  - Bowel obstruction
  - Bowel perforation
  - Herniation
  - Meckel diverticulitis
  - Toxic megacolon
  - Pancreatic pseudocyst

  HepatoBiliary
  - Biliary Stones
  - Acute Hepatitis
  - Acute Cholecystitis
  - Acute pancreatitis
- Genitourinary
  - Ureteral calculus
  - Acute pyelonephritis
  - Acute cystitis
  - Rupture of renal pelvis
  - Ureteral obstruction
- Vascular
  - Superior mesenteric artery syndrome
  - Thrombosis/Infarction - Specifically mesenteric venous thrombosis
  - Ruptured visceral artery aneurysm
- Respiratory
  - Pneumonia
- Other
  - Intraperitoneal hemorrhage
  - Splenic rupture
  - Abdominal trauma
  - Acute Intermittent porphyria
  - Diabetic ketoacidosis
  - Sickle cell disease



Presentation of abdominal pain in pregnancy

- Often presents with localised discomfort and no sign of maternal or fetal distress.
- If there is any doubt then immediate referral is required.
- Even if immediate referral is clearly not required, ensure the mother understands that she should seek further help if there is any deterioration, change or persistence of symptoms, or if there is any indication of fetal distress (reduced fetal movements).

Physical examination

- physical examination, findings may be less prominent compared to those of nonpregnant patients with the same disorder
- Peritoneal signs are often absent in pregnancy because of the lifting and stretching of the anterior abdominal wall. The underlying inflammation has no direct contact with the parietal peritoneum, which precludes any muscular response or guarding that would otherwise be expected
- The uterus can also obstruct and inhibit the movement of the omentum to an area of inflammation, distorting the clinical picture.
- To help distinguish extrauterine tenderness from uterine tenderness, performing the examination with the patient in the right or left decubitus position, thus displacing the gravid uterus to one side, may prove helpful.
- When performing a physical examination of the gravid abdomen, it is essential to recall the changing positions of the intra-abdominal contents at different gestational ages. For example, the appendix is located at the McBurney point in patients in early pregnancy and in nonpregnant patients. After the first trimester, the appendix is progressively displaced upward and laterally, until it is closer to the gallbladder in late pregnancy
- Such alterations in physical assessment can delay diagnosis, and many authorities attribute the increased morbidity and mortality of acute abdomen in gravid patients to this delay.
- When evaluating the gravid patient, the clinician must evaluate 2 patients at the same time, the mother and the fetus.
- Before the gestational age at which independent viability (if delivery were to occur) is generally expected evaluation of the fetus can be limited to documentation of the presence or absence of fetal heart tones by Doppler or ultrasound. When the fetus is considered viable, a more thorough evaluation is required. The age of viability varies from institution to institution. Monitor the fetal heart rate and uterine tone continuously throughout the period of evaluation.
- A nonreassuring tracing or evidence of fetal distress may suggest an obstetric etiology for the acute abdomen (eg, placental abruption, uterine rupture). A reassuring tracing allows the evaluation to continue at an appropriate pace.
- Monitoring for uterine contractions throughout the evaluation period and even after definitive treatment is important. A strong correlation is observed between intra-abdominal infectious or inflammatory processes and preterm labor and delivery.

Investigations of abdominal pain in pregnancy

- When evaluating the gravid patient with acute abdominal pain, remember that some very commonly used laboratory tests have altered reference ranges in pregnancy. These changes can make the initial evaluation process somewhat more difficult.
- Fetal monitoring
- Urinanalysis, MSU: infection, proteinuria in pre-eclampsia
- Full blood count: raised white cell count suggestive of infection, although the white cell count is normally slighty raised in pregnancy
- Liver function tests
- Ultrasound: may demonstrate ectopic pregnancy, abruption, miscarriage
- Magnetic resonance imaging : The intrinsic safety of MRI and its ability to accurately show abdominal and pelvic disease in pregnant patients make it highly useful in the evaluation of these patients.
- Laparoscopy to confirm ectopic pregnancy - Laparoscopy has become increasingly popular in the treatment and evaluation of acute abdomen. In the past, pregnancy was considered a contraindication for laparoscopy , Care must be taken to minimize manipulation of the uterus. Adjust the location of trocar placement based on uterine size. Monitor fetal heart tones during the surgical procedure

Management of abdominal pain in pregnancy

- A thorough assessment of the wellbeing of the mother and fetus,
- as well as the possible underlying cause is required.
- Treatment of cause; urgent hospital referral if uncertain cause, and/or maternal or fetal distress.
- If surgery is required but is considered elective, waiting until after the pregnancy is completed is prudent.
- If surgery is deemed necessary during pregnancy, perform it in the second trimester if possible; the risk of preterm labor and delivery is lower in the second trimester compared to the third, and the risk of spontaneous loss and risks due to medications such as anesthetic agents are lower in the second trimester compared to the first.
- A pregnancy in a woman with an intra-abdominal inflammatory disease will not be harmed by proper surgical treatment. The fetus is more likely to be damaged if the proper operation is delayed.
- Laparotomy (or perhaps laparoscopy but not in late pregnancy) is indicated if the diagnosis is in doubt or if there is shock.

Delivery

- Base delivery decisions on obstetric indications
- The mode of delivery used should also be decided based on obstetric indications.
- If continuation of the pregnancy is expected to lead to maternal morbidity or mortality, delivery is indicated.
- If improvement of the maternal condition cannot be expected with delivery, treat the patient with the fetus in utero
- The prophylactic effect of tocolytics remains unproven in these patients. If used, tocolytics should be administered with care
- If preterm delivery is likely, glucocorticoids can be administered to the mother to decrease the risk of neonatal complications.
- Avoid glucocorticoids if the mother is at serious risk for significant infection

Braxton Hicks contractions

- **They** are sporadic uterine contractions that actually start at about 6 weeks, although women won't be able to feel them that early.
- they probably won't start to notice them until sometime after midpregnancy,
- if they notice them at all (some women don't). They get their name from John Braxton Hicks, an English doctor who first described them in 1872.

