HCFI Dr KK Aggarwal Research Fund

Minutes of an International Weekly Meeting on "Nonobstetric Surgical Emergencies"

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- Pregnancy can be complicated with different surgical emergencies, which may potentially endanger mother as well as fetus.
- Diagnosis and treatment both carry a dilemma followed by a debate on the safest surgical approach during pregnancy, which still continues.
- Appropriate early intervention is essential to decrease the morbidity and mortality.
- Nonobstetric pathologies during pregnancy can be seen in 1% to 2% of all cases. During pregnancy, 0.2% to 1.0% of women require general surgery for nonobstetric problem. Acute abdomen develops during 1 in 500 to 635 pregnancies.
- Gastrointestinal (GI) disorders account for 0.5% to 1% of presentations requiring surgery during pregnancy.
- Pregnancy causes several changes that affect presentation of acute abdominal pain.
- Heartburn and constipation are frequent because of decreased gastric motility.
- Gravid uterus approximately 12 weeks of gestational age compresses and displaces the underlying and surrounding abdominal viscera.
- The expanding uterus makes it difficult to localize pain and can mask or delay the emergence of peritoneal signs.
- Increased laxity of the anterior abdominal wall can also further delay peritoneal signs during pregnancy.
- Progesterone prepares the body for pregnancy by relaxing smooth muscles but also affects the GI tract. It relaxes the lower esophageal sphincter and decreases gastric motility, which increases frequency of heartburn, gastroesophageal reflux and nausea during pregnancy. Progesterone causes bile stasis and increases the incidence of cholelithiasis and resultant cholecystitis. Additionally, elevated levels of estrogen increases bile concentration, which also increases formation of cholelithiasis and risk of acute cholecystitis.
- The most frequent indications for surgery during pregnancy are infections such as acute appendicitis and cholecystitis. Other indications are infected cysts, carbuncles, hemorrhoids (external thrombosed), hernia (strangulated, incarcerated or obstructed).
- Pregnant women may also require acute surgical intervention for ovarian disorders and bowel obstruction, as well as for traumatological or oncological indications.
- Managing such scenarios can be equally challenging for both obstetricians and general surgeons.
- The nongynecological and nonobstetric causes include acute appendicitis, symptomatic cholecystitis, intestinal obstruction, cholangitis, acute pancreatitis and peptic ulcer perforation.
- The gynecological and nonobstetric causes include twisted or ruptured ovarian cyst and torsion of pedunculated subserosal fibroid.
- The obstetric causes are acute ectopic pregnancy, ruptured uterus (spontaneous or with risk factors).
- Appendicitis is one of the most common problems in pregnant women with acute abdomen. The incidence of acute appendicitis is the same in pregnant and nonpregnant women. It occurs most commonly during the second trimester.
- Appendicitis occurs in one of every 1,500 pregnancies. Perforated appendix increases fetal morbidity and mortality rates, which are as high as 20% to 35% with perforation and as low as 0% to 1.5% in uncomplicated appendicitis.
- The classic scenario of appendicitis entails periumbilical pain radiating to right lower quadrant. Following the onset of pain, anorexia, nausea, vomiting, fever may develop.
- Anorexia, nausea and vomiting can also occur in early pregnancy, but differential diagnosis can be done by lab investigations and imaging.
- Abdominal examination usually reveals tenderness, rebound tenderness and involuntary guarding classically over the McBurney's point.

