Evaluation of Guide Wire Cannulation Technique in Elderly Patients with Choledocholithiasis

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Abstract

Aims: Post-ERCP pancreatitis is the most frequent complication of ERCP. We aimed to evaluate guide-wire cannulation as compared to conventional contrast-assisted cannulation with regard to the rate of post-ERCP pancreatitis (PEP) in elderly patients with choledocholithiasis. **Methods**: Patients aged 80 years or over with known choledocholithiasis, who were referred to ERCP in one single district hospital from January 2005 to March 2008 were reviewed retrospectively. **Results**: During this period, 246 ERCPs were performed in 217 patients. In 82 procedures (37.0%) deep cannulation of the biliary tree was achieved by means of a contrast-assisted procedure, whereas in the remaining 135 attempts a guide wire was used. Among the 64 patients older than 80 years, cannulation was accomplished in 25 by contrast visualization of the biliary tree and in 39 by means of the guide-wire. In the overall population of 217 patients, PEP occurred in 11 patients (5%), 10 and 1 case, respectively, for each of the two procedures (p=0.00042). In the elderly patients, PEP occurred in 5 out of 25 patients after contrast filling of the bile duct, and in 1 out of 39 patients after the guide-wire utilization (p=0.021). Cannulation was successful in 201 of 217 patients (92.6%), and in 57 of the 64 elderly patients (89%) (36 with guide wire, p=0.42). Bleeding occurred in 5 patients (2.3%) and perforation in one (0.46%). **Conclusion**: The guide-wire seems to reduce the incidence of pancreatitis in the elderly compared to conventional contrast but does not improve the success rate for cannulation.

Key words

ERCP – elderly – guide-wire cannulation – post-ERCP pancreatitis

Received: 16.02.2009 Accepted: 27.04.2009
J Gastrointestin Liver Dis
June 2009 Vol.18 No 2, 185-188
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Introduction

Despite the fact that therapeutic ERCP is increasingly being used to manage biliary tract diseases, the procedure remains compounded by two persistent problems: failure of successful biliary cannulation, and post ERCP-pancreatitis (PEP) [1]. Post-ERCP pancreatitis is the most frequent complication of ERCP. In prospective series of non-selected patients, it occurs at a rate of 2.1% to 39% [2-5]. However, a recently published systematic review of post-ERCP complication, involving 16,855 patients, described that pancreatitis occurred only in 585 (3.47%) of all patients. Pancreatic damage was mild in 262 cases (44.8% of all pancreatitis) and moderate in 256 (43.8%), severe pancreatitis developed in 67 patients (11.4%) of all patients with post-ERCP pancreatitis [6].

ERCP is considered to be a potentially life–saving intervention. One of the major concerns with ERCP, especially in the elderly and particularly in those with multiple co-morbid conditions has been shown to be related to common bile duct (CBD) cannulation and its exploration in patients 80 years or older reportedly has a high mortality rate at 9 % [7].

Guide-wire cannulation has been proposed as a simple way to avoid PEP [8].

Our aim was to examine whether primary deep biliary cannulation with guide-wire was associated with a lower rate of PEP than conventional contrast-assisted cannulation in the elderly with choledocholithiasis.

Patients and Methods

Patients aged 80 years and over with choledocholithiasis who underwent ERCP at the Endoscopy Unit, University Hospital of Alexandroupolis between January 2005 and March 2008 were indentified and retrospectively reviewed. Only patients with known choledocholithiasis, confirmed by MRCP were included. Patients with previous endoscopic sphincterotomy, cancer (pancreatic or biliary), surgically altered anatomy (Bilroth II gastrectomy) and periampullary diverticulum were excluded.

Patients referred for ERCP were routinely assessed by a member of the Endoscopy Unit to assess the appropriateness of the indications. Patient or family members were informed regarding the indication and the risk associated with the intended procedures. Consent was obtained from patients or family members if patients were unable to give written consents. The procedures were routinely conducted under conscious sedation with intravenous midazolam (Dormicum) and pethidin. Moreover, hyoscine hydrobromide (Buscopan) or glucagon was used as smooth muscle relaxants at the endoscopist discretion.

All procedures were performed by the same experienced gastroenterologist in the Endoscopy Unit using the Olympus endoscopic system. There was a random distribution based on the endoscopist's personal preference. Therapeutic endoscopes were used in all cases. Patients underwent initial cannulation of the CBD either with standard catheter (ERCP- 1, 5.5 Fr. Standard tip; Wilson-Cook Medical Inc., Wiston Salem NC, USA) or hydrophilic guide-wire (HGW) (Jagwire standard, 0.035-inch, tip style straight; Boston Scientific Corp. Natick, MA, USA).

After endoscopic sphincterotomy, stone clearance was performed, unless there were contradications. For stone clearance, either the biliary mechanical lithotripter (BML, Olympus) was routinely used under fluoroscopic guidance to crush big CBD stones or basket (Dormia basket, Olympus) and balloon catheter (Extractor XL triple lumen retrieval balloon, Boston Scientific Microvasive), through which a check cholangiogram was performed to ensure the end of the procedures.