As pregnancy progresses, Braxton Hicks contractions tend to come somewhat more often, but they remain infrequent, irregular, and essentially painless. Sometimes, though, Braxton Hicks are hard to distinguish from early signs of **preterm labor**

By the time within weeks of labor, these contractions may get more intense and more frequent, and cause some discomfort.

- Unlike the earlier painless and sporadic Braxton Hicks contractions that caused no obvious cervical change, these may help cervix "ripen": gradually soften and efface, and maybe even begin to dilate
- This period is sometimes referred to as "pre-**labor**."

False labour pain

(Late Braxton Hicks contractions)

- Irregular,
- Not progressively increasing
- Not associated with bulging of forebag of water or dilatation of the cervix.
- Respond to anlgesics
- Cause women confusion as to whether or not they were going into actual labor.
- They are thought to be part of the process of effacement, the thinning and dilation of the cervix

Labour (term or preterm)

- The evaluation of all pregnant women with abdominal discomfort must always include uterine contractions as an etiology.
- Pain from labor is generally intermittent, occurring at decreasing intervals. However, tetanic uterine contractions, often evidence of uterine irritability, may produce sustained pain.
- An accurate estimation of gestational age is crucial to distinguish the normal labor anticipated in a term pregnancy from preterm labor.
- Preterm contractions are contractions that are painful and occur by definition before 37 weeks of gestational age; preterm labor is defined as preterm contractions with associated cervical change.
- When contractions are suspected as a cause of abdominal pain, a cervical examination should be performed to evaluate the cervix for dilation, effacement, and if possible the station of the presenting part.
- A digital cervical examination should not be performed in the face of vaginal bleeding if placenta previa has not been ruled out
- Patients who are at less than 37 weeks' gestation with suspected preterm rupture of membranes should have a sterile speculum examination performed to confirm membrane rupture and to visually assess cervical dilation, because digital examinations may increase the risk of ascending infection.
- While the majority of preterm labor is idiopathic, the clinician should remember that there are many conditions that may cause preterm uterine contractions and preterm labor, including placental abruption, chorioamnionitis, trauma, appendicitis, and pyelonephritis or other infection. Rapid evaluation is essential as tocolysis or other obstetric interventions may be indicated depending on gestational age

Round Ligament Pain

with advancing gestational age as the uterine size increases.

The round ligaments, found on the right and left sides of the uterus, attach to the pubic bone and help support the placement of the uterus in the abdominal cavity.

these ligaments endure continual stretching and are a common source of pain in the latter part of pregnancy.

Pain, either a sharp spasm or dull ache continuous, and may be described as a stretching or pulling sensation, is felt on one, or sometimes both, sides of the lower abdomen , often described as "round ligament pain"; however the exact origin of this pain many vary from patient to patient.

This pain may be relieved by heat or acetaminophen,

It is a benign and usually self-limiting occurrence that commonly causes discomfort in the second trimester

Red Degeneration Of A Uterine Myoma (syndrome of painful myoma)

- The most common complication is the syndrome of 'painful myoma'; this is due to red or carneous degeneration and occurs in 5–8% of myomas during pregnancy
- This complication is associated with localized pain of rapid onset, nausea, vomiting and fever, tenderness, and an elevated white blood cell count
- It usually occurs during the second trimester of pregnancy
- ultrasound findings reveal cystic spaces in the myomas
- The management of leiomyoma during pregnancy is medical, (symptomatic control of pain with acetaminophen and narcotics if required)
- in rare circumstances when medical ttt faied , surgical intervention and myomectomy may be performed successfully in carefully selected patients, and this seems to lead to an improvement in pregnancy outcome.

Uterine Tortion

- The uterus rotates axially 30 °- 40 °to the right in 80% of normal pregnancies.
- Rarely, it rotates > 90 °causing acute uterine torsion in mid or late pregnancy with abdominal pain, shock, a tense uterus, and urinary retention (catheterization may reveal a displaced urethra in twisted vagina).
- Fibroids, adnexal masses, or congenital asymmetrical uterine anomalies are present in 90%.
- Diagnosis is usually at laparotomy.
- Delivery is by caesarean section

Pressure symptoms

- Upper abdominal pressure --- pain due to flaring of the ribs particularly in breech presentation - The ribcage expands enormously during pregnancy to help make room for the expanding uterus and to maintain adequate lung capacity. Many pregnant women experience rib discomfort from this expansion, as well as the occasional little foot or knee of fetus that might habitually press against the ribs.
- Mid abdominal pressure --- distension of the abdominal wall (Twins , polyhydramnios)
- Lower abdominal pressure --engagement of the head

Liver congestion

- e.g.
  - pre-eclampsia;
  - acute fatty liver of pregnancy;
  - HELLP syndrome

Hepatic rupture

- Hepatic rupture is a rare but catastrophic occurrence in pregnancy it may be spontaneous but most are associated with preeclampsia and eclampsia associated disseminated intravascular coagulation.
- Rupture usually occurs close to term or immediately postpartum.
- Right upper quadrant pain and tendernes, hemorrhagic shock ,distended abdomen
- Rupture of the liver capsule is thought to result from subcapsular bleeding and can be confirmed by sonography
- Correct any associated coagulopathy with recombinant factor VIIa.
- Most patients have been treated operatively with the current principles of liver trauma management in the nonpregnant patient
- Maternal mortality rates range from 20-75%

PROM/Chorioamnionitis

- Choioamniotitis usually precipitated by pre-term premature rupture of membranes

