

# The use of percutaneous cholecystostomy in the treatment of acute cholecystitis during pregnancy

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## Summary

The purpose of this study was to investigate the efficacy of percutaneous cholecystostomy (PC) in treatment of acute cholecystitis during pregnancy. The author retrospectively evaluated six pregnant patients who underwent PC for acute cholecystitis between 1994 and 2014. The median age of the patients were 31 years (22-36). Two patients were in first trimester and the others in third trimester. All patients were underwent medical therapy before PC; since no improvement was observed in their complaints and physical examination findings, the author performed PC. All patients underwent LC following PC. PC is a safe, alternative treatment modality for palliative purposes in pregnant patients with acute cholecystitis who are unresponsive to medical therapy or who have comorbid conditions making surgery risky, or in acute cholecystitis cases occurring in third trimester of pregnancy to reach postpartum period when surgery is safer.

**Key Words:** Acute cholecystitis; Pregnancy; Percutaneous cholecystostomy; Medical treatment; Laparoscopic cholecystectomy.

## Introduction

Bile stones are common during pregnancy. The physiological changes in pregnancy increase the risk of bile stone formation. The incidence of bile stones is between 6.5% and 8.4% in nulliparous women, while it increases to 12% to 30% in parallel with increasing number of pregnancies [1-3]. Acute cholecystitis secondary to bile stones occur in 0.1% of all pregnancies and 12% of pregnancies are complicated by bile stone disease [4, 5].

Medical therapy for acute cholecystitis in pregnancy fails in nearly 27% of affected patients and 25% of patients initially responding to medical therapy eventually suffer recurrences [6, 7]. In such patients surgical therapy is an option although, depending on pregnancy stage and surgical technique, non-obstetric surgery may increase the risks of low birth weight and premature labor [8-10].

Percutaneous cholecystostomy (PC) has recently been successfully used for the treatment of patients with acute cholecystitis who are unresponsive to medical therapy or at high risk for anesthesia-related complications due to age or comorbid conditions [11].

In this retrospective study the authors aimed to investigate the role of PC in the treatment of the pregnant women with acute cholecystitis who are unresponsive to medical therapy.

## Materials and Methods

In this study the authors retrospectively evaluated six pregnant women who underwent PC between 1994 and 2014 for acute

cholecystitis that was unresponsive to medical therapy.

Age, the number of previous pregnancies and deliveries, comorbidities, complaints, former biliary symptoms, laboratory and USG findings, medical therapies applied before PC and their durations, complications of acute cholecystitis, PC-related complications, duration of catheter placement, and cholecystectomy timing and technique were recorded.

Preterm labor is considered a labor before 37 weeks of gestation, and low birth weight is considered a birth weight less than 2,500 grams. The patients are also examined for the presence of a congenital anomaly.

The PC catheter was a 8.3 F pigtail catheter that was placed transhepatically under local anesthesia using the Seldinger method with the ultrasonographic guidance. Following the procedure the position of the catheter was checked by contrast agent injection through the catheter and observed under fluoroscopy.

## Results

The median age of the study population was 31 years (22-36). Two patients were in first trimester (six and ten weeks) and the others in third trimester (Table 1).

Two patients who were in third trimester of pregnancy had bouts of acute cholecystitis that required hospital admission prior whereas the others had described no biliary attacks but they stated that their symptoms began two to 15 days before hospital admission.

All patients had upper right quadrant pain, nausea, and vomiting and all had murphy sign in physical examination. They were all diagnosed with acute cholecystitis based on the USG findings of the disease (stone in gall bladder, or increased wall thickness).

Table 1. — *Summary of patients' demographics and outcomes.*

Patient no.	Patient age (y)	Obstetric history	Gestational age (w)	Symptoms	Medical therapy duration (d)	ERCP	PC catheter durationTime (w)	LC timing	Outcome of pregnancy	Birth weight (g)
1	36	G2P0	6	RUQ Pain	3	+	6	After Birth	C/S	1,400
2	29	G2P2	34	RUQ pain	2	-	6	After Birth	C/S	2,950
3	31	G1P0	10	Epigastric pain	2	-	4	Second Trimester	C/S	3,350
4	31	G3P1	32	RUQ Pain	2	-	6	After Birth	C/S	3,200
5	32	G3P2	35	RUQ Pain	2	-	6	After Birth	NVD	3,400
6	22	G3P2	30	RUQ Pain	4	-	6	After Birth	C/S	3,200

C: gravida; P: para; RUQ: right upper quadrant, C/S: cesarean section; NVD: normal vaginal delivery; w: week; d: day.

