

## Sedation for endoscopic retrograde cholangiopancreatography (ERCP) in a pregnant patient

LEYLA IYILIKCI<sup>1</sup>, MESUT AKARSU<sup>2</sup>, EMINE KOCAAYAN<sup>1</sup>, and ÖMER TOPALAK<sup>2</sup>

<sup>1</sup>Dokuz Eylul University, School of Medicine, Department of Anesthesiology, Inciralti, 35340, Izmir, Turkey

<sup>2</sup>Dokuz Eylul University, School of Medicine, Division of Gastroenterology, Izmir, Turkey

### Abstract

Anesthesiology management of endoscopic retrograde cholangiopancreatography (ERCP) in the twenty-first week of pregnancy of a woman patient is reported. The patient gave birth to a healthy male baby at 40 weeks of gestation.

**Key word** ERCP · pregnancy

### Introduction

The incidence of gallstones during pregnancy is reported to be as high as 4.2% in the literature [1]. Cholelithiasis in pregnancy is a relatively uncommon but serious condition because of cholangitis and pancreatitis, and the diagnosis is not standardized. Treating symptomatic cholelithiasis during pregnancy is a difficult problem. Several reports have shown that endoscopic retrograde cholangiopancreatography (ERCP) is suitable in such patients [1–4].

Sedation during ERCP in pregnant patients has important aspects of fetal and maternal monitoring, hazards of radiation to the fetus, and side effects of the prone position [1,2,5]. In this article we report the anesthetic management for ERCP in a pregnant woman.

### Case report

A 20-year-old woman gravida 1, para 0 (63 kg) was admitted to the hospital in her twenty-first week of pregnancy for ERCP because of cholelithiasis. Before the procedure the patient had complained of abdominal pain, jaundice, nausea, vomiting, and itching. Ultrasound examination revealed dilatation of the common

and intrahepatic bile ducts in association with suspicion of choledocholithiasis. The diagnosis was made during routine examination of the 21-week fetus with normal morphological features.

There were abnormalities in laboratory values, with an erythrocyte sedimentation rate of 50 mm·h<sup>-1</sup>, total bilirubin level of 3.6 mg·dl<sup>-1</sup> (normal <1 mg·dl<sup>-1</sup>), direct bilirubin level of 2.8 mg·dl<sup>-1</sup>, and elevated liver enzymes, with alkaline phosphatase 450 U·l<sup>-1</sup> (normal, 34–240 U·l<sup>-1</sup>), aspartate aminotransferase 70 IU·l<sup>-1</sup> (1–31 U·l<sup>-1</sup>), and alanine aminotransferase 68 U·l<sup>-1</sup> (normal, 1–31 U·l<sup>-1</sup>).

Following electrocardiography, noninvasive blood pressure measurement, pulse oximetry (M1094B; Hewlett Packard, Saronno, Italy), and fetal heart rate monitoring devices were applied, with the patient in the left lateral position. Insufflation of oxygen at a flow rate of 6 l·min<sup>-1</sup> was maintained throughout the procedure. Initial blood pressure and heart rate of the patient were 110/60 mmHg- and 110 beats·min<sup>-1</sup> respectively. Fetal heart rate was between normal limits (140–160 beats·min<sup>-1</sup>; Multimox 6 sonoline S1 Siemens; Erlangen, Germany). She was very anxious and had severe abdominal pain. Following sedation with midazolam 2 mg, propofol and fentanyl (total, 1 µg·kg<sup>-1</sup> and 1.5 mg·kg<sup>-1</sup>) were given in incremental doses during the procedure as needed. The Ramsey score was 4 during the procedure.

Spontaneous respiration was maintained throughout the intervention, which lasted for 35 min. ERCP procedures with the patient in the supine position had been performed previously by our experienced endoscopists. Selective biliary cannulation was performed and the common bile duct (CBD) was filled.

Cholangiography revealed a dilated CBD with stones. A bloodless 10-mm sphincterotomy was made and a biliary stone was extracted. Total procedure time was 35 min and the fluoroscopy time was 1 min with abdominal shielding. Fluoroscopy was used for as short a time as possible and spot radiographs were avoided.

Address correspondence to: L. Iyilikci

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Ultrasonic evaluation of the patient after the procedure revealed normal uterine and fetal hemodynamics. The patient gave birth to a 40-week gestational age, healthy boy, with a normal birth weight (4150 g).

## Discussion

Physiologic changes of pregnancy leave women at increased risk for gallstone complications. ERCP during pregnancy was first reported in 1990 for the treatment of complicated gallstone disease. Since then, numerous reports have shown that, if certain precautionary measures are taken, therapeutic ERCP can be safely performed during pregnancy [6].

Cholelithiasis during pregnancy is a serious problem that may lead to cholangitis, gallstone pancreatitis, or both, with potentially life-threatening consequences for both mother and baby [6].

According to Gupta et al. [8], only limited data are available regarding the safety of therapeutic ERCP in pregnancy. The medical records of 18 pregnant women (first trimester, 4; second, 6; third, 8) who underwent ERCP between July 1994 and December 2004 were reviewed. Patients and their families were contacted to assess the wellbeing of mother and baby. All the women underwent therapeutic ERCP and biliary sphincterotomy for common bile duct (CBD) stones. In 4 patients, 10-Fr CBD stents were inserted; 3 of these 4 patients required mechanical lithotripsy after delivery. Median procedure time was 17 min and median fluoroscopy time was 8 s. One patient developed mild post-ERCP pancreatitis and one had post-sphincterotomy bleeding. One woman had a preterm delivery. At follow-up after a median of 6 years, all the babies were healthy.

