

General Surgery in Emergency: During Pregnancy

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ABSTRACT

Acute care surgeons are frequently asked to assess pregnant patients who are experiencing abdominal pain. The majority of diagnostic and treatment choices for pregnant patients will adhere to the standard principles of surgery; nevertheless, pregnant patients have some essential distinctions to be aware of in order to avoid mistakes that could result in difficulties for both mother and fetus. This study aims to outline the most typical emergencies that surgeons dealing with pregnant patients must deal with as well as the most recent treatment choices.

1. INTRODUCTION

Every year, over 8000 urgent non-obstetrical surgical operations are carried out, which can affect up to 2% of all pregnancies. [1] The hazards and benefits of diagnostic procedures and therapeutic interventions on both the mother and the fetus must be considered while evaluating the pregnant patient. The normal physiologic and anatomical changes that occur during pregnancy may make it challenging to interpret the indicators typically utilized in early diagnosis of emergency diseases, complicating therapy. The high complication risk in this patient population is a result of the delay in identification and treatment of the surgical abdomen in the pregnant patient due to fear of extra procedures and examinations. Preventing avoidable maternal complications and fetal loss from emergency surgical situations requires close attention to detail, increased suspicion, repeated physical examinations, clinical awareness, and systematic evaluation. The more frequent causes of the acute abdomen in pregnancy will be highlighted in this overview, along with potential treatments. Never put off or postpone necessary diagnostic tests or treatments due to pregnancy; never penalize a patient for being pregnant.

NORMAL PHYSIOLOGIC AND ANATOMIC CHANGES IN PREGNANCY

Almost every organ system is affected by the physiological changes that make up maternal adaptation to pregnancy. Pregnancy-related "physiologic anemia" is caused by the fact that red blood cell mass grows by just 20% while plasma volume rises by about 50%. A baseline hematocrit of 31%–33% is not unusual. [2] The pregnant patient can tolerate a large quantity of blood loss without showing any overt signs of shock thanks to the increased plasma volume.

Pregnancy increases tidal volume due to increased progesterone levels, which increases oxygen intake and resting ventilation.

This causes a metabolic compensation with bicarbonate levels between 19 and 20 mEq/L and a respiratory alkalosis with a pCO₂ of roughly 30 mm Hg. [3] Pregnant women have decreased gastrointestinal motility, lower resting lower esophageal pressure, a higher likelihood of gastroesophageal reflux, and a higher risk of aspiration during general anesthesia.

Reduced ureteral tone and peristalsis during pregnancy might cause a dilated ureter and hydronephrosis. The rate of right-sided hydro-nephrosis is much higher than the rate of left-sided hydro-nephrosis, which is partly caused by mechanical compression on the ureters as the uterus grows. [4] Urolithiasis or an infection may result from these alterations.[5]

Laparoscopy in Pregnancy

A diagnostic and therapeutic method for treating pregnant patients with abdominal pain is laparoscopy. [6] In all trimesters, laparoscopy is generally well tolerated by both mother and fetus with little side effects. [7,8] A more recent Nationwide Inpatient Sample study of 20 000 patients found a three times higher risk of an adverse obstetrical outcome associated with open surgery, despite low-grade evidence that laparoscopic compared with open appendectomy was associated with a higher rate of fetal loss in a 2012 meta-analysis of 11 studies. [9] According to the body habit and stage of pregnancy, we prefer the laparoscopic method when it appears safe for trochar insertion. In order to prevent harm to the uterus during entry, it is advised to use the open trochar placement technique (Hasson technique) or to put the Veress needle into a different site (Palmer's point). [10,11] The uterus shouldn't be handled by the surgeon while doing the procedure. All viable pregnancies that are 24 weeks or older should use immediate preoperative and postoperative fetal monitoring.[12,13]

ACUTE ABDOMEN IN THE PREGNANT PATIENT

One in six hundred thirty-five pregnant women need non-obstetric abdominal surgery. [14] The expanding uterus, which displaces other intra-abdominal organs and makes physical examination challenging [15], the high prevalence of nausea, vomiting, and abdominal pain frequently experienced in the typical obstetric patient [16], and the general reluctance to operate unnecessarily on a gravid patient make it difficult to make the diagnosis. [1] The most frequent non-obstetrical emergencies requiring surgery during pregnancy are acute appendicitis and cholecystitis. [10]

Gallbladder Disease

The second most frequent non-obstetric surgical condition is biliary tract disease. [1] Pregnant women are more likely to develop biliary sludge and gallstones due to weight gain and hormonal changes. Gallbladder volume increases during fasting and postprandially due to weaker contractions and reduced emptying. The production of sludge and stones could conceivably result from biliary stasis' contribution to the sequestration of cholesterol crystals. Progesterone hinders gallbladder emptying, but estrogen enhances bile lithogenicity. [17] Unfortunately, 20%–40% of pregnant women who appear with symptoms will experience a repeat of those symptoms before giving birth. [18,19] Frequently, this return is worse than the initial manifestation.