Uterine Injury

- Medical terminology used to describe uterine injury during delivery is imprecise, with the overlapping terms "window," "dehiscence," and "rupture" often used to describe various clinical manifestations
- Uterine windows believed to arise from lack of complete healing of the original scar, a partial rather than a complete separation of uterine wall layers. Operative reports often describe windows as membranes so thin they can be seen through.
- uterine scar dehiscence constitutes separation of a preexisting scar that does not disrupt the overlying visceral peritoneum (uterine serosa) and that does not significantly bleed from its edges. In addition, the fetus, placenta, and umbilical cord must be contained within the uterine cavity.
- uterine rupture is defined as a full-thickness separation of the uterine wall and the overlying serosa) Rupture is often traumatic and may occur in an intact uterus or involve the majority of a uterine scar from previous cesarean delivery .
- Uterine rupture is associated with clinically significant uterine bleeding; fetal distress; expulsion or protrusion of the fetus, placenta, or both into the abdominal cavity; and the need for prompt cesarean delivery, uterine repair, or hysterectomy.

Ectopic Pregnancy

- The most common obstetric cause of an acute abdomen in the first trimester is ectopic pregnancy.
- History, pelivc examination, serum ß-hCG, culdocentesis, vaginal sonography, and laparoscopy can all be valuable in establishing the diagnosis.
- Treatment is surgical, with laparoscopy or laparotomy. Linear salpingotomy, linear salpingostomy, or salpingectomy can be performed

A ruptured corpus luteum In pregnancy

- A ruptured corpus luteum in pregnancy may produce intraabdominal bleeding and even an acute abdomen.
- In early pregnancy before an intrauterine pregnancy can be confirmed by US, a corpus luteum may be very difficult to distinguish from an ectopic pregnancy or adnexal torsion, and frequently patients in the first trimester with pain and an adnexal mass on ultrasonography require a laparoscopy for definitive diagnosis

Placental Abruption

- Placental abruption is premature separation of the placenta from the uterus, resulting in bleeding from the site of placental attachment (concealed , revealed . Combined)
- Abruption The triad of abdominal pain, uterine rigidity, and vaginal bleeding suggests this.
- It occurs in between 1 in 80 and 1 in 200 pregnancies.
- fetal monitoring may indicate fetal tachycardia and Fetal loss is high (up to 60%).
- A tender uterus is highly suggestive and may be identified on tocography
- Ultrasound may be diagnostic (but not necessarily so).
- Minor abruptions with no maternal or fetal compromise may be managed conservatively, while others are true obstetric emergencies
- A live viable fetus merits rapid delivery as demise can be sudden.
- Prepare for DIC, which complicates 33% -50% of severe cases,
- beware PPH, which is also common

Severe Preeclampsia

- Right upper quadrant pain may be a manifestation of severe pregnancy-induced hypertension or preeclampsia, and is related to a combination of hepatic edema and ischemia -- subcapsular hepatic hematoma even hepatic rupture
- Women with severe pre-eclampsia must be delivered rapidly

Acute polyhydramnios

- Polyhydramnios is generally due to maternal diabetes (around 20% of cases) and results from hyperglycemia of the fetus which results in fetal polyuria (fetal urine is a major source of amniotic fluid).
- About 20% of the cases of polyhydramnios are associated with fetal anomalies that impairs the ability of the fetus to swallow (because the fetus normally swallows amniotic fluid and absorbs it through its intestinal villi). This includes: gastrointestinal abnormalities such as esophageal atresia and duodenal atresia , chromosomal abnormalities such as Down's syndrome (which is itself often associated with GI abnormalities) , neurological abnormalities such as anencephaly, which impair the swallowing reflex
- In a multiple gestation pregnancy, twin-twin transfusion syndrome is usually the cause.
- Fetuses with polyhydramnios are at risk for a number of other problems including cord prolapse, placental abruption and perinatal death.
- At delivery the baby should be checked for congenital abnormalities.
- Treatment -- amnioreduction has been used in response to polyhydramnios by frequent transabdominal removal of relatively small amniotic fluid volumes was associated with prolongation of pregnancy

Acute urinary retention secondary to a retroverted gravid uterus

- due to elongation and compression of the urethra.
- Incarceration: occurs usually around 14-16 weeks where the uterus continue to grow posteriorly in the pelvis and its fundus is below the promontory of the sacrum. This may be due to: jutting promontory, pelvic adhesions, posterior wall fibroid
- Pain: may be due to: bladder distension, pressure on pelvic organs, or abortion.
- Slow evacuation of the bladder and leave Foley's catheter to keep it empty. Place the patient in prone or Sims' position.
- These usually succeed to correct the retroversion, if fail do:
- Manual correction with or without anaesthesia. In extremely rare cases, laparotomy may be needed to free the adhesions.
- Management of anterior sacculations: In late pregnancy: deliver the foetus by caesarean section.

Acute Fatty Liver (Hepatic Lipidosis Of Pregnancy}

- When confronted with non-specific including nausea, vomiting, anorexia and abdominal pain, fev symptoms and signs of impending liver failure during the third trimester of pregnancy. jaundice, lesser elevation of aminotransferases, leukocytosis, hepatic encephalopathy, and disseminated intravascular coagulation -- one should consider acute fatty liver of pregnancy.
- The differential diagnosis with (pre-)eclampsia and HELLP syndrome is sometimes difficult.
- In these cases a liver biopsy is helpful though rarely performed during pregnancy.
- After delivery of the child the liver test abnormalities will ultimately disappear. Recent publications reveal that a dysfunction in the oxidation of mitochondrial fatty acids may contribute to the aetiology of this rare disorder.
- This rare disorder has a benign course when early recognition and prompt delivery once the diagnosis was considered to reduce maternal mortality and morbidity, even if this means sacrificing the foetus .
- Correction of coagulation and electrolyte disorders and treating reflux oesophagitis (due to the intense vomiting) with proton pump inhibitors.Blood sugar levels need to be monitored and corrected.Encephalopathy and seizures should be treated appropriately (lactulose and antibiotics, magnesium or benzodiazepinesand phenytoin).
- Mortality rates of up to 85% with this condition because it can deteriorate suddenly and progress rapidly to fulminant hepatic failure requiring admission to an intensive care unit.
- Rare cases have been reported of patients whose condition did not improve after delivery and liver transplantation was necessary
- Acute fatty liver of pregnancy is best treated in a centre with expertise in hepatology, high-risk obstetrics, maternal-fetal medicine and neonatology. The physicians who treat this condition will often consult with experts in liver transplantation in severe cases. Admission to the intensive care unit is recommended