- Diffuse peritonitis or abdominal wall rigidity are suggestive of appendicular perforation.
- When the appendix is in the retrocecal region, pain is usually described as dull rather than localized, elicited more likely by rectal/vaginal examination than by abdominal examination. Accordingly, pelvic appendix may cause tenderness below McBurney's point, urinary frequency, dysuria, tenesmus and diarrhea.
- Pregnant women are less likely to have a classic presentation of appendicitis versus nonpregnant women, especially in late pregnancy.
- However, location of appendix migrates a few cms cephalad (above) towards the liver, with the enlarged uterus, so in the third trimester, the pain may localize to mid or even upper right abdomen.
- McBurney's point tenderness may be less prominent because gravid uterus lifts and stretches anterior abdominal wall away from the inflamed appendix.
- Since direct contact between area of inflammation and parietal peritoneum is impeded, there is less rebound tenderness or guarding.
- Gravid uterus may also inhibit contact between the omentum and the inflamed appendix.
- Around 80% of nonpregnant patients with appendicitis have a preoperative leukocytosis (total leukocyte count [TLC] >10,000) with left shift. But mild leukocytosis can be a normal finding in pregnant individuals; TLC may be as high as 16,900 in the third trimester, rising as high as 29,000 during labor.
- If the inflamed appendix is close to the ureter or bladder, microscopic hematuria and pyuria may occur.
- Mild elevations in serum bilirubin may be a marker for appendicular perforation with sensitivity of 70% and specificity of 86%.
- C-reactive protein (CRP) may be elevated in appendicitis, but it is a nonspecific sign of inflammation.
- Ultrasound during pregnancy is safe and is effective in identifying the etiology of acute abdominal pain in many patients and should be the initial imaging modality of choice.
- Magnetic resonance imaging (MRI) is preferred over computed tomography (CT) scan for diagnosis of nonobstetric pain in the gravid patient.
- Abdominal CT scan may be used in emergency situations during pregnancy. CT scan should not be the initial imaging test of choice.
- The first imaging test is USG, 2nd is MRI and third is CT scan.
- Antibiotic therapy alone for pregnant women with appendicitis should be considered experimental as available data are limited.
- Patients should be counseled about the possible increase in maternal morbidity.
- In a study involving over 7,000 pregnant women with uncomplicated appendicitis, medical management was associated with increased risk of complications compared with appendectomy viz. peritonitis, venous thromboembolism, sepsis syndrome and septic shock.
- Appendectomy is usually the curate treatment of acute appendicitis. Delaying surgery for >24 hours after the onset of symptoms increases risk of perforation.
- Approaches for appendectomy include laparoscopic and open techniques. The choice of technique should be based on the patient's clinical status and preferences, gestational age and the experience of the surgeon.
- Earlier there were concerns of uterine injury from trocar placement and fetal malperfusion due to pneumoperitoneum during laparoscopy.
- However, current guidelines state that laparoscopic surgery is standard of care in pregnant women as it is safe, allows easier identification of appendix and offers an opportunity for evaluation of abdomen for any associated pathology.
- When performing open appendectomy in a pregnant woman, a transverse incision is made at McBurney's point. But when the diagnosis is less certain, lower midline vertical incision can be used as it permits adequate exposure of abdomen for diagnosis and treatment of surgical conditions that mimic appendicitis.
- Vertical incision can also be used for a cesarean delivery, if subsequently required for the usual obstetric indications.
- It is prudent to minimize traction on the uterus and uterine manipulation, although an association between these maneuvers and preterm birth is unknown.
- Laparoscopic appendectomy can be performed successfully during all trimesters with very few complications as shown in many case reports, case series and cohort studies in pregnancy.

- Decision to proceed is based on skill and experience of surgeon and clinical factors such as size of the gravid uterus.
- Adopt slightly left lateral position of the patient in the second trimester during laparoscopic surgery.
- Use of open entry techniques or placement of trocars under direct visualization and limiting intra-abdominal pressure to <12 mmHg.
- Concerns have however been raised that laparoscopic appendectomy appears to be associated with higher rates of preterm delivery and fetal loss.
- After appendicitis, cholecystitis is the second most common surgical condition during pregnancy. Acute acalculous cholecystitis seems to be more common during pregnancy vs. nonpregnant women.
- The incidence of gallstone disease complicating pregnancy is 0.05% to 0.8%.
- Hormonal changes during pregnancy increase the risk of cholecystitis. An elevated estrogen level causes aggregation of cholesterol crystals and thus leads to increased viscosity of bile and gallstone formation. Progesterone causes smooth muscle relaxation and bile sludging creating a good environment for development of cholelithiasis.
- The signs and symptoms of acute cholecystitis are similar to those in nonpregnant population and include nausea, vomiting, fever and right upper quadrant pain.
- Laboratory tests are not useful as the TLC, amylase and alkaline phosphatase are elevated during normal pregnancy.
- Diagnostic test of choice for all patients with right upper quadrant pain is ultrasound, which has 95% to 98% accuracy: wall thickness >3 mm, presence of pericholecystic fluid/gallstones/Murphy sign.
- If diagnosis and surgical evaluation are delayed, the risk of complication increases, which may include gallbladder rupture, peritonitis, sepsis. They can cause preterm labor and contribute to fetal death and increase maternal mortality.
- Either conservative management or cholecystectomy may be chosen for management of acute cholecystitis.
- Conservative management includes hydration, supportive care and antibiotic therapy with a beta-lactamase inhibitor. Alternatively, third-generation cephalosporin may be given along with metronidazole.
- Acute pancreatitis presents as sudden onset, dull aching, rapidly progressive epigastric pain radiation towards back, refractory to usual doses of analgesics. It improves with stooping forwards.
- Ultrasound helps to exclude possible differential diagnoses and to diagnose gallstone pancreatitis, but it does not establish diagnosis. CT is reserved for particular indications.
- Acute pancreatitis should always be diagnosed with both clinical features and biochemical tests.
- Acute pancreatitis should initially be managed conservatively after resuscitation, preferably in intensive care unit (ICU). Prognosis is assessed by APACHE-II or CTSI (CT scan Severity Index). Necrosectomy can be done in laparoscopic approach by an experienced hepatopancreatobiliary surgeon.
- Laparoscopic cholecystectomy is very safe. Port placement should be above the umbilicus depending on the size of the gravid uterus. Trocar entry should be guided, under direct vision, should be tailored.
- Intestinal obstruction is characterized by colicky abdominal pain, vomiting, constipation and abdominal distension.
- Clinical presentation may be confusing since vomiting, constipation both can be present due to physiological changes of pregnancy.
- Abdominal distension and visible peristalsis are difficult to assess because of the growing uterus.
- Intestinal obstruction complicates as many as 1 in 1,500 to 3,000 pregnancies.
- They most often occur in the third trimester because of the mechanical effects of the rapidly growing gravid uterus on the GI tract.
- Obstructions also occur in the immediate post-partum period from the rapidly decreasing size of the uterus.
- Among patients with bowel obstruction, the maternal mortality rate can be as high as 6% and the fetal mortality rate as high as 26%.
- Risk increases in the third trimester, where maternal mortality rate can reach 10% to 20%, especially if the diagnosis is delayed.
- The incidence of bowel obstruction increased recently, perhaps because of an increase in number of abdominal procedures, an increased incidence of pelvic inflammatory disease (PID) and an increase in the number of older women becoming pregnant.
- Adhesions are thought to cause 60% to 70% of small bowel obstructions during pregnancy.

