

Endoscopic Retrograde Cholangiopancreatography in Pediatric Patient Population: Bangladesh Perspective

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Abstract

Background: Endoscopic retrograde cholangiopancreatography (ERCP) is a universally established modality in the evaluation and treatment of adults with suspected biliary and pancreatic disease. Experience with ERCP in children has been relatively limited especially in a developing country like Bangladesh. **Objective:** Aim of this study is to evaluate the diagnostic and therapeutic yields of ERCP for biliary and pancreatic diseases in Bangladeshi children. **Design and settings:** This retrospective study was conducted in the departments of Gastroenterology & Hepatology of Bangabandhu Memorial Hospital and Chattagram Metropolitan Hospital, Chittagong, Bangladesh between 2004 and 2013. **Patients:** Seventy-three patients (14 males and 59 females) aged 1 year 7 months to 18 years with the suspicion of biliary or pancreatic diseases were included in this study. **Interventions:** Seventy-six procedures of ERCPs were performed. **Main outcome measures:** Common indications for ERCP and its therapeutic outcomes were assessed. **Results:** The most common indications were biliary ascariasis (25), choledocholithiasis (17), biliary dilatation of unknown cause (11), chronic pancreatitis (3), choledochal cyst (1), and Mirizzi syndrome (1). Therapeutic procedures included sphincterotomy (41), worm extraction (25), stone extraction (12), and biliary stenting (2). Adverse events were uncommon and usually minor. **Conclusion:** ERCP is a highly effective and safe diagnostic and therapeutic modality with highest indication for biliary ascariasis in Bangladeshi children. **Key words:** ERCP, ascariasis, biliary ascariasis, children, Bangladesh.

INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) is a universally established modality in the evaluation and treatment of adult patients with suspected biliary and pancreatic disease. The safety and utility of ERCP in adults has been well documented. However, experience in the use ERCP for the investigation and treatment of biliary and pancreatic disorder have been relatively limited in pediatric population especially in developing country like Bangladesh. Major limitations of ERCP in pediatric population are relative low incidence of diseases, low incidence of clinical suspicion, lack of well-trained pediatric gastroenterologist in ERCP due to little exposure to the procedure, limited availability of pediatric duodenoscope, impression that ERCP in children is technically difficult to accomplish, and increasing use of MRCP in the field of diagnostic indications. Also data on the outcomes of ERCP in pediatric patients

are limited due to fewer studies and small number of patients in published trials. Aim of this study is to evaluate the diagnostic and therapeutic yields of ERCP for biliary and pancreatic diseases in Bangladeshi pediatric patient population.

PATIENTS AND METHODS

The data of all consecutive patients aged less than or equal to 18 years who underwent ERCP procedures between the years 2004 and 2013 in Bangabandhu Memorial Hospital and Chattagram Metropolitan Hospital were retrospectively identified through computer database searches. Patients having suspected biliary and pancreatic diseases with characteristic features of clinical, laboratory, and imaging examinations, were selected for the study. ERCP was performed with adult Pentax duodenoscopes (ED 3440T & ED 3480 TK), Siemens (Siremobil Compact) fluoroscope, microvasive, and other endoscopic accessories. The method of anesthesia was intravenous sedation with a combination of midazolam, fentanyl and ketamine. The standard guidelines were followed for pre and post procedural measures. The routine disinfection of the instruments and accessories was done with activated glutaraldehyde solution. The IRB, Bangabandhu Memorial Hospital, Chittagong, Bangladesh, has given permission to conduct this study.

RESULTS

During the study period, a total number of 2646 ERCPs were performed. Of these only 76 (2.9%) were done in pediatric patient population with the age range of 1 year 7 months to 18 years (mean age 13 years). There were 14 (19.2%) male and 59 (80.8%) female patients.

The common indications were biliary ascariasis in 25 (30.4%), choledocholithiasis in 17 (22.4%), biliary dilatation of unknown cause in 11 (14.5%), chronic pancreatitis in 3 (3.9%), choledochal cyst in 1 (1.3%), and Mirizzi syndrome in 1 (1.3%).

The diagnostic yields and the therapeutic outcomes of patients who had undergone ERCP are shown in Tables 1 and 2, respectively. Therapeutic interventions performed included endoscopic sphincterotomy 41 (56.2%), worm extraction from biliary tree 24 (96%), stone extraction from biliary tree 12 (70.6%), stone extraction from pancreatic duct 1 (33.3%), and biliary stent placement in 2 patients. There were no instances of pancreatitis, bleeding, or perforation related to ERCP.