Hypertension, diabetes mellitus, and hematologic diseases were the most common preanesthetic problems in ERCP procedures [4].

However, because ERCP is performed under fluoroscopic guidance, there is widespread concern about radiation-induced damage to the fetus [1]. Actually, the American College of Obstetricians and Gynecologists (ACOG) states that fetal the risk of anomalies, growth restriction, or abortions is not increased with radiation exposure of less than 5 rad, a level above the range of exposure for diagnostic procedures [9].

Hypotension during pregnancy is primarily due to decreased vascular tone and is greatly accentuated by aortocaval compression. To prevent further decrease in blood pressure during the intervention, our patient was positioned in the left lateral position [10].

Sedation in pregnancy has always been a challenge to anesthesiologists. No anesthetic drug, inhaled anesthetic, or local anesthetic has been proven to be teratogenic in

humans [11]. A notable exception is the benzodiazepine group, which has been linked to congenital anomalies [10,11]. All agents that are administered during pregnancy must be used with caution and vigilance. It is clear that anesthetic effects on placental perfusion and the placental transfer of depressant drugs may influence the fetus [10]. Due to our limited experience with the anesthetic management of a pregnant patient with cholelithiasis, we chose to minimize or prevent fetal exposure to drugs. We used a midazolam, propofol, and fentanyl combination for sedation of the patient. Propofol was preferred because it can be titrated easily, and has a good recovery, with a low incidence of nausea and vomiting. In our hospital, sedation is used routinely for diagnostic and therapeutic ERCP. Sedation is mandatory for the comfort of the patient and physician performing the procedure. In this respect it is known that the short-acting anesthetic propofol offers certain potential advantages for sedation during ERCP. Midazolam was used before propofol because of its specific amnesic and anxiolytic properties. The analgesic component of this sedation regimen was the opioid. All drugs were given in incremental doses to prevent hemodynamic and respiratory changes in mother and fetus during the procedure. In addition to the standard monitoring, we recorded fetal heart rate with ultrasonography whenever possible during the procedure, and the fetal heart rate remained at 140–160 beats·min<sup>-1</sup>.

Simmons et al. [1] reported that, during the 2-year interval of 2001 to 2002, they successfully performed ERCP in six pregnant women between 6 and 30 weeks of gestation with symptomatic acute cholangitis or pancreatitis, without radiation exposure or major maternal complications. No post-ERCP complications occurred in this series. Two patients required cholecystectomy later, 1 in the postpartum period and the other 5 weeks post-ERCP. Two infants were born at term without complications. Two infants were born prematurely at 35 weeks, 1 with significant growth restriction and pulmonary complications and 1 without developmental problems or complications. In our patient there was no maternal or fetal complication due to the procedure or sedation.

We can conclude that pregnant patients can undergo the ERCP procedure safely if some issues such as evaluation of the patient before the procedure, monitoring of mother and fetus during the intervention, and using safe drugs for sedation are taken into consideration.

## References

1. Simmons DC, Tarnasky PR, Rivera-Alsina ME, Lopez JF, Edman CD (2004) Endoscopic retrograde cholangiopancreato-

- graphy (ERCP) in pregnancy without the use of radiation. *Am J Obstet Gynecol* 190:1467–1469
2. McGrath BA, Singh M, Singh T, Maguire S (2005) Spontaneous common bile duct rupture in pregnancy. *Int J Obstet Anesth* 14:172–174
  3. Cappell MS (2006) Sedation and analgesia for gastrointestinal endoscopy during pregnancy. *Gastrointest Endosc Clin N Am* 16:1–31
  4. Amornyotin S, Na-Pomphet S, Wongwathanyoo T, Chalayonnavin V (2004) Anesthesia for endoscopic retrograde cholangiopancreatography (ERCP) from 1999 to 2003 in Siriraj Hospital: a retrospective study. *J Med Assoc Thai* 87:1491–1495
  5. Bagcı S, Tuzun A, Erdil A, Gulsen M, Dagalp K (2003) Treatment of choledocholithiasis in pregnancy: a case report. *Arch Gynecol Obstet* 267:239–241
  6. Schmit A, Lazaraki G, Hittelet A, Cremer M, Le Moine O, Deviere J (2005) Complications of endoscopic retrograde cholangiopancreatography during live endoscopy workshop demonstrations. *Endoscopy* 37:695–699
  7. Menees S, Elta G (2006) Endoscopic retrograde cholangiopancreatography during pregnancy. *Gastrointest Endosc Clin N Am* 16:41–57
  8. Gupta R, Tandan M, Lakhtakia S, Santosh D, Rao GV, Reddy DN (2005) Safety of therapeutic ERCP in pregnancy—an Indian experience. *Indian J Gastroenterol* 24:161–163
  9. American College of Obstetricians and Gynecologists, Committee on Obstetric Practice (2004) Guidelines for diagnostic imaging during pregnancy. *Obstet Gynecol* 104:647–651
  10. Glosten B (2000) Anesthesia for obstetrics. In: Miller RD (ed) *Anesthesia* Churchill Livingstone, New York, pp 2025–2068
  11. Morgan GE, Mikhail SM, Murray JM (2002) *Clinical anesthesiology*. McGraw-Hill, New York, pp 819–846