- Diagnosing intestinal obstruction in pregnancy is challenging as clinical symptoms mimic morning sickness in first trimester. Ideally MRI should be investigation of choice in pregnancy. But if unavailable, X-ray abdomen can be done. Supine X-ray is better than erect posture. However, due to superimposed images of the fetal skeleton identification of dilated bowel loops can be difficult.
- X-ray during organogenesis should be done with caution.
- Decision should be taken after assessing the risk and benefits. Explain clearly to the patient and the family.
- USG might show a hernia defect if an incarcerated hernia is suspected based on physical examination or patient history.
- Majority of other bowel obstruction improve with resuscitation. No improvement of symptoms should be managed by laparoscopic or open surgery.
- Surgical evaluation should not be delayed once the diagnosis is suspected.
- Colonoscopy allows identification and treatment of sigmoid volvulus.
- Surgery during pregnancy for hernia is indicated only when obstruction, strangulation or incarceration is suspected.
- Resection of nonviable gut followed by stoma formation or primary anastomosis can be attempted.
- Any kind of pathology can occur in pregnant women and requires immediate surgical treatment and optimized interdisciplinary management to achieve maximum safety for both mother and fetus, to avoid teratogenous mediation, fetal acidosis and hypoxemia, stillbirth or premature birth.
- It is possible that the physiological changes of pregnancy including the gravid abdomen with displacement of abdominal structures and respiratory changes may increase the risk of perioperative complications. Despite the paucity of data, there have been concerns that nonobstetric surgery may increase the risk of surgical complications as well as adverse obstetrical outcomes.
- A study by Fong et al focused on surgical interventions during the third trimester, giving the general recommendation that they should be avoided whenever possible.
- There are no clear recommendations as to the circumstances in which laparoscopy should be used in pregnant women or open surgery is preferred.
- The decision to choose either laparoscopy or open surgery is mostly taken at the surgeon's discretion.
- Only for unclear acute abdomen with suspected acute appendicitis does the Society of American Gastrointestinal Endoscopic Surgeons recommend laparoscopy.
- In a systemic review, the rate of elective termination of pregnancy following nonobstetric surgery was 1.3%. The prematurity rate was 8.2%. Fetal loss associated with appendectomy was 2.6%; however, the rate was increased when peritonitis was present (~11%).
- Pregnant women had higher risks of postoperative septicemia, pneumonia, urinary tract infection and in-hospital mortality compared with nonpregnant women. Pregnant women also had longer hospital stays and higher medical expenditures.
- The most commonly reported complications include reoperation, infection, wound morbidity, prolonged mechanical ventilation or reintubation, venous thromboembolism and death.
- Withholding indicated surgery during pregnancy is not recommended by either the American Society of Anesthesiologists (ASA) or the American College of Obstetricians and Gynecologists (ACOG).
- Pregnancy does not increase the risk of postoperative complications after cholecystectomy and appendectomy. ACOG states: "Because of the difficulty of conducting large-scale randomized trials in this population, there are no data to allow for specific recommendations."
- When there is need for nonobstetric surgery during pregnancy arises, risk stratification, risk mitigation and maternal counseling regarding anticipated outcomes can be challenging.
- Modern surgical and anesthesia techniques appear to diminish the rate of maternal death and neonatal morbidity.
- With a proper multidisciplinary approach, nonobstetric surgery during pregnancy should only be considered to achieve maximum safety for both mother and fetus.

Participants – Member National Medical Associations: Dr Wasiq Qazi, Pakistan, President-CMAAO; Dr Alvin Yee-Shing Chan, Hong Kong, Treasurer-CMAAO; Dr Akhtar Hussein, South Africa

Invitees: Dr Monica Vasudev, USA; Dr Colin Goldberg; Dr Toran Scythe; Dr Bimla Kapoor; Dr S Sharma, Editor-IJCP Group

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