The incidence of gallstone pancreatitis is also up to 15% higher when symptomatic cholelithiasis is managed non-operatively. [19] In the past, it was believed that the second

trimester was the best time for cholecystectomy since there were fewer spontaneous abortions and premature births; however, a growing body of research indicates that all trimesters can be conducted with equal safety when using laparoscopy. [7,8]

Cholangitis

Although choledocholithiasis in pregnancy is uncommon, occurring in around 1 in 1200 births, therapeutic intervention is almost always necessary. [20] Fever, leukocytosis, stomach pain, hyperbilirubinemia, and high alkaline phosphatase, with or without shock, imply the diagnosis of cholangitis in both pregnant and non-pregnant individuals with choledocholithiasis. [21] It has been demonstrated that Charcot's original triad is 95% specific but only 26% sensitive for cholangitis.

The preferred method of treatment for pregnant patients with choledocholithiasis is currently endoscopic treatment, particularly when cholangitis is present. The first study on therapeutic ERCP during pregnancy was published in 1990 by Baillie et al. [22]

Both conscious sedation and general anesthesia have been used for ERCP with equal safety. [76–79] During the surgery, maternal fetal monitoring should be used under the obstetrician's supervision. Percutaneous transhepatic cholangiography with drainage can be done when ERCP is either not accessible or failed. [23,24]

Acute Pancreatitis

About 1 in 1000 to 5000 pregnancies are complicated by acute pancreatitis, which typically develops late in the third trimester or in the first few weeks after delivery. [25-29] The most frequent cause, accounting for 67% to 100% of cases, is cholelithiasis, which is followed by ethanol usage and hyperlipidemia. [30,31] The medical management includes bowel rest, fluid and electrolyte resuscitation, and the use of analgesics, and is the same as for pancreatitis in non-pregnant women. [32] An intensive care unit is the ideal setting for managing these individuals. A quick cholecystectomy should be carried out if the identified etiology was biliary, as was previously noted for choledocholithiasis due to the high rate of recurrence of symptoms related to gallstones. [25]

2. CONCLUSION

When faced with a potential surgical diagnosis, pregnant patients are a special population where concern about the possibility of harm to the unborn frequently takes precedence over clinical judgment.

While it's crucial to keep radiation exposure to a minimum and avoid doing unneeded surgeries on this population, waiting too long to get diagnosed or treated can be harmful to the mother and fetus. Due to the typical physiologic and anatomic changes that take place during pregnancy, getting the right diagnosis in a pregnant patient can be difficult. While decreased radiation imaging techniques like MRI or radiation-free ERCP may help limit the amount of radiation exposure to the fetus, depending on the practice context, their availability and time commitment may make them less practical. Depending on the surgeon's level of comfort with the length of the pregnancy, minimally invasive surgery may be carried out successfully. To avoid ever penalizing a patient for being pregnant, a diagnosis should be quickly obtained and treatment provided in cases of general surgical emergencies during pregnancy.