Laboratory results indicated an elevated serum amylase level (1,000 U/L) and lipase level (20,00 U/L) in one patient; one other patient had elevated total (eight mg/dl) and direct bilirubin (six mg/dl); she underwent magnetic resonance cholangiography (MRC) showing a stone in common bile duct that was removed by endoscopic retrograde cholangiopancreatography (ERCP).

All patients underwent medical therapy for two to four days, oral intake was stopped, and IV fluids and antibiotics were administered. As complaints and physical examination findings did not improve and the patients were recommended laparoscopic cholecystectomy (LC). However, two patients were placed a PC catheter, with one being in first trimester and refusing surgery due to her comorbid conditions (sickle cell anemia and history of pulmonary embolism) and the other for high fetal risks at that period. The other four patients in third trimester underwent PC after they refused LC for the risk of premature labor. All patients were applied LC following PC. No complication occurred during or after PC placement and the catheters were removed four to six weeks after their placement.

All patients were operated with LC, with the patient sustaining acute cholecystitis and acute pancreatitis in first trimester being operated in second trimester and others at the postpartum period.

Five patients delivered via cesarean section and one via normal vaginal route. The patient with sickle cell anemia delivered a low birth weight infant (1,400 g) at a preterm labor (at 32 weeks of gestation). Other deliveries occurred after 38 weeks of gestation and all delivered infants weighed in excess of 2,500 g. No congenital anomaly was observed in any infant.

## Discussion

The treatment of acute cholecystitis due to bile stones during pregnancy remains debated. Asymptomatic cholelithiasis in pregnancy treated with medical therapy have a recurrence rate of 57%; it also causes acute cholecystitis or pancreatitis at a rate of 23% and leads to increased maternal and fetal mortality [12].

Cholecystectomy operations during pregnancy are per-

formed for recurrent attacks of biliary colic in 37-70% of cases and acute cholecystitis in 20-32% [13,14]. Some studies have suggested that there is no increased risk associated with non-obstetric surgery in first trimester of pregnancy, whereas others have reported that surgery especially at an early period of pregnancy may lead to premature birth and low birth weight [9, 10, 15, 16]. Hence, it is recommended that surgery be delayed until second trimester [17]. Considering the outcomes of medical and surgical therapies, however, they share similar rates of mortality and morbidity [6].

Currently, LC is performed successfully in all stages of pregnancy using carefully applied surgical and anesthetic procedures although it may cause premature labor owing to the growing uterus and the resulting intra-abdominal space reduction especially in the later stages of third trimester [16, 18]. Literature reports suggest that all laparoscopic cholecystectomies in third trimester have been performed at 30<sup>th</sup> week at the latest [19, 20]. Four of the present patients presented with acute cholecystitis at or beyond 30 weeks of gestation; owing to the technical difficulties of a surgical intervention at that period, a higher likelihood of turning to open surgery, and the inherent risk of premature labor, these patients were placed a PC and followed conservatively without having biliary complaints until after labor when laparoscopic cholecystectomy was performed.

One patient having pancreatitis simultaneously with acute cholecystitis in first trimester underwent LC at second trimester when surgery was deemed less risky, while all other patients were treated with LC following delivery.

PC has been recently used with a success rate of 98% in treatment of acute cholecystitis cases who have poor overall status or comorbidities, or who are unresponsive to medical therapy [17]. Allmendinger *et al.* used PC as a safe and effective treatment modality in two pregnant patients with acute cholecystitis [21]. The present authors also observed a clinical improvement in all patients after PC and no PC related complication (bleeding, bile leak, accidental catheter removal) occurred.

Only one patient experienced an incident of premature labor and delivering a low birth weight infant, although that

event was considered to be a complication of sickle cell anemia that patient already had. Other patients delivered infants weighing in excess of 2,500 g beyond 37 weeks of gestation. One patient who applied at early pregnancy suffered acute pancreatitis and underwent LC in second trimester, six weeks after the incident. The other patient was not operated during pregnancy due to comorbidities and she underwent LC after the delivery.

## Conclusion

PC is a safe and alternative treatment modality for palliative purposes in pregnant patients with acute cholecystitis who are unresponsive to medical therapy or who have comorbid conditions, or in acute cholecystitis cases occurring in early stages of pregnancy to reach second trimester or postpartum period when surgery is more safe.

