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Successful ERCP application in pregnant women with cholestasis

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Abstract

We aimed to present successful endoscopic retrograde cholangiopancreatography (ERCP) applications and results in our pregnant cases. A retrospective analysis was performed on the data of 14 successful ERCP procedures performed on our pregnant patients between 2016 and 2022. The ERCP operation was carried out on the patients while they were in the left decubitus position by endoscopists skilled in biliary endoscopy. Methods to lessen prenatal radiation exposure were used during the fluoroscopy procedure. Throughout the process, short-term fluoroscopies were employed. The duration of each fluoroscopy on the patient was noted. 14 pregnant women who presented with cholestasis results had ERCP and sphincterotomy. Two of the procedures were completed on full patients during the appropriate trimesters. Our pregnant women had a mean gestational age of 17.8 weeks and a mean mother age of 24.85.6 (19-38). The fluoroscopy took 0.16 minutes (0-35sec). Ten pregnant women (10 sec) had very little fetal radiation exposure, while four other pregnant women (4 sec to 14 sec) had some.

The two women's combined prenatal radiation exposure was reportedly between 30 and 35 seconds. One mild bleeding after sphincterotomy, two hyperamylasemia following ERCP, and one case of acute respiratory distress syndrome were procedure-related complications. Two days after an ERCP, cholecystitis manifested in one pregnant woman.

When measures are taken as directed by a multidisciplinary team, ERCP can be used during pregnancy without risk and produce positive outcomes.

Keywords: Pregnancy, ERCP, cholestasis

Introduction

Pregnancy-related physiological changes can lead to biliary disease [1,2]. High estrogen levels stimulate hepatic cholesterol production and secretion [3,4]. The release of bile acids is slowed down by bile stasis, which is caused by increased progesterone during pregnancy [3,4]. This risk rises with each additional pregnancy, and multigravid mothers are more likely to experience biliary issues [4]. In a prospective research, new cholelithiasis increased in the following time and reached up to 10.2% in the sixth week after birth in 3,200 pregnant women who had first abdominal ultrasonography (US) without gallstones [4,6].

Treatment is urgently needed for complications such as cholangitis, symptomatic choledocholithiasis, biliary stenosis, and biliary pancreatitis [6,7]. These cholelithiasis-related consequences are rather uncommon and can be managed conservatively [1-4].

The most frequent indications for endoscopic retrograde cholangiopancreatography (ERCP) are gallstone pancreatitis or choledocholithiasis. Radiation exposure to fetuses is a major worry. Endoscopic retrograde cholangiopancreatography (ERCP) can be used to safely and effectively treat pregnant individuals with gallstone disease complicated by cholangitis or choledocholithiasis [9-11].

CITATION

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Delaying intervention until after pregnancy or the second trimester is an usual rule in treating pregnant women with acute biliary system diseases. In extreme circumstances, ERCP should be performed on these pregnant women without delay because the risk of complications rises as the treatment is put off.

Material and Methods

After performing blood tests and imaging procedures on 14 pregnant women who had cholecystitis, choledocholithiasis, and cholangitis as a result of biliary pancreatitis, we sought to present the outcomes of the ERCP treatment. The multidisciplinary team evaluated our cases in which right upper quadrant pain, fever, jaundice, and laboratory tests showing elevated white blood cells, ALT, AST, GGT, and elevated bilirubin were present in pregnant women with gallbladder stones, choledocholithiasis, and cholangitis due to acute pancreatitis. Before the operation, the obstetrics and gynecology department talked with pregnant women. Doctors with experience carefully assessed and documented the mother's and fetus's health.

This risk rises with each additional pregnancy, and multigravid mothers are more likely to experience biliary issues [4]. The management of gallstone-related illnesses in pregnant women should be individualized, as it is with other patients. However, when making treatment decisions for pregnant women, the health of the mother and the fetus as well as the gestational age should be taken into account. Patients with asymptomatic gallstones do not require therapy. Treatment is typically started with conservative techniques in patients with biliary colic but who do not have complications such as cholecystitis of gallstones, cholangitis, biliary tract obstruction, or biliary pancreatitis [4,11–13].

Preprocedural examination often includes radiographic imaging (e.g., abdominal ultrasonography, magnetic resonance cholangiopancreatography (MRCP)) to confirm the diagnosis for the majority of patients with suspected gallstone disease and choledocholithiasis [4,14–16]. If the diagnosis of choledocholithiasis is still unclear and/or MRCP cannot be performed or is in doubt, endoscopic ultrasound (EUS) is a viable alternative [4,17]. EUS can be performed right before ERCP, and if gallstones are not found, ERCP may not be required. Moreover, in patients with proven choledocholithiasis using EUS, stone features (such as size, quantity, and position) can be assessed to simplify the ERCP operation [4,18]. Pre-procedural preparation for ERCP patients who are pregnant is the same as for ERCP patients who are not pregnant.