Intrahepatic cholestasis of pregnancy

- It occurs in one percent of pregnancies, causing intense skin itching and elevated levels of liver enzymes and bile acids.
- It resolves spontaneously after delivery, but can recur in later pregnancies.
- The cause of intrahepatic cholestasis of pregnancy is unknown, though it often runs in families.
- One theory holds that intrahepatic cholestasis of pregnancy is caused by the liver's insufficient capacity to metabolize the high amounts of placenta-derived sex steroids during pregnancy.
- Ursodiol (ursodeoxycholic acid) is a naturally occurring bile acid used orally to dissolve gallstones. The drug has also been used for the treatment of intrahepatic cholestasis of pregnancy

Hiatus Hernia

- A hiatal (pronounced hi-ATE-ul) hernia is different from other abdominal hernias. It cannot be seen from outside the body. In a hiatal hernia, the stomach bulges upward into the diaphragm.
- There are two main types of hiatal hernias: sliding and paraesophageal (next to the esophagus).
- In a sliding hiatal hernia, the stomach and the esophagus slide up into the chest through the hiatus. This is the more common type of hernia.
- The paraesophageal hernia is less common, but is a greater cause for concern. The esophagus and stomach stay in their normal locations, but part of the stomach squeezes through the hiatus, landing it next to the esophagus.
- A hiatal hernia is treated differently. Surgery is recommended only as a last resort. Instead, changes in the patient's lifestyle are recommended.
- Some of these changes are:Avoiding lying down after meals ,Avoiding spicy or acidic foods, alcohol, and tobacco ,Eating small, frequent, bland meals , Eating a high-fiber diet
- Antacids are used to neutralize stomach acid and decrease heartburn.
- Drugs are also available to reduce the amount of stomach acid produced.
- Drugs that makes the muscles around the esophagus work more

Peptic ulcer disease

- Complications of peptic ulcer disease such as perforation, hemorrhage, and obstruction are extremely rare during pregnancy
- however, when they occur, they do so late either in the third trimester during pregnancy or early in the postpartum period

Bowel Obstruction e.g. adhesions, volvulus

- Intestinal obstruction in the pregnant patients occurs in 1 out of 2500 to 3000 pregnancies.
- Most cases occur in patients who have had a prior operative procedure, most commonly appendectomy or gynecologic surgery, and presumably result from pressure on preexisting adhesions by the enlarging uterus.
- Obstruction is most common in the third trimester and least common in the first.
- Symptoms of obstruction are similar to those of the nonpregnant patient.

Irritable bowel syndrome (IBS) (Spastic colon)

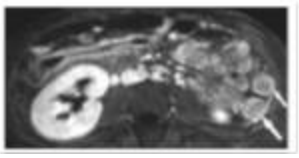
The Rome II criteria for defining IBS include abdominal pain or discomfort for 12 weeks or longer, which need not be continuous, over the past 12 months plus two of the following: (1) relief of discomfort with defecation; (2) association of discomfort with altered stool frequency; and (3) association of discomfort with altered stool form.

CONSTIPATION

- constipation in pregnancy is 11-38%.
- it is multifactorial. Decreased small bowel motility - Decreased motilin level - Decreased colonic motility - Increased absorption of water - Iron supplementation
- Evaluation should include a careful history, presence of preexisting constipation, dietary habits, current medications, and use of laxatives. Perform a digital rectal examination to exclude fecal impaction. The results of blood studies can be useful to exclude hypothyroidism, diabetes mellitus, hypercalcemia, and hypokalemia as possible causes. If rectal bleeding is present, anoscopy or flexible sigmoidoscopy can be performed to exclude anorectal lesions.
- -Conservative treatment is the mainstay of therapy. - Dietary changes
  - Increased physical activity - Kegel exercises (may be useful)
  - Bulking agents, eg, psyllium (safe in pregnancy)
  - Stool softeners such as sodium docusate are probably safe.- Stimulant laxatives are probably safe for intermittent use but should not be used regularly - Castor oil and mineral oil should not used in pregnancy.

Inflammatory Bowel Disease (IBD)

- It is inflammation of the digestive tract, including
- - Crohn's disease (Granulomatous)
- - Ulcerative colitis (Non-granulomatous)
- Men and women with IBD have a risk of passing their disease to their baby through their genes. First-degree relatives (children, siblings) of people with IBD are between 3 and 20 times more likely to develop the disease compared to relatives of people with no history of IBD.
- About two-thirds of women in remission will stay in remission, and women with active disease are likely to have continued active disease during pregnancy. Thus, doctors usually recommend that women try to conceive while their disease is in remission
- Flexible sigmoidoscopy appears to be safe during pregnancy, although colonoscopy and x-rays should be avoided, if possible.
- If Crohn's disease affects the areas around the vagina, a Cesarean delivery may be preferred to reduce the risk of developing fistulas.



