

ACUTE CHOLECYSTITIS DURING PREGNANCY: WHAT IS THE BEST APPROACH?

Jen-Yu Tseng^{1,2}, Ming-Jie Yang^{1,3}, Chih-Chun Yang^{2,3}, Kuan-Chong Chao^{1,3}, Hsin-Yang Li^{1,3*}

¹Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, ²Department of Obstetrics and Gynecology, Cardinal Tien Hospital—Hsintien, and ³National Yang-Ming University, School of Medicine, Taipei, Taiwan.

Pregnancy is a continuous dynamic state that affects the maternal physiology at any given time throughout the 40 weeks of gestation and postpartum period. Abdominal discomfort and pain are common complaints that may be related to pregnancy itself or to non-obstetric causes. The incidence of acute abdomen during pregnancy is approximately 1 in 500 pregnancies [1]. Appendicitis, cholecystitis, pancreatitis, and bowel obstruction are the most commonly reported non-obstetric abdominal surgical conditions seen in pregnancy. In any event, when right upper quadrant pain is reported, the differential diagnosis should encompass uterine contraction, fetal movement, uterine rupture, ectopic pregnancy, adnexal torsion or rupture, liver hematoma, cholelithiasis, cholecystitis, cholangitis, hepatitis, pancreatitis, and peptic ulcer [2].

During pregnancy, the metabolic, synthesizing and excretory functions of the liver are influenced by increases in serum estrogen and progesterone [3]. The gallbladder serves as a reservoir for bile produced by the liver. Following ingestion of food with a high lipid content, the gallbladder contracts and ejects bile salts into the intestine. Elevation of estrogen during pregnancy results in cholesterol crystal aggregation, hence increasing the viscosity of bile and the risk of cholelithiasis. Progesterone induces gallbladder smooth muscle relaxation, leading to bile stasis, which in turn, also increases the risk of cholelithiasis.

The incidence of acute cholecystitis in pregnancy is reported in approximately 0.2–0.5 per 1,000 pregnancies [4]. Depending on gestational age and symptoms, different methods of management have been reported, ranging from supportive care, antibiotics [5], percutaneous transhepatic gallbladder drainage

(PTGBD) [6], endoscopic retrograde cholangiopancreatography (ERCP) [7], laparoscopic cholecystectomy [8], and open cholecystectomy. Herein, we try to analyze and assess what is the best approach of diagnosing and treating acute cholecystitis in pregnancy.

A 41-year-old female, gravida 2, para 0, with last menstrual period August 14, 2007 and with estimated date of confinement May 20, 2008, presented to our emergency department with upper abdominal pain at 19⁺4 weeks' gestational age. Tracing back her history, she was a hepatitis B carrier with regular follow-up at our gastroenterology department. No other remarkable past history was mentioned and she denied use of oral contraceptives. Prenatal follow-up was unremarkable except for total placenta previa detected during routine check-up at 16 weeks' gestational age. Because of her advanced maternal age, the client underwent amniocentesis at 18 weeks' gestational age.

Unfortunately, the client started to complain of intractable abdominal pain and was admitted to our service under the impression of premature uterine contractions. Uterine and fetal monitoring was established and irregular contractions were noted; hence, MgSO₄ and ritodrine were titrated until contractions were inhibited. Laboratory data showed an elevated white blood cell count up to 18,800/mm³ with 95% neutrophils and 2% lymphocytes. Because there was persistent pain, a whole abdominal ultrasound was arranged which showed a distended gallbladder with bile sludge and positive sonographic Murphy sign. No evidence of calculus was noted (Figure 1). Under the impression of acute cholecystitis, a general surgeon was consulted and antibiotics with cefuroxime 1,500 mg intravenously plus metronidazole 1 ampule intravenously every 8 hours were suggested as well as ultrasound-guided PTGBD.

The procedure was performed uneventfully, and 150 mL of dark bile was aspirated from the pigtail drainage system (Figure 2). Aerobic and anaerobic cultures of the drained substance failed to yield any bacteria growth after 1 week. Intravenous antibiotics were changed to oral antibiotics (cefadroxil twice daily and metronidazole



ELSEVIER

*Correspondence to: Dr Hsin-Yang Li, Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, 201, Shih-Pai Road, Section 2, Taipei 112, Taiwan.

E-mail: hyli@vghtpe.gov.tw

Accepted: March 7, 2008



Figure 1. Distended gallbladder with bile sludge (white arrow) and increased wall thickening (black arrow).