Routine monitoring of pulse, blood pressure and saturation were performed before, during and after the procedures. All patients were assessed clinically at the bedside before discharge from the endoscopy unit. Any adverse events occurring during the procedures were addressed immediately by the performing endoscopist.

Patients were monitored closely for the first 24 hours post–procedure before discharge from the hospital and asked to have laboratory tests including serum amylase, bilirubin, as well as plain abdominal radiographs. CT scans were obtained in patients with post procedure symptoms to determine whether intraperitoneal or retroperitoneal air or pancreatitis were present. Cases of bleeding and perforation were also reported.

Post-discharge, all patients were followed-up in the gastroenterology outpatient clinic. Data on patients' demography, indications, events and complications were retrieved from case records. A diagnosis of PEP was made in the presence of typical abdominal pain associated with a greater than three–fold elevation of serum amylase above the upper limit of normal on day 1 after the procedure. All ERCP complications were graded according to consensus criteria [9].

The statistical software package SPSS for Windows Version 8.o (SPSS INC, Chicago, IL, USA) was used to analyze the data. Statistical significance was taken as $p<0.05$.

Results

Patients were enrolled retrospectively between January 2005 to March 2008. During this period, 246 ERCP procedures were performed. A total of 217 patients with naïve papillae, who met the criteria underwent either contrast-assisted cannulation (n= 82), or with guide-wire (n=135). In 194 patients (78.7%), ERCP was performed only once. The remaining 23 patients (21.3%) had more than one procedure, as follows: two (n=19), three (n= 3), or four procedures (n=2). Repeated procedures were mainly performed for stent replacement.

Among all patients, 64 (29.5%) were elderly (> 80 years), with a mean age of 83.7±2.7 years.

Primary selective CBD cannulation using a standard catheter was performed in 25 elderly patients, and using a guide-wire in 39. There was no statistically significant difference between the two treatment arms with respect to gender and technique used: 25/82 in standard catheter group (30.4%) vs. 39/135 in the guide-wire group (28.8%) (p=0.82).

The overall cannulation success rate was 92.6% (201/217): 75 in the contrast group and 126 in the guide-wire group. Among the 75 patients in whom CBD cannulation was performed with the assistance of the standard catheter method, 21 were above 80 years and 54 below. No difference was found between the two groups of age regarding the success rate, either in the contrast, or in the guide–wire group: 21/25 (84%) above 80 years vs. 54/ 57 (94.7%) success in catheter group(p=0.17) and 36/ 39 (92.3%) in the elderly vs. 90/96 (93.75%) success in the younger patients with guide-wire (p=0.88).

Overall, in the elderly there were 7 failures of cannulation (4 in the contrast arm and 3 in the guide–wire arm). According to our results, the guide-wire technique did not improve the success rate for biliary cannulation during ERCP in the elderly.

Complications occurred in 17 patients (7.8%), of whom 9 were elderly (9/64, 14%): 14 out of 17 belonged to the contrast arm and 3 to the guide-wire arm. Among the elderly, 7 out of 25 in the contrast group developed complications compared to 2 out of 39 in the guide-wire group (p=0.008). Table I describes the post-ERCP complications in both groups.

The most frequent complication was PEP, which developed in 11 patients out of 217 (5%). Post sphincterotomy bleeding was recorded in 5/217 (2.3%), and was associated mostly with the cannulation with standard catheter. It occurred in 4 out of 82 (4.9 %) in the contrast group vs 1 out of 135 (0.75%) in the guide-wire group (p=0.048). Bleeding after endoscopic shincterotomy was always immediate: 5 patients were successfully treated with endoscopic injection of normal saline plus epinephrine (1:10,000) and none of them required blood transfusion.

Duodenal perforation occurred in one 82 year old male patient in the guide wire group and in none of the contrast group (p=0.27), but eventually surgery was avoided.

Table I. Post-ERCP complications in the two groups of patients in relation with age

Complications	Standard Catheter Group		Total (n=82)	Guide-wire Group		Total (n=135)	Both Groups Total (n=217)	P-Value
	≥80 (n=25)	<80 (n=57)		≥80 (n=39)	<80 (n=96)			
Bleeding	2	2	4 (4.9%)	1	0	1 (0.75%)	5	0.048
Perforation	0	0	0 (0%)	1	0	1 (0.75%)	1	0.27
Pancreatitis	5	5	10 (12.2%)	1	0	1 (0.75%)	11	0.00042
mild	4	4	8 (9.7%)	0	1	1 (0.75%)	9	0.009
moderate	0	1	1 (1.2%)	0	0	0 (0%)	1	0.18
severe	1	0	1 (1.2%)	0	0	0 (0%)	1	0.18
Total number patients	7	7	14 (17%)	2	1	3 (2.2%)	17	0.00036

Among the 11 patients with PEP, 10 belonged to the standard catheter group and only 1 to the guide-wire group (10/82 vs. 1/135) (p=0.0042). In 9 patients, pancreatitis was mild and in one moderate. Severe pancreatitis occurred in one 84 year old male patient who finally developed a pseudocyst and underwent surgical intervention.