Acute Appendicitis

- It affects 1 in 1500 pregnancies, less common than in non-pregnant women , mortality is higher (esp. from 20 weeks), Perforation is commoner (15â-20%), Fetal mortality is ~1.5% for simple appendicitis , ~30% if perforation.
- Diagnosis is complicated by change in position of appendix as it migrates upwards, outwards and posteriorly as pregnancy progresses, so pain is less well localized (often paraumbilical or subcostal but right lower quadrant still commonest) and tenderness, rebound, and guarding less obvious. Peritonitis can make the uterus tense and woody-hard.
- Leucocytosis is suggestive.
- Operative delay is dangerous.
- Laparotomy over site of maximal tenderness with patient tilted 30° to the left should be performed by an experienced obstetric surgeon (or by laparoscopy).
- Appendicitis is not diagnosed in 1 in 5 cases in pregnant women until the appendix has ruptured causing peritonitis, which can cause premature labour or abortion.

Biliary Stones

Physiologic changes in gallbladder function and bile composition during pregnancy favor gallstone formation.

Gallbladder size increases during pregnancy, with no change in common bile duct diameter.

It is unknown whether the frequency of complications of cholelithiasis is increased in pregnant compared to nonpregnant women.

However, because cholelithiasis is common in young, healthy women, it is not surprising that complications of cholelithiasis are among the most common nonobstetric gastrointestinal problems seen during pregnancy

Acute Cholecystitis

- Cholecystitis is second only to appendicitis as an indication for surgery in pregnant women. Incidence 1-6 per 10,000 pregnancies
- Spontaneous perforation of the gall bladder associated with cholecystitis has been reported.
- The signs and symptoms of acute cholecystitis are similar to those in nonpregnant patients.
- As in nonpregnant patients, the diagnosis is based on typical symptoms, laboratory findings, and the presence of gallstones.
- Acalculous cholecystitis may occur but usually presented with localized pain in right upper quadrant
- Ultrasound confirms the presence of stones.
- The main differential diagnosis is appendicitis, and laparotomy or laparoscopy is mandatory if this cannot be excluded.
- Most patients only require symptomatic relief -- 90% the acute process resolves with conservative management. .
- cholecystectomy is only necessary in complicated cases such as obstruction, as can cause 15% perinatal mortality.
- In advanced pregnancy, cholecystostomy and lithotomy may be all that is possible.
- ERCP and endoscopic retrograde sphincterotomy are possible if exposure to radiation is minimised.
- In early to middle of second trimester, laparoscopic cholecystostomy can be a safe and effective method of treatment but carries few problems as uterine perforation or injury

Acute Pancearititis

- The most common cause of acute pancreatitis during pregnancy is gallstones; however, other causes such as alcoholism and drug reactions should always be included in the differential diagnosis.
- The incidence approximately 1 in 3333 pregnancies and is more commonly diagnosed with advancing gestational age.
- Presenting complaints include nausea, vomiting, and epigastric abdominal pain often radiating to the back.
- The cornerstone of diagnosis remains a serum amylase and lipase.
- Imaging the biliary tree may be helpful in identifying the etiology of acute pancreatitis as approximately two-thirds of cases in pregnancy are due to gallstones.
- Initial management of acute pancreatitis involves conservative therapy with nothing by mouth and intravenous hydration; some patients may require nasogastric suction for complete bowel rest.
- The majority of pregnant patients will respond to these initial conservative measures;
- however, an ERCP or surgical intervention may be required with gallstone pancreatitis or pseudocyst formation

Symptomatic Physiologic Hydronephrosis in Pregnancy

- Gestational upper urinary tract dilatation results from evolution of a physiologic process, namely, ureteral compression by the expanding uterus
- Because hydroureteronephrosis of pregnancy occurs as an outcome of dextrorotation of the uterus at mid-term, it usually happens on the right
- Ureterectasis is also thought to have a non-obstructive component, related to hormonal changes induced by a functioning placenta.
- Painful hydronephrosis of pregnancy is conventionally treated by having the patient remain situated to the left in order to relieve ureteral pressure induced by the dextrorotated uterus
- When this measure fails, ureteral stenting or establishment of percutaneous drainage are effective in pain relief and preventing evolution of hydronephrosis to spontaneous renal rupture
- Alternative resolutions to the problem of symptomatic gestational hydronephrosis include induction of labor and delivery and epidural block.

Spontaneous Rupture of a Hydronephrotic Kidney

- Hydronephrosis during pregnancy is common but rarely results in renal rupture.
- sudden severe flank colicky pain radiating to the right lower abdomen with percussion tenderness at the right costovertebral angle
- suspected to have renal/ureteral calculi.
- Ultrasonography and intravenous pyelography showed urine extravasating from the renal pelvis, indicating rupture of the right renal pelvis
- serial sonography was useful in the early detection and management of the rupture.
- Immediately following the insertion of a double-J indwelling catheter,
- symptoms and perirenal extravasation ceased

Urinary Stones

approximately 1 in 1500 pregnancies

The classic presentation is flank pain, but patients may also present with nonspecific abdominal pain

. Uterine contractions may also be present, further complicating the diagnosis, as the onset of preterm labor in patients with urinary calculi has been described.

Fever may also be present and should raise the index of suspicion for a coexisting urinary tact infection.

Urolithiasis should also be suspected in a patient with suspected pyelonephritis who fails to respond to antibiotic management.

Every pregnant patient with flank or abdominal pain should have urine microscopic analysis performed.

The presence of blood in the absence of recent urinary tract instrumentation raises the possibility of urinary calculi and appropriate imaging studies should be used to aid in the diagnosis.

Other indications for imaging the renal system include a negative urine culture with the clinical diagnosis of pyelonephritis, suspected pyelonephritis with persistent fever after 48 hours of appropriate antibiotics, increasing blood urea nitrogen (BUN) and creatinine levels, and protracted pain.