Table 1: Diagnostic outcome of pediatric ERCP

Diagnosis	Number	Percentage (%)
Biliary ascariasis	25	30.4%
Choledocholithiasis	17	22.4%
Biliary dilatation, unknown cause	11	14.5%
Chronic pancreatitis	3	3.9%
Choledochal cyst	1	1.3%
Mirizzi syndrome	1	1.3%
Undiagnosed	7	9.2%
Normal	11	14.5%

Table 2: Therapeutic outcome of pediatric ERCP

Procedures	Number	Percentage (%)
Endoscopic sphincterotomy	41	96%
Worm extraction from biliary tree	Success: 24 Failure: 1	96.4% 4%
Stone extraction from biliary tree	Success: 12 Failure: 5	70.6% 29.4%
Stone extraction from pancreatic duct	Success: 1 Failure: 2	33.3% 66.7%
Biliary stenting	2	

DISCUSSION

ERCP has a revolutionary impact on diagnosis and treatment of adult patients with suspected biliary and pancreatic diseases worldwide. The safety and utility of ERCP in adults has been well documented. But experience with ERCP in pediatric population has been limited especially in a developing country like Bangladesh. This is the first study of ERCP in pediatric patients having suspected biliary and pancreatic disease in Bangladeshi population. In neonates and in infants younger than 12 months, ERCP was performed with a special pediatric duodenoscope (Olympus America Inc., Singapore) which has an insertion tube diameter of 7.5 mm with a channel of 2.0 mm.¹ A standard adult duodenoscope (ED 3440T and ED 3480TK) with insertion tube diameter of approximately 11 mm with a channel of 4.2 mm, was used in all the pediatric patients including the youngest one of age 1 year 7 months. Successful cannulation of

common bile duct (CBD) in neonates and young infants varies from 27% to 95% according to the experience of the endoscopist.¹⁻⁴ Only one patient failed in cannulation of CBD (success rate 98%).

ERCP was indicated in almost three times more in female than male patients (both adult and pediatric) in our previous study.⁵ In the present study, of only pediatric population, the ratio of male and female patients have been similar.

The highest indication of pediatric ERCP in our study was biliary ascariasis (30.4%), which was almost close (24.2%) to our previous study of total population.⁵ Ascariasis is the most common of intestinal helminthiasis affecting a quarter of the world's population. Prevalence is high where there is poor hygiene and sanitation or where human faeces are used as fertilizer. Heavy infection is most common among children. *Ascaris* infection is particularly common in the Far East, India, and South Africa.⁶ In Bangladesh, different investigators have reported ascariasis prevalence rates differently ranged from 65% to 92% in rural children and 40% to 66% in urban children. *Ascaris* infestation can produce acute biliary obstruction and cholangitis. The worm can be seen with ERCP and can be recovered with tripod basket.⁷ The authors could extract the worms from biliary trees in 96% of the pediatric patients.

Cholelithiasis was found in 22.4% of the pediatric population. Cholelithiasis occurs rarely in both infants and children.⁸ Conditions associated with the presence of stones include biliary tract malformation such as choledochal cyst, chronic liver disease, hemolysis, and infection. It has already been shown that stones in intrahepatic bile ducts are particularly common in certain parts of the world such as Far East and Brazil where they are associated with parasitic infestations. In biliary ascariasis, the adult worm may lodge in CBD producing partial bile duct obstruction and secondary cholangitic abscess. The *ascaris* may be a nucleus for intrahepatic gallstones.^{9,10}

The role and value of ERCP and endoscopic sphincterotomy in children with cholelithiasis are not well established. Sphincterotomy with CBD stone removal has been successfully performed in young infants, in children, and in adolescents.¹¹⁻¹⁵ The authors could successfully extract the stones from biliary trees in 70.6% of the pediatric patients.

In children with chronic pancreatitis, debilitating pain and recurrent attacks may be caused by pancreatic stones, strictures of the main duct, or pseudocysts that impair the normal outflow of pancreatic juice. ERCP can demonstrate the abnormalities that can be treated endoscopically.^{16,17} The

authors were able to extract stones from main pancreatic duct in 1 of 3 patients having chronic pancreatitis.

Choledochal cyst is primarily a disease of children and young adults, and 60% of reported cases are diagnosed before age 10.¹⁸ Only 1 (1.3%) choledochal cyst of total pediatric patient population, were detected.

Biliary dilatation of unknown cause was found in 11 (14.5%) patients of total pediatric population. Sequelae of biliary ascariasis with recent spontaneous expulsion might be the underlying cause in most of these biliary dilatations.

The incidence of adverse events in pediatric patients is not well established. In neonates and young infants with neonatal cholestasis, there were no major adverse events in the studies reported in literature.¹⁻⁴ In our series, there were no instances of pancreatitis, bleeding, or perforation related to ERCP.

ERCP has been found highly effective and a safe diagnostic and therapeutic modality with the highest indication for biliary ascariasis in Bangladeshi pediatric patient population having suspicion of biliary and pancreatic disease.

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