



Digestive Endoscopy

Therapeutic ERCP in paediatric patients[☆]

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Abstract

Background. Major limitations of endoscopic retrograde cholangiopancreatography in paediatric populations are a low incidence of biliopancreatic disease among children, the equipment dimensions (size of endoscopes and devices) and the increasing role of MR-cholangiopancreatography in the field of diagnostic indications. Aim of this study was to evaluate the diagnostic and therapeutic yields of endoscopic retrograde cholangiopancreatography for biliopancreatic diseases in a paediatric population.

Methods. Between 1996 and 2002, 48 endoscopic retrograde cholangiopancreatographies were performed in 38 children aged 4 weeks to 17 years as part of the diagnostic evaluation for suspected pancreatic or biliary tract disease. Endoscopic retrograde cholangiopancreatography was carried out under general anaesthesia, using prototype paediatric duodenoscopes or standard duodenoscopes in children younger or older than 18 months, respectively.

Results. The indications to perform endoscopic retrograde cholangiopancreatography were common bile duct stones (14 children), biliopancreatic abnormalities (8), primary sclerosing cholangitis (2), Wirsung disruption (1), biliary leakage (1), cholestasis (4) and pancreatitis (8). Cannulation was successful in all patients but one. Sphincterotomy together with stone extraction or stent insertion was performed in 30/38 patients. Immediate complications were mild and treated conservatively.

Conclusions. Diagnostic and therapeutic endoscopic retrograde cholangiopancreatography can be used safely and effectively in the management of biliopancreatic diseases in childhood as well. Indications, endoscopic techniques and complications are similar to those reported for adult patients.

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1. Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is an established procedure in the management of most benign and malignant biliopancreatic diseases in adult patients. Although feasibility of ERCP in the paediatric population has been repeatedly demonstrated [1–15], a clear consensus for appropriate indications and choice of endoscopic

treatment has not been achieved yet; furthermore, published experiences remain relatively limited. This fact is related to the low incidence of biliopancreatic disease in the paediatric population, to the available equipment (size of endoscopes and devices), to the endoscopists' experience in the field of paediatric ERCP, and recently, to the development and the improvement of magnetic resonance cholangiopancreatography (MRCP) for the diagnosis of biliopancreatic diseases. Quite recently, the state-of-the-art field of application of ERCP in paediatric patients has been reviewed extensively [16–18].

We report our experience on 48 ERCP performed consecutively in 38 patients with biliary and pancreatic disorders, with particular reference to safety of the procedure, its

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diagnostic and therapeutic yields and its impact on the patient's management.

2. Materials and methods

Between March 1996 and March 2002, 38 patients with biliopancreatic disorders were evaluated. There were 14 boys and 24 girls, aged from 4 weeks to 17 years. Every patient aged less than 18 years, referred to our Divisions for ERCP during this time period, was included in the study. All ERCP procedures were performed by a single endoscopist (R.R.) with experience in ERCP in adults.

Clinical data, ERCP report and other data regarding patients and procedures were obtained by a retrospective evaluation of clinical records and from a database of ERCP procedures. The study was approved by the local Ethical Committee.

The patients were classified as having either biliary or pancreatic indications for ERCP, based on clinical history, physical examinations, liver function tests, serum amylase/lipase levels, abdominal ultrasonographic CT scans and/or MRCP findings.

Before performing ERCP, an informed written consent was obtained from every patient's parents after extensive explanation of the risks and benefits of the procedure.

All patients underwent the procedure in the surgical theatre, under general anaesthesia, in order to provide airway protection and optimal tolerance.

Endoscopy was performed using prototype paediatric duodenoscopes (Olympus PJF 7.5) with 2.0 mm diameter operative channel in children younger than 18 months, and standard duodenoscopes (Pentax ED3430K or Olympus JFIT20) with a 3.8–4.2 mm operative channel, in those older than 1.5 years and when a therapeutic procedure was needed.

Sphincterotomies were carried out using either a double-lumen or a triple-lumen sphincterotome.

Stone extraction was performed using either a basket or an 8.5 mm diameter balloon-retriever to remove smaller debris. Antibiotic prophylaxis, usually with piperacillin, was administered when sphincterotomy or other operative procedures were carried out.

3. Results

During a 6-year period, 48 procedures were performed in 38 patients (mean 1.26 procedures per patient). Out of the 48 procedures, 11 were performed during the first year of the study, 9 in the second, 10 in the third, 6 in the fourth, 5 in the fifth and 7 during the sixth year of study; the mean number of procedures performed yearly was 8.

Median age of children was 10 years (range 4 weeks to 17 years), 31/38 (82%) of the patients were children (age was ≤ 1 year in 7 cases, >1 to 12 years in 24 cases), 7/38 (18%) were adolescent (aged 13–17 years); details of age and indications

Table 1
Stratification of patients and indications for ERCP according to age groups

	Children		Adolescents 13–17 years	Total
	≤ 1 year	>1 –12 years		
Number of patients	7	24	7	38
Mean age	16.7 weeks	8.6 years	14.7 years	
Biliary obstructions	2 (29%)	12 (50%)	5 (71%)	19 (50%)
Cholestasis	4 (57%)	–	–	4 (11%)
Acute or recurrent pancreatitis	1 (14%)	10 (42%)	2 (29%)	13 (34%)
Traumatic Wirsung dysruption	–	1 (4%)	–	1 (3%)
Biliary leakage	–	1 (4%)	–	1 (3%)

for ERCP are reported in Table 1. Indication for ERCP was biliary obstruction in 19 cases (50%), cholestasis in 4 (11%), acute or recurrent pancreatitis in 13 cases (34%), traumatic Wirsung dysruption in 1 patient (3%) and biliary leakage in 1 case (3%). Median follow-up after the first procedure was 46.5 months (range 16.4–96.6 months).

Successful cannulation of the major papilla with subsequent opacification of biliary tracts or pancreatic duct was achieved in all the patients at the first attempt, except for those with extra-hepatic biliary atresia (three cases) and for one 5-week-old infant with cholestasis (final diagnosis: choledochal sludge). A successful cannulation was achieved in 37/38 patients (97%). Details regarding operative and diagnostic ERCP are reported in Table 2.

Common bile duct stones (CBDS) were found in 14 children: all patients underwent endoscopic sphincterotomy (ES) and stone extraction. One-third of the children with CBDS (5 patients, 13% of the total population) initially presented with severe acute pancreatitis (Glasgow score >3): a prompt clinical improvement with complete symptomatic remission was observed after ES and stone extraction. One of the patients had recurrent CBDS after 2 years, and retreatment was performed successfully.

In three patients with gallbladder stones associated with CBDS and indication to cholecystectomy, ERCP was performed during the surgical laparoscopic procedure, after placement of a guided wire through the cystic duct (*rendez-vous technique*) under laparoscopic guidance [19].

All patients had undergone abdominal ultrasound prior to ERCP, and a significant dilation of biliary tree was

Table 2
Frequency of therapeutic and diagnostic ERCP (data are expressed as number of cases and percentage)

Endoscopic therapy	Number of cases (%)
Biliary sphincterotomy	31 (82)
Pancreatic sphincterotomy	6 (16)
Stone extraction	16 (42)
Stent insertion	9 (24)
Diagnostic ERCP	6 (16)
Total number of patients	38 (100)

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