Initial imaging may include a renal ultrasound. However, the finding of hydroureteronephrosis in pregnancy is often a nonspecific physiologic finding related to bolus fluid administration, mechanical obstruction from the uterus, or the smooth muscle relaxing effect of progesterone.

Identification of ureteral jets with Doppler sonography may help in excluding ureteral obstruction.

If the diagnosis is still uncertain after sonographic evaluation, a noncontrast abdominal (renal protocol) CT or intravenous pyelogram (IVP) should be done. A limited IVP, a scout film and an image at 20 minutes, will result in a dose of less than 200 mrad, significantly less than the teratogenic level

Patients with urolithiasis should be hydrated and be given appropriate pain control. Antibiotics are indicated for a concomitant upper or lower urinary tract infection.

The urine may also be strained to identify when the stone has passed.

This conservative approach will be successful in the majority of patients

Surgical intervention may be required when conservative management fails or complications of ureteral obstruction develop such as worsening renal function or a persistent infection proximal to the stone.

Interstitial cystitis

- Interstitial cystitis is another painful condition of the bladder, which causes a burning pain over the bladder area.
- Urine analysis may reveal mast cells in this condition but their significance is debated.
- Some studies have reported greater numbers of these cells in the detrusor muscle of patients with interstitial cystitis than in normal detrusor muscle

Acute Pyelonephritis

- Acute pyelonephritis must always be considered in the differential diagnosis of abdominal or flank pain in pregnancy, and must also be considered in any patient with obstructive urinary calculi.
- Classic symptoms include back or flank pain in association with fever, chills, nausea, vomiting, and malaise. Patients may also complain of uterine contractions. On examination the patient is often febrile, looks ill, and will have costovertebral angle tenderness on the affected side. Clinical presentation may range from mild, nonspecific discomfort to urosepsis.
- Initial evaluation of the patient with suspected acute pyelonephritis should include a microscopic analysis of the unspun urine. Pyuria is almost always present and a Gram stain will often reveal bacteria, indicating >105 colony forming units per milliliter.
- Early identification of either gram-negative or gram-positive bacteria in this manner can also help guide initial antibiotic selection.79,80 Leukocytosis will generally be present, often with an increase in immature forms, or bands, and urine and blood cultures should also be obtained prior to initiation of antibiotics. A serum BUN and creatinine should also be obtained for assessment of baseline renal function in any patient with suspected pyelonephritis. While urine cultures of >105 colony forming units per milliliter are generally seen with pyelonephritis, 20 percent of patients will have urine cultures with lower colony counts.79,80
- Pregnant women with pyelonephritis generally warrant inpatient therapy. Many will require intravenous hydration, and may be too ill to tolerate oral antibiotics, and those who have reached the stage of fetal viability will require close observation for the first 24 to 48 hours for preterm labor.
- Initial antibiotic therapy may be guided by the Gram stain before the urine culture results are available. Second- or third-generation cephalosporins are generally effective against gram-negative bacteria,
- although local resistance patterns should always be considered. Demonstration of gram-positive bacteria on Gram stain is concerning for enterococci and so empiric therapy with ampicillin and gentamicin should be instituted.

Adnexal And Ovarian complications

- Adnexal disorders requiring surgical intervention occur in approximately one in 1000 pregnancies.
- Ovarian masses may be problematic during pregnancy because of their risk for torsion, rupture, or hemorrhage.
- The size of the mass is an important consideration as complications increase with increasing size;
- large ovarian lesions may also become impacted in the pelvis and even obstruct labor. While most adnexal masses in pregnancy are functional cysts that resolve by 18 weeks' gestation,
- The most common diagnosis in an ovarian mass large enough to warrant surgical intervention after 18 weeks' gestation is a benign cystic teratoma
- As most ovarian masses in pregnancy are smaller, functional cysts that are asymptomatic, they are usually identified as incidental findings on pelvic examinations in early pregnancy or on obstetric or pelvic ultrasounds ordered for other reasons. As the uterus enlarges, identification of adnexal pathology on bimanual examination becomes increasingly more difficult.
- Complications of adnexal lesions, such as adnexal torsion, rupture, or hemorrhage may present with pain and also with signs of peritoneal irritation such as nausea and vomiting.
- The best method for evaluating the adnexa in pregnancy is ultrasound. Simple cysts smaller than 6 cm are more likely to be functional, but extremely large functional cysts may sometimes be seen., also be used when adnexal torsion is suspected. Adnexal torsion is more likely in the
- Masses greater than 6 cm that persist should generally be removed in the early second trimester to reduce the risk of complications such as rupture, torsion, or hemorrhage.
- Large masses that are symptomatic may sometimes require earlier intervention

Pubic symphysis pain

- Pubic symphysis separation is a recognized complication of pregnancy with incidence estimates ranging from one in 300 to one in 30,000.
- Characteristic symptoms of symphyseal separation include suprapubic pain and tenderness with radiation to the back of legs, difficulty ambulating and, occasionally, bladder dysfunction.
- There is a minor pregnancy-induced physiological increase in laxity of the symphyseal soft tissue. There is no evidence that the degree of symphyseal distention determines the severity of pelvic pain in pregnancy or after childbirth
- A diagnosis can often be made on the basis of clinical history, presenting symptoms but sometimes ultrasound documentation of symphyseal separation are frequently used to confirm the diagnosis.
- Ultrasound measurement of the symphyseal width shows around 4 mm in non-pregnant women. Asymptomatic pregnant women have an average width of 6.3 mm. The majority of pregnant women with 9.5 mm or more have symphyseal pain
- it is associated with two or more children, large babies and an abnormal loosening of the joints typical of pregnancy.
- treatment of this condition conservatively with bedrest, pelvic binders, ambulation devices and mild analgesics.