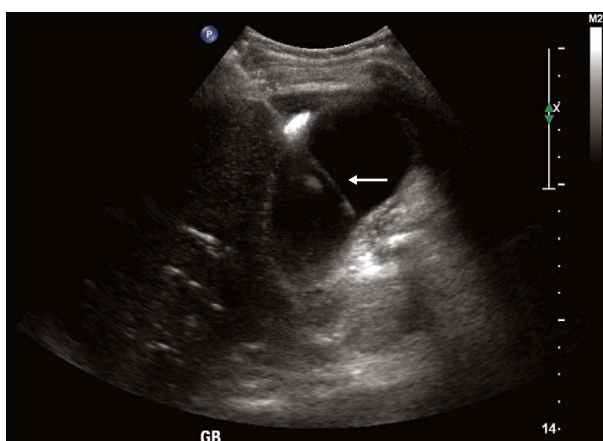


Figure 2. Percutaneous transhepatic placement of pigtail drainage system into gallbladder (arrow).



Figure 3. After removal of pigtail drainage system. Note the collapse of gallbladder (arrow).

three times daily) 6 days after the procedure. Ultrasound was repeated 10 days after drainage, showing regression of gallbladder distention (Figure 3). Laboratory values returned to normal limits and symptoms and signs subsided; the client was discharged in a stable

condition after removal of the drain, with regular prenatal follow-up at our outpatient department.

Whenever pregnant women present themselves with abdominal discomfort or pain, gestational age, maternal age and symptoms and signs have to be thoroughly scrutinized. Uterine and fetal monitoring needs to be established to assess the possibility of uterine contractions and to determine fetal well-being. If intractable pain is present, further examinations have to be arranged in order to localize the contributing factor.

Regarding risk factors resulting in formation of gallstones, subjects aged between 40 and 69 years have a four times higher prevalence than younger subjects [9], female gender has a higher prevalence [10], and pregnancy increases prevalence from 1.3% in nulliparous females to 12.2% in multiparous females [11].

Symptoms of acute cholecystitis are similar to those in the nonpregnant state and include the classic colicky or stabbing pain in the right upper quadrant, which can radiate to the right flank, scapula, and shoulder. Other symptoms may include anorexia, nausea, vomiting, dyspnea, low-grade fever, and fatty food intolerance [12].

A delay in diagnosis may increase the risk of perforation, resulting in generalized peritonitis or sepsis, which might ultimately contribute to preterm labor, fetal loss, and maternal mortality. Ultrasound avoids radiation exposure to the gravid uterus, is noninvasive, and has an accuracy of approximately 95–98% in detecting changes in the gallbladder; hence, it is the standard method for diagnosis. Classic findings include biliary sludge, gallbladder calculi, wall thickening (>3 mm), and sonographic Murphy sign (focal tenderness under the ultrasound transducer positioned over the gallbladder) [13].

Initial management includes discontinuation of oral ingestion, intravenous fluid replacement, analgesia, and administration of antibiotics, if signs of infection are present. In selected high-risk patients, less invasive procedures such as PTGBD and ERCP can be performed. PTGBD provides adequate biliary decompression and is a lower-risk procedure which has been shown to be safe and temporarily effective in treating acalculous cholecystitis [6]. Under ultrasound guidance and local anesthesia, a pigtail drainage tube is inserted through the liver and into the distended gallbladder. Essentially, it is recommended that the drainage tube should not be extracted until a fistula forms around the tube (around 2 weeks) in severe cases where changing of the drainage tube is necessary. Major disadvantages of this procedure are bile leakage, bile duct injury, and abdominal abscess [14]. When choledocholithiasis or gallstone pancreatitis is considered as the offending cause of acute cholecystitis, visualization of the whole biliary tract can

be established with ERCP, and generous sphincterotomy should be performed with subsequent removal of the stone [12]. Results of PTGBD and ERCP have been promising, but the recurrence rates, nevertheless, are lower in acalculous than in calculus-induced cholecystitis.

Previous reports recommend surgical intervention of a patient in the first trimester to be deferred until the second trimester, and of a patient in the third trimester to be delayed until after parturition. During the second trimester, fetal organogenesis is complete, the size of the gravid uterus allows relatively good operative field visualization, and possible injury to the gravid uterus is diminished compared with during the third trimester. However, recent trends, newer instrumentation and skilled personnel encourage arranging laparoscopic cholecystectomy at the time of diagnosis. In order to prevent injury to the gravid uterus during insertion of the Veress needle, use of the Hasson trocar for open laparoscopy has been advocated [8]. Pneumoperitoneum should be kept at a maximum of 15 mmHg, and fetal well-being can be monitored with transvaginal ultrasound. Laparoscopic surgery during pregnancy has proven to be quite safe with end results of a shorter hospital stay, smaller incision, and early ambulation. Patients undergoing open cholecystectomy experienced a higher frequency of postoperative premature uterine contractions requiring tocolytic therapy compared with the laparoscopic approach; thus, nowadays, it has become less and less common unless laparoscopic surgery is not feasible [15].