Pregnancy-related cholangitis has a high mortality rate for both the mother and the fetus. ERCP is the most efficient technique of treatment for cholangitis and pancreatitis brought on by choledocholithiasis [4,5]. The use of ERCP during pregnancy is nevertheless restricted since it involves radiation. Fetal mortality, intrauterine growth restriction, deformities, and childhood cancer are possible dangers of ERCP [4]. During pregnancy, it has been advised to employ imaging techniques devoid of

ionizing radiation [9]. Consequently, it is crucial to make every effort to totally rule out radiation during ERCP. The literature has demonstrated that ERCP can be carried out safely in skilled hands without the need for fluoroscopy [9–12]. In clinical practice, therapeutic ERCP is frequently done during pregnancy with clear grounds [12,13]. The long-term negative effects of children's radiation exposure are unknown, despite the fact that the research on radiation exposure in ERCP has demonstrated that ERCP is safe and effective early after the surgery [13–18]. After birth, late adverse effects including cancer can take years to manifest. The initial option for ERCP during pregnancy should be radiation-free to address this radiation issue [4,5,19,20].

In our research, we used ERCP along with radiation. Lead shields were placed under the mother during the ERCP treatment, and lead shields were positioned in the front when necessary, in order to minimise the fluoroscopy time and the radiation exposure to the mother and particularly the fetus. In any patient without a control, fluoroscopy was not employed; instead, a film was just taken for baseline viewing. Biliary endoscopists with experience performed cannulation in each case in one motion. Stones and debris were then removed from the bile ducts by conducting an endoscopic sphincterotomy, after which the bile ducts were swept with 6- and 8-mm biliary balloons. A maximum of two balloon sweeps were then carried out.

Results for our patients were assessed in the past. When abdominal ultrasonography revealed intrahepatic bile duct dilatation and elevated bilirubin levels, magnetic resonance cholangiopancreatography was utilized to determine the presence of choledocholithiasis. It was determined that pregnant women with fever, abdominal pain, jaundice, and radiological abnormalities had acute cholangitis caused by choledocholithiasis.

All pregnant women and their family members received thorough explanations of the advantages, dangers, and available treatment options connected to ERCP, and their verbal and written agreement was obtained. Results from the laboratory were examined and noted before the ERCP operation. Before the surgery, skilled obstetricians examined the mother and fetus. An anesthesiologist with experience in the ERCP surgery administered pethidine HCl (100mg) and midazolam (3mg) for analgesia and sedation. The patients were positioned correctly to avoid the abdominal aorta or vena cava crushing the uterus in expectant women. Before the expectant mother was positioned on the C-arm equipment, a lead pad was placed under her to reduce the radiation exposure to the fetus.

Senior biliary endoscopists with at least 200 procedures per year of experience carried out the ERCP technique. The bile duct was cannulated along the papilla with a guide-wire cannulation of the bile duct after the proper duodenoscope was positioned in the lumen, and attention was made to seeing the bile leaking around the guide wire to confirm uncomplicated cannulation. The bile duct architecture was followed by endoscopic sphincterotomy, and the stone inside was visible on the film obtained after

cannulation with only a small amount of opaque material. A bile balloon was quickly swept at least twice to remove stones and other debris. Since it wasn't evident whether the stones were completely removed, the proper endoscopic biliary stents were implanted.

The clinical improvement of pregnant women and the improvement of test data confirmed the therapeutic ERCP's efficacy. A radiologist with knowledge of bile ducts carried out an ultrasonographic assessment of the biliary tract following ERCP procedures. All pregnant patients were thereafter monitored up until discharge. The typical fluoroscopy took 0.16 minutes (0-35 sec). Ten pregnant women had little fetal radiation exposure (0.0001 Gy), and four of them had fetal radiation exposure between 0.0001 and 0.0002 Gy. The two women's combined estimated prenatal radiation dose ranged from 0.0002 to 0.0005 Gy.

Results

The mean gestational age for our patients was 24 weeks, and the mean maternal age was 24.8±5.6 (19-38). (8-35 weeks). Table 1 displays the laboratory results for patients. Table 2 displays research findings and treatment outcomes. All of the expectant mothers were able to get a cannulation that worked.

Table 1. Laboratory results of the patients

Mean Age	24.8±5.6 (19-38)
WBC	14300±670 (11000-16000)
ALT	124 (75-420)
AST	130 (65-390)
GGT	220 (160-430)
Bilirubin	9.5 (2.5-16)
MRCP	Stone and debris in 13 cases, 1 case normal
USG	choledochal stones in 11 cases, IHBD dilatation in 2 cases, 1 case normal
IHBD:Intrahepatic bild dilatation	

Table 2. Treatment results of patients

Number of patients 14	
Diagnosis	Ten choledocholithiasis, 2 IHBD dilatation, one biliary pancreatitis, one jaundice enzyme elevation
Procedure	Decompression with endoscopic sphincterotomy balloon in 13 cases. Stent in 1 case, was removed after delivery
Choledochal content	Stone in 10 cases Debris in 2 cases Nothing in 2 cases
Gestational age (week)	18-35 weeks
Delivery time (week)	Ten term 2 cases 36 weeks 1 case 34 weeks, 1 case 35 weeks
IHBD:Intrahepatic bild dilatation	

There were no issues with the operation that were seen in the mother or fetus. Following endoscopic sphincterotomy with the bipolar flow during the ERCP operation, biliary balloons were used to remove obstructions and stones from the biliary tract. Ten patients received six mm balloons, whereas four patients received

eight mm balloons. Ultrasonography was used on all patients to confirm that the biliary tract had been cleared of stones. One mild bleeding after sphincterotomy, two hyperamylasemia following ERCP, and one severe respiratory infection were all related to the procedure.