Sacroiliac strain of pregnancy

- The **sacroiliac joint** is where the back of the pelvis connects with the sacral vertebrae of the lower spine.
- Most body types display a small dimple on each side of the low back at the sacroiliac joint. Generally, this joint moves very little, however; instability from increased ligament laxity at this joint can occur during the last half of pregnancy and, more commonly, the postpartum period.
- Sacroiliac instability is painful and may cause functional weakness in one or both legs, and low back muscle spasms. Bending, lifting and carrying, sitting with the legs crossed or to one side, prolonged standing/slouching, or walking up a steep hill may aggravate the condition.

Back Pain

- **Factors that influence back pain during pregnancy**
- The spine is vulnerable due to the following factors during pregnancy:

-Hormone production during pregnancy makes joints less stable (to allow the pelvis to spread as the baby grows)

-Typical weight gain of 25-35 pounds during pregnancy, with the majority or extra weight distributed around the abdomen

-Increase in postural strain as the body compensates for changes in the pregnant woman's center of gravity

Lumbar Disc Herniation

- The prevalence of symptomatic lumbar disc herniation during pregnancy may be on the increase because of the increasing age of patients who are becoming pregnant.
- pregnancy at any stage is no contraindication to magnetic resonance imaging scan, epidural and/or general anesthesia,
- surgical disc excision as disc surgery during gestation is a safe method of management in severe neurologic deficits

To help prevent or ease back pain

- Try to be aware of how she stands, sits, and moves.
- Wear low-heeled (but not flat) shoes with good arch support.
- Ask for help when lifting heavy objects.
- When standing for long periods, place one foot on a stool or box.
- If her bed is too soft, have someone help her place a board between the mattress and box spring.
- Don't bend over from the waist to pick things up—squat down, bend your knees, and keep herr back straight.
- Sit in chairs with good back support, or use a small pillow behind the low part of her back.
- Try to sleep on her side with one or two pillows between her legs for support.
- Try to wear Maternity Belt comfortably supports the lumbar and abdominal regions
- Apply heat or cold to the painful area or massage it.

Rectus sheath haematoma

- Very rarely, bleeding within the rectus sheath and haematoma formation can occur
- with coughing (or spontaneously) in late pregnancy causing produces a painful, tender swelling that can mimic an intraperitoneal mass with features of an acute abdomen .
- Ultrasound is helpful.
- Conservative treatment

Mesetric Vein Thrombosis

- Pregnancy is a hypercoagulability state and is a risk factor for development of mesentric vein thrombosis
  - This is an extremely rare but potentially lethal event. The exact incidence is not known.
  - Most reported cases have occurred in settings where dehydration (eg, from hyperemesis gravidarum) complicated an underlying hypercoagulable state (eg, factor V Leiden)
  - The treatment is resection of the involved segment with institution of chronic anticoagulation.
  - The surgeon needs to have a low threshold for reoperation, as extension of the process to adjacent areas of the bowel is common .

Rupture of visceral artery aneurysm

- Any of the visceral vessels may become aneurysmal, but splenic artery aneurysms are probably the most common and the most apt to rupture during the puerperium.
- Splenic artery aneurysms (SAAs) constitute approximately 60% of all visceral arterial aneurysms
- leading to a sudden onset of severe pain in the left hypochondrium Prior to the massive intraperitoneal hemorrhage (shock, dyspnea and hypotensive)
- ultrasound revealed free fluid in the abdomen
- The treatment is emergency removal of aneurysm of splenic artery with spleenectomy .
- Because of the lethality of this complication, elective aneurysm resection or angiographic coiling is recommended when these lesions are noted in women of child-bearing age.

Splenic rupture

- It can occur rarely during the third trimester of pregnancy; in the absence of trauma, systemic disease, or scarring of the splenic parenchyma, it has been defined as **spontaneous,** meaning that the rupture happens in an apparently normal spleen.
- Congenital malpositioning, a short splenic pedicle, or a deeply located spleen have all been proposed as possible predisposing or contributing factors but have never been demonstrated
- hemorrhagic shock, abdominal pain, and distention, are usually clinically obvious. However, splenic trauma can also produce a subcapsular hematoma, which may not rupture until hours or even months after the injury.
- Rupture is generally preceded by left upper quadrant abdominal pain. Splenic rupture should be suspected in patients with blunt abdominal trauma and hemorrhagic shock or left upper quadrant pain (which sometimes radiates to the shoulder); patients with unexplained left upper quadrant pain, particularly if there is evidence of hypovolemia or shock, should be asked about recent trauma.
- The diagnosis is confirmed by CT scan (in the stable patient), ultrasound, or peritoneal lavage (in the unstable patient).
- Treatment has traditionally been splenectomy. However, splenectomy should be avoided if possible, particularly in children, to avoid the resulting permanent susceptibility to bacterial infections. In this case, treatment is transfusion as needed.

Mesenteric Lymphadenitis

- It is inflammation of the mesenteric lymph nodes.
- It causes a clinical presentation that is often difficult to differentiate from acute appendicitis.
- Up to 20% of patients undergoing appendectomy have been found to have nonspecific mesenteric adenitis
- Clinical presentations include the following: Abdominal pain - Often right lower quadrant (RLQ) but may be more diffuse , Fever ,Diarrhea ,Malaise , Anorexia , Concomitant or antecedent upper respiratory tract infection , Nausea and vomiting (which generally precedes abdominal pain, as compared to the sequence in appendicitis) ,History of ingestion of raw pork may be obtained in areas with endemic *Yersinia* (eg, Belgium).
- **Physical:** No set of physical findings is pathognomonic of mesenteric lymphadenitis , Fever (38-38.5° C) ,Flushed appearance , RLQ tenderness - Mild, with or without rebound tenderness , Voluntary guarding rather than abdominal rigidity , Rectal tenderness , Rhinorrhea , Hyperemic pharynx ,Toxic appearance , Associated peripheral lymphadenopathy (usually cervical) in 20% of cases
- CBC count: Leucocytosis with WBCs exceeding 10,000/mL occurs in at least 50% of cases.
- Abdominal ultrasound scanning with Doppler scanning is a useful adjunct for excluding other differential diagnoses. For instance, ultrasonic demonstration of mural thickening of the terminal ileum plus mesenteric thickening is indicative of regional enteritis. Focal abdominal tenderness in response to transducer pressure is common. empiric antimicrobial therapy must be comprehensive and should cover the likely pathogens in the context of the clinical setting.