Furthermore, PEP developed in 5 out of 25 (20%) among the elderly in whom the contrast-assisted technique was used, and only in 1 out of 39 (2.5%) in whom the guide-wire technique was chosen (p=0.021).

There was a statistically significant association between the reduced rate of postinvestigational pancreatitis and the performance of the guide-wire cannulation, especially in the elderly.

Among all the 17 patients who developed complications, 7 were male and 10 female (p=0.61). In the PEP group, 9 were female and 2 male (p=0.04). No association was observed between PEP and gender in the subgroup of elderly patients.

Discussion

ERCP is a potentially life-saving procedure in the elderly. There has been an increase in the demand on therapeutic ERCP due to biliary tract pathologies as the population grows older. In old patients often, one or more concomitant diseases are observed and presentations can be atypical. Both factors may lead to difficulty in diagnosis and treatment [7].

In addition, PEP is the most common complication of ERCP and potentially one of the most serious [10]. Lella et al proposed that accessing the bile duct with soft-tipped tracer guide-wire, post-ERCP pancreatitis could be prevented [8]. In this technique, the biliary or the pancreatic duct was cannulated with a guide-wire inserted through a catheter or sphincterotome instead of catheterizing after contrast injection. Guide-wire cannulation possibly reduces the risk of PEP by minimizing the risk of injury to pancreas, since duct opacification is often avoided. Despite the encouraging results, the data are limited regarding the high risk populations.

The aim of this retrospective study was to examine whether primary deep biliary cannulation with guide-wire is associated with a reduced rate of PEP compared to conventional contrast-assisted cannulation in the elderly. All procedures were performed by the same experienced endoscopist in a single hospital. Only patients with choledocholithiasis were included in order to minimize the differences between the compared groups and any accompanying factors that could contribute to complications, as the study carries the disadvantages of being a retrospective one.

In our study, the patients in the two groups were comparable with respect to all important clinical characteristics including sex, indication and naïve ampullary area. The overall cannulation success rate in total was 92.6%, without differences being detected between the two groups of age and the success rate, either in the contrast group, or in the guide–wire group.

According to our results, the guide-wire technique did not improve the success rate for biliary cannulation during ERCP in the elderly. In addition, gender did not contribute to greater success in both elderly and younger patients either with contrast or with guide-wire assistance.

On the contrary, Katsinelos et al reported a higher success rate in a guide-wire group than in the standard catheter group (81.4% vs. 53.9%, respectively p<0.001), but in different population groups including younger patients and periampullary diverticula. Especially in the latest group, the study suggests the use of a HGW as the primary device to achieve CBD cannulation [11]. Similarly, Bailey et al described a higher success rate (97.3 %) and improved success with guide-wire, but there was no discrimination between the elderly and younger group [1]. Michopoulos et al reported a success rate of 95% in deep cannulation of the bile duct with the use of HGW [12]. One study suggested the use of a sphincterotome and guide-wire in cases where this had not been accomplished with a standard catheter, in order to increase the success rate of cannulation [13]. Neither the crossover cannulation technique, nor the number of attempts were routinely reported in our patients' records. Therefore, both parameters were not calculated in our study, in order to avoid unsafe results.

Moreover, none of the techniques increased the number of endoscopies that had to be repeated in both groups of age.

Regarding the complications, these occurred in 17 patients in our population (7.8%) and 9 of them were elderly (14%). We found a higher rate of complications in the elderly compared to other reports. One study in octogenarians described complications in 9.6% of the patients in total and a 4.4% PEP occurrence [14]. Fritz et al reported no significant difference in the complication rate between the elderly and younger patients (6.5% and 5.1%) but only 13.4% of the 724 patients were elderly, whereas in our population almost 30% were elderly [15]. Several studies confirmed that ERCP is safe and effective in the elderly [7, 14, 16, 17].

Especially in PEP occurrence several factors have been consistently implicated such as female sex, younger age, suspected Oddi sphincter dysfunction, history of prior PEP, recurrent acute pancreatitis and normal bilirubin level. Papillary trauma, difficult cannulation, precut sphincterotomy, biliary and pancreatic sphincerotomy, injection of contrast media into the pancreatic duct, balloon dilatation of the biliary sphincter have also been reported to increase the risk of developing post-ERCP pancreatitis [4, 18].

In our study, PEP occurred in 11 patients of whom 5 were elderly. There was a statistically significant association between the reduced rate of postinvestigational pancreatitis and the performance of the guide-wire cannulation even in the group of elderly patients.

This is a retrospective study and as such it has limitations. Although our results are encouraging, more data and well-designed prospective studies are required before guide-wire cannulation can be proposed as a safer technique in elderly patients.

Conclusion

The guide-wire technique seems to reduce the incidence of post-ERCP pancreatitis in the elderly as compared to the conventional contrast technique, but does not appear to improve the primary success rate for biliary cannulation during ERCP in this population.

Conflicts of interest

None to declare.

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