On reviewing our client's medical history, she fulfilled the risk factors for cholecystitis. The client was over 40 years of age, female, and pregnant. As she had only recently undergone amniocentesis at 18 weeks' gestation, the main differential diagnosis resulting in abdominal discomfort were chorioamnionitis and premature uterine contraction. Tocolytics were able to inhibit the irregular contractions, but the pain did not subside; the whole abdominal ultrasound revealed a dilated gallbladder with bile sludge. As previously reported, in cases of acalculous cholecystitis, PTGBD is less invasive and an effective method to relieve the problem. Surgical intervention with laparoscopy was not considered, because the client had just undergone amniocentesis a week before and the possibility of aggravating premature uterine contraction was kept in mind. Fortunately, the patient recovered uneventfully after drainage of bile and removal of the pigtail drainage system.

Because pregnancy can mask abdominal complaints, a thorough patient assessment has to be made. In cases

where acute cholecystitis is suspected, ultrasound becomes an effective and accurate diagnostic tool. Depending on gestational age, careful evaluation and use of an experienced team consisting of an obstetrician, gastroenterologist and surgeon, the method of treatment can be individualized and tailored according to the symptoms and signs to yield a favorable pregnancy outcome.

References

1. Coleman MT, Triano VA, Rund DA. Nonobstetric emergencies in pregnancy: trauma and surgical conditions. *Am J Obstet Gynecol* 1997;177:497-502.
2. Benjaminov FS, Heathcote J. Liver disease in pregnancy. *Am J Gastroenterol* 2004;99:2479-88.
3. Van Thiel DH, Gavalier JS. Pregnancy-associated sex steroids and their effect on the liver. *Semin Liver Dis* 1987;7:1-7.
4. Landers D, Carmona R, Cromblehome W, Lim R. Acute cholecystitis in pregnancy. *Obstet Gynecol* 1987;69:131-3.
5. Zakko SF, Afdhal NH. Treatment of acute cholecystitis. <http://www.utdol.com> [Date accessed: 30 January 2008]
6. Allmendinger N, Hallisey MJ, Ohki SK, Straub JJ. Percutaneous cholecystostomy treatment of acute cholecystitis in pregnancy. *Obstet Gynecol* 1995;86:653-4.
7. Baillie J. ERCP during pregnancy. *Am J Gastroenterol* 2003;98:237-8.
8. Halkic N, Tempia-Caliera AA, Ksontini R, Suter M, Delaloye JF, Vuilleumier H. Laparoscopic management of appendicitis and symptomatic cholelithiasis during pregnancy. *Langenbecks Arch Surg* 2006;391:467-71.
9. Barbara L, Sama C, Morselli-Labate AM. A ten year incidence of gallstone disease: the Sirmione study. *J Hepatol* 1993;18:43-8.
10. Atti AF, Carulli N, Roda E. Epidemiology of gallstone disease in Italy: prevalence data of the Multicenter Italian Study on Cholelithiasis (M.I.COL.). *Am J Epidemiol* 1995;141:158-65.
11. Mendez-Sanchez N, Chavez-Tapia NC, Uribe M. Pregnancy and gallbladder disease. *Ann Hepatol* 2006;5:227-30.
12. Angelini DJ. Obstetric triage: management of acute nonobstetric abdominal pain in pregnancy. *J Nurse Midwifery* 1999;44:572-84.
13. Augustin G, Majerovic M. Non-obstetrical acute abdomen during pregnancy. *Eur J Obstet Gynecol Reprod Biol* 2007;131:4-12.
14. Tsumura H, Ichikawa T, Hiyama E, Kagawa T, Nishihara M, Murakami Y, Sueda T. An evaluation of laparoscopic cholecystectomy after selective percutaneous transhepatic gallbladder drainage for acute cholecystitis. *Gastrointest Endosc* 2004;59:839-44.
15. Barone JE, Bears S, Chen S, Tsai J, Russell JC. Outcome study of cholecystectomy during pregnancy. *Am J Surg* 1999;177:232-6.