Meckel diverticulitis

- Meckel diverticulum is the most common form of congenital abnormality of the small intestine, resulting from an incomplete obliteration of the vitelline duct
- it is named after Johann Friedrich Meckel, who established its embryonic origin between 1808 and 1820
- Meckel's diverticulum has been known to occur in 2% of the general population and is usually asymptomatic; it causes complications in 4% of cases.
- Intussusception is another serious and common complication of the Meckel diverticulum.
- Like other diverticula in the body, the Meckel diverticulum can become inflamed. Diverticulitis is seen usually in older patients. Meckel diverticulum is less prone to inflammation than the appendix because most diverticula have a wide mouth, have very little lymphoid tissue, and are self-emptying.
- The clinical presentation includes abdominal pain in the periumbilical area that radiates to the right lower quadrant..
- Meckel diverticulitis may be disguised as appendicitis; the correct diagnosis is usually established at the laparotomy. History of bleeding per rectum may be helpful in distinguishing this entity from appendicitis.

Myocardial Infarction

- Incidence of 1 in 10 000. in pregnancy
- The highest incidence occurs in the third trimester and in multigravidas older than 33 years of age.
- Pregnancy imposes increasing stress upon the cardiovascular system throughout normal pregnancy and particularly during delivery.
- Both the blood vo-lume and the basal cardiac output increase by 40-50%.
- These changes of pregnancy may cause worsening of ichemia.
- It is most commonly located in the anterior wall.
- It is accompanied by significant maternal and fetal mortality ranging from 25-48%.
- Mortality is increased if the infarct occurs in the third trimester, if the patient is under age 35year, if she delivers within 2 weeks of her infarct, and if she has cesarean section.

Lower Lobar Pneumonia

- The incidence of pneumonia in pregnancy is not different from that in non-pregnant adults 20 to 40 year-old
- It has been reported in 1.1 to 2.7 per 1,000 deliveries
- the incidence of pneumonia increases with gestational age. Fifty percent to 80% of pneumonias are reported in third trimester
- The enlarging uterus causes anatomical changes (elevation of the diaphragm, increase in the transverse diameter of the chest) that decrease the mother's ability to clear respiratory secretions. Relaxation of the gastro-esophageal sphincter, delayed gastric emptying, and raised intragastric pressure due to abdominal compression by the uterus increase mother's risk of aspiration.
- Risk factors for maternal pneumonia are human immunodeficiency virus infection, sickle cell disease, cystic fibrosis, antepartum systemic corticosteroid therapy, asthma, and anemia
- Macrolides and beta-lactam antibiotics have a favorable safety profile in pregnancy and provide adequate coverage for the most common organisms

Sickle Cell Anemia crisis

- Patients with sickle cell anemia may present with severe abdominal pain during pregnancy

Acute intermittent porphyria (AIP)

- It is a rare metabolic disorder in the production of heme, the oxygen-binding prosthetic group of hemoglobin. Specifically, it is characterized by a deficiency of the enzyme porphobilinogen deaminase
- Additional factors must also be present such as hormones, drugs and dietary changes that trigger the appearance of symptoms. Symptoms of AIP may include abdominal pain, constipation, and muscle weakness.
- A high-carbohydrate diet is typically recommended; in severe attacks, a glucose 10% infusion is recommended, which may aid in recovery. If drugs have caused the attack, discontinuing the offending substances is essential. Infection is one of the top causes of attacks and requires vigorous treatment. Pain is extremely severe and almost always requires the use of opiates to reduce it to tolerable levels. Pain should be treated early as medically possible due to its severity. Nausea can be severe; it may respond to phenothiazine drugs but is sometimes intractable. Hot water baths/showers may lessen nausea temporarily, but can present a risk of burns or falls.

Psychological Abdominal Pain

- diagnosis of exclusion and must be very careful not to miss a physical cause for the abdominal pain

Key Points

- Diagnostic delays are more common with surgical disorders in pregnancy, increasing both maternal and fetal morbidity and mortality.
- Physical finding of a surgical abdomen may be more difficult to elicit in pregnancy.
- Obstetric causes must always be considered in the pregnant patient with abdominal or pelvic pain, regardless of gestational age.
- With any pain in pregnancy think, could this be the onset of labour?
- Abdominal pain may be from ligament stretching or from symphysis pubis strain. In early pregnancy remember miscarriage and ectopics
- Suspected appendicitis is the most common nonobstetric indication for surgery in pregnancy.
- Adnexal masses that persist beyond 18 weeks' gestation are rarely functional.
- The incidence of gallbladder disease is increased in pregnancy.
- Abdominal pain may complicate pre-eclampsia by liver congestion. Rarely, in severe pre-eclampsia the liver perforates.
- Pancreatitis in pregnancy is rare; but mortality high (37% maternal; 5.6% fetal). Diagnose by urinary diastase in first trimester when amylase may be low
- Ultrasound (US) is the most useful imaging tool in the evaluation of abdominal pain in pregnancy.
- Do not hesitate to involve a surgeon, obstetrician/gynecologist, and a specialist in maternal-fetal medicine when dealing with this challenging situation.

Thank You