3. REFERENCES

1. Augustin G, Majerovic M. Non-obstetrical acute abdomen during pregnancy. *Eur J Obstet Gynecol Reprod Biol* 2007;131:4–12.
2. Taylor DJ, Lind T. Red cell mass during and after normal pregnancy. *Br J Obstet Gynaecol* 1979;86:364–70.
3. Yeomans ER, Gilstrap LC. Physiologic changes in pregnancy and their impact on critical care. *Crit Care Med* 2005;33:S256–S258.
4. Cheung KL, Lafayette RA. Renal physiology of pregnancy. *Adv Chronic Kidney Dis* 2013;20:209–14.
5. Kilpatrick CC, Monga M. Approach to the acute abdomen in pregnancy. *Obstet Gynecol Clin North Am* 2007;34:389–402.
6. Al-Fozan H, Tulandi T. Safety and risks of laparoscopy in pregnancy. *Curr Opin Obstet Gynecol* 2002;14:375–9.
7. Affleck DG, Handrahan DL, Egger MJ, Price RR. The laparoscopic management of appendicitis and cholelithiasis during pregnancy. *Am J Surg* 1999;178:523–8.
8. Dhupar R, Smaldone GM, Hamad GG. Is there a benefit to delaying cholecystectomy for symptomatic gallbladder disease during pregnancy? *Surg Endosc* 2010;24:108–12.
9. Sachs A, Guglielminotti J, Miller R, Landau R, Smiley R, Li G. Risk factors and risk stratification for adverse obstetrical outcomes after appendectomy or cholecystectomy during pregnancy. *JAMA Surg* 2017:E1–6.
10. Fatum M, Rojansky N. Laparoscopic surgery during pregnancy. *Obstet Gynecol Surv* 2001;56:50–9.
11. Thepsuwan J, Huang K-G, Wilamarta M, Adlan A-S, Manvelyan V, Lee C-L, et al. Principles of safe abdominal entry in laparoscopic gynecologic surgery. *Gynecology and Minimally Invasive Therapy* 2013;2:105–9.
12. Palmer R. Safety in laparoscopy. *J Reprod Med* 1974;13:1–5.
13. Barone JE, Bears S, Chen S, Tsai J, Russell JC. Outcome study of cholecystectomy during pregnancy. *Am J Surg* 1999;177:232–6.
14. Steinbrook RA, Brooks DC, Datta S. Laparoscopic cholecystectomy during pregnancy. Review of anesthetic management, surgical considerations. *Surg Endosc* 1996;10:511–5.
15. Kort B, Katz VL, Watson WJ. The effect of nonobstetric operation during pregnancy. *Surg Gynecol Obstet* 1993;177:371–6. 30 Parangi S, Levine D, Henry A, Isakovich N, Pories S. Surgical gastrointestinal disorders during pregnancy. *Am J Surg* 2007;193:223–32.
16. Lacasse A, Rey E, Ferreira E, Morin C, Bérard A. Epidemiology of nausea and vomiting of pregnancy: prevalence, severity, determinants, and the importance of race/ethnicity. *BMC Pregnancy Childbirth* 2009;9:1–9.
17. Behar J. Clinical aspects of gallbladder motor function and dysfunction. *Curr Gastroenterol Rep* 1999;1:91–4
18. Jorge AM, Keswani RN, Veerappan A, Soper NJ, Gawron AJ. Non-operative management of symptomatic cholelithiasis in pregnancy is associated with frequent hospitalizations. *J Gastrointest Surg* 2015;19:598–603.
19. Lu EJ, Curet MJ, El-Sayed YY, Kirkwood KS. Medical versus surgical management of biliary tract disease in pregnancy. *Am J Surg* 2004;188:755–9.

20. Othman MO, Stone E, Hashimi M, Parasher G. Conservative management of cholelithiasis and its complications in pregnancy is associated with recurrent symptoms and more emergency department visits. *Gastrointest Endosc* 2012;76:564–9.
21. Koncoro H, Lesmana CR, Philipi B. Choledocholithiasis during pregnancy: multimodal approach treatment. *The Indonesian Journal of Gastroenterology, Hepatology, and Digestive Endoscopy* 2016;17:58–63
22. Baillie J, Cairns SR, Putman WS, Cotton PB. Endoscopic management of choledocholithiasis during pregnancy. *Surg Gynecol Obstet* 1990;171:1–4
23. Rex DK, Deenadayalu VP, Eid E, Imperiale TF, Walker JA, Sandhu K, Clarke AC, Hillman LC, Horiuchi A, Cohen LB, et al. Endoscopist-directed administration of propofol: a worldwide safety experience. *Gastroenterology* 2009;137:1229–37.
24. Coté GA, Hovis RM, Anstas MA, Waldbaum L, Azar RR, Early DS, Edmundowicz SA, Mullady DK, Jonnalagadda SS. Incidence of sedation-related complications with propofol use during advanced endoscopic procedures. *Clin Gastroenterol Hepatol* 2010;8:137–42.
25. Garewal D, Vele L, Waikar P. Anaesthetic considerations for endoscopic retrograde cholangio-pancreatography procedures. *Curr Opin Anaesthesiol* 2013;26:475–80.
26. Thosani N, Banerjee S. Deep sedation or general anesthesia for ERCP? *Dig Dis Sci* 2013;58:3061–3.
27. Ozcan N, Kahriman G, Mavili E. Percutaneous transhepatic removal of bile duct stones: results of 261 patients. *Cardiovasc Intervent Radiol* 2012;35:890–7.
28. Lan Cheong Wah D, Christophi C, Muralidharan V. Acute cholangitis: current concepts. *ANZ J Surg* 2017;87:554–9.
29. Mador BD, Nathens AB, Xiong W, Panton ONM, Hameed SM. Timing of cholecystectomy following endoscopic sphincterotomy: a population-based study. *Surg Endosc* 2017;31:2977–85.
30. Hernandez A, Petrov MS, Brooks DC, Banks PA, Ashley SW, Tavakkolizadeh A. Acute pancreatitis and pregnancy: a 10-year single center experience. *J Gastrointest Surg* 2007;11:1623–7.
31. McKay AJ, O'Neill J, Imrie CW. Pancreatitis, pregnancy and gallstones. *Br J Obstet Gynaecol* 1980;87:47–50.
32. Ramin KD, Ramin SM, Richey SD, Cunningham FG. Acute pancreatitis in pregnancy. *Am J Obstet Gynecol* 1995;173:187–91.