Discussion

Gallstone formation is brought on by irregularities in estrogen and progesterone levels during pregnancy, which raise bile's lithogenicity and hinder the gallbladder's ability to empty. The second most frequent non-obstetric emergency among pregnant women is acute cholecystitis. Both the mother and the fetus may die from choledocholithiasis and associated side effects, such as pancreatitis [4,10,11]. Significant maternal and fetal mortality results from biliary pancreatitis [4]. The management of gallstone-related illnesses in expectant women should be individualized, as it is with other patients. However, when making treatment decisions for pregnant women, the health of the mother and the fetus as well as the gestational age should be taken into account. Patients with asymptomatic gallstones do not require therapy. Treatment is typically started with conservative techniques in patients with biliary colic but who do not have complications such cholecystitis of gallstones, cholangitis, biliary tract obstruction, or biliary pancreatitis [4,11–13].

Preprocedural examination often includes radiographic imaging (e.g., abdominal ultrasonography, magnetic resonance cholangiopancreatography (MRCP)) to confirm the diagnosis for the majority of patients with suspected gallstone disease and choledocholithiasis [4,14–16]. EUS can be performed right before ERCP, and if gallstones are not found, ERCP may not be required. Pre-procedural preparation for ERCP patients who are pregnant is the same as for ERCP patients who are not pregnant.

The overall event rate for general adverse outcomes was found to be 15.9% in a meta-analysis by Azab et al., in which they analyzed 27 studies involving 1307 pregnant patients. Adverse events were reported to be 17.6% in the ERCP group without radiation and 21.6% in the ERCP group with radiation. The difference between the rates of fetal side effects in the radiation-free group (6.2%) and the radiation-affected ERCP group (5.2%) was not statistically significant (p>0.05). There was no discernible difference between the groups (p>0.05) when it came to the adverse effects experienced by expectant mothers, which were 8.4% in the ERCP group without radiation and 7.6% in the ERCP group with radiation. There was a statistically significant difference between the two groups (p<0.05) between the rates of non-pregnancy adverse events in pregnant moms who underwent ERCP without radiation and those who underwent ERCP with radiation, which was 7.6% compared to 14.9% in the former. These findings demonstrated that the ERCP technique carried out by specialists skilled in biliary endoscopy is safe and efficient in pregnancy and lowers the rates of complications unrelated to pregnancy, but not fetal or pregnancy-related issues [4,11,17]. ERCP was generally safe for the fetus, with no known fetal congenital deformity, despite the increased risk of preterm birth and low birth weight [4,18,19]. Preterm birth and intrauterine

growth retardation risk, however, was elevated in both groups.

In our research, we used ERCP along with radiation. Lead shields were placed under the mother during the ERCP treatment, and lead shields were positioned in the front when necessary, in order to minimise the fluoroscopy time and the radiation exposure to the mother and particularly the fetus. In any patient without a control, fluoroscopy was not employed; instead, a film was just taken for baseline viewing. Biliary endoscopists with experience performed cannulation in each case in one motion. Stones and debris were then removed from the bile ducts by conducting an endoscopic sphincterotomy, after which the bile ducts were swept with 6- and 8-mm biliary balloons. A maximum of two balloon sweeps were then carried out. Procedure-related issues in our study included one case of minor bleeding following sphincterotomy, two cases of hyperamylasemia following ERCP, and one case of acute respiratory distress syndrome. Two days after an ERCP, cholecystitis manifested in one pregnant woman. After giving birth, our pregnant ladies were monitored and their progress was recorded for six months. During this time, no issues like deformity, miscarriage, or stillbirth were noted. Our findings agreed with the body of research.

In order to avoid potentially fatal complications for both mother and fetus, our data show that ERCP is a technique that should be used right away for bile duct decompression during pregnancy. Non-radiation methods do not alter fetal or pregnancy outcomes, although they can lower the likelihood of non-pregnancy outcomes.

Conclusion

In conclusion, a great deal of research has been done both internationally and in our country regarding ERCP with and without radiation during pregnancy [4,5,10,18,19]. For pregnant women with clear indications for ERCP, therapeutic ERCP without radiation combined with guide-wire cannulation may be a viable treatment plan. Following up with patients via laboratory and ultrasonography can be a secure, easy, and affordable way to gauge the success of the surgery. When clearing the choledoch has been unsuccessful, stenting should be explored. To make definite judgments on ERCP with or without radiation, further thorough research are required.

Conflict of interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical approval

The approval number 2022-184 dated 01.11.2022 was obtained from the Malatya Turgut Özal University Ethics Committee to allow the study to be conducted.

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