## References

- [1] Gilat T., Konikoff F.: "Pregnancy and the biliary tract". *Can. J. Gastroenterol.*, 2000, 14, 55.
- [2] Ko C.W., Beresford S. A. A., Schulte S. J., Matsumoto A. M., Lee S.P.: "Incidence, natural history, and risk factors for biliary sludge and Stones during pregnancy". *Hepatology*, 2005, 41, 359.
- [3] Valdivieso V., Covarrubias C., Siegel F., Cruz F.: "Pregnancy and cholelithiasis: pathogenesis and natural course of gallstones diagnosed in early puerperium". *Hepatology*, 1993, 17, 1.
- [4] Dietrich C.S., Hill C.C., Hueman M.: "Surgical diseases presenting in pregnancy". *Surg. Clin. North Am.*, 2008, 88, 408.
- [5] Swisher S.G., Schmit P.J., Hunt K.K., Hiyama D.T., Bennion R.S., Swisher E.M., Tompson J.E.: "Biliary disease during pregnancy". *Am. J. Surg.*, 1994, 168, 576.
- [6] Date R.S., Kaushal M., Ramesh A.: "A review of the management of gallstone disease and its complications in pregnancy". *Am. J. Surg.*, 2008, 196, 599.
- [7] Lu E.J., Curet M.J., El-Sayed Y.Y., Kirkwood K.S.: "Medical versus surgical management of biliary tract disease in pregnancy". *Am. J. Surg.*, 2004, 188, 755.
- [8] Cohen-Kerem R., Railton C., Oren D., Lishner M., Koren G.: "Pregnancy outcome following non-obstetric surgical intervention". *Am. J. Surg.*, 2005, 190, 467.
- [9] Jenkins T.M., Mckey S.F., Benzoni E.M., Tolosa J.E., Sciscione A.C.: "Non-obstetric surgery during gestation: Risk factors for lower birthweight". *Aust. N. Z. J. Obstet. Gynaecol.*, 2003, 43, 27.
- [10] Reedy M.B., Kallen B., Kuehl T.J.: "Laparoscopy during pregnancy: A study of five fetal outcome parameters with use of the Swedish Health Registry". *Am. J. Obstet. Gynecol.*, 1997, 177, 673.
- [11] Othman M.O., 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.
- [12] Glasgow R.E., Visser B.C., Harris H.W., Patti M.C., Kilpatrick S.J., Mulvihill S.J.: "Changing management of gallstone disease during pregnancy". *Surg. Endosc.*, 1998, 12, 241.
- [13] Chiappetta Porras L.T., Napoli E.D., Canullan C.M., Quesada B.M., Roff H.E., Alvarez Rodriguez J., Oria A.S.: "Minimally invasive management of acute biliary tract disease during pregnancy". *HPB Surg.*, 2009, 2009, 829020.
- [14] Ghumman E., Bary M., Grace P.A.: "Management of galstones in pregnancy". *Br. J. Surg.*, 1997, 84, 1646.
- [15] Barone J.E., Bears S., Chen S., Tsai J., Russell J.C.: "Outcome study of cholecystectomy during pregnancy". *Am. J. Surg.*, 1997, 177, 232.
- [16] McKellar D.P., Anderson C.T., Boynton C.J., Peoples J.B.: "Cholecystectomy during pregnancy without fetal loss". *Surg. Gynecol. Obstet.*, 1992, 174, 465.
- [17] Spira R.M., Nissan A., Zamir O., Cohen T., Fields S.I., Freund H.R.: "Percutaneous transhepatic cholecystostomy and delayed laparoscopic cholecystectomy in critically ill patients with acute calculus cholecystitis". *Am. J. Surg.*, 2002, 183, 62.
- [18] Jelin E.B., Smink D.S., Vernon A.H., Brooks D.C.: "Management of biliary tract disease during pregnancy: a decision analysis". *Surg. Endosc.*, 2008, 22, 54.
- [19] Hani M.N.B.: "Laparoscopic surgery for symptomatic cholelithiasis during pregnancy". *Surg. Laparosc. Endosc. Percutan. Tech.*, 2007, 17, 482.
- [20] Machado N.O., Machado L.S.: "Laparoscopic cholecystectomy in the third trimester of pregnancy: report of 3 cases". *Surg. Laparosc. Endosc. Percutan. Tech.*, 2009, 19, 439.
- [21] Allmendinger N., Hallisey M.J., Ohki S.K., Straub J.J.: "Percutaneous cholecystostomy treatment of acute cholecystitis in pregnancy". *Obstet. Gynecol.*, 1995, 86, 653.

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