Endoscopic retrograde cholangiopancreatography in the elderly: a prospective and comparative study

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Abstract

Objective: In this study we aimed to compare the utility and safety of endoscopic retrograde cholangiopancreatography (ERCP) in elderly and younger groups of people.

Methods: The study involved 299 patients who underwent ERCP for the first time between March 2002 and January 2003. Group A consisted of 202 patients who were 69 years of age or younger and group B involved 97 patients who were 70 years of age or older. The patients were prospectively identified and data were gathered on them prospectively. Clinical and biochemical features, ERCP procedures, ERCP diagnosis, complications and length of hospital stay were compared between the two groups.

Results: Group B patients presented with more specific symptoms compared with group A. Laboratory findings were similar in both groups other than mean bilirubin levels, which were higher in the elderly group. Selective biliary cannulation was technically successful in 99% of both groups. Precut papillotomy was performed in 49.5% of group A patients and 56.7% of group B patients. Choledocholithiasis was the most frequent diagnosis in both groups. Benign biliary stenosis was more frequent in group A and malignant biliary stenosis in group B. Among the malignant aetiologies, pancreatic carcinoma was the most common cancer in both groups. Post-procedural complications developed in 27 (9%) patients. There were 16 (7.9%) complications (six bleeding, five pancreatitis, three perforation and two cholangitis) in the 202 patients aged under 70 years. In comparison, 11 (11.3%) of the 97 patients aged over 70 years developed a complication (bleeding in six, pancreatitis in one, perforation in one, cholangitis in two and ileus in one). Twelve (nine group A and three group B) patients died within 5–30 days of the procedure. Length of hospital stay was comparable for both groups (15.53 ± 12.43 days in group A and 14.84 ± 11.56 days in group B).

Conclusions: Diagnostic and therapeutic ERCP has similar outcomes in both elderly and younger patients. ERCP is effective and safe in elderly patients with naive papilla. The more invasive procedures like precut papillotomy may be performed safely in the elderly.

Keywords: endoscopic retrograde cholangiopancreatography, elderly, precut papillotomy

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is a diagnostic and therapeutic procedure that has been used worldwide for the last 35 years. It is useful for the evaluation and management of patients with anatomic evidence of bile or pancreatic duct obstruction. Although biliary and pancreatic disorders may be diagnosed by using non-invasive techniques, such as ultrasonography, computerised tomography (CT) and magnetic resonance cholangiopancreatography (MRCP), ERCP has the additional advantage of therapeutic intervention [1].

Biliary and pancreatic diseases are commonly seen in the elderly. By the age of 70, the prevalence of cholelithiasis, the most frequently occurring disorder affecting these organ systems, increases. Also, the prevalence of co-existent bile duct stones increases about four times compared with the younger population [2].
Therapeutic ERCP often obviates the need for emergency biliary tract surgery in the elderly, is better tolerated, and is associated with significantly less risk and a lower mortality [3]. There are several reports regarding ERCP success and safety in the elderly [4–10]. However, not all have been comparative and most have been retrospective. In our study we aimed to prospectively examine the safety and efficacy of ERCP in elderly patients (aged 70 years or more) compared with a lower age group.

Methods

Between March 2002 and January 2003, 1,132 ERCPs were performed in our ERCP laboratory. Patients with previous endoscopic sphincterotomy (420 procedures) and who were referred to our hospital for ERCP procedure while being hospitalised in another centre (413 procedures) were excluded (to observe and standardise the possible complications). Two hundred and ninety-nine patients who were hospitalised in our hospital and who had naive papilla were included in this study. All patients were investigated with one or more non-invasive techniques including ultrasonography, CT and MRCP before ERCP and the aim was therapeutic (curative or palliative) rather than diagnostic in all attempts. Two hundred and two patients were ≤69 years of age (group A, female 102, male 100, mean age 49.8±13.5 years) and 97 patients were ≥70 years of age (group B, female 51, male 46, mean age 74.9±4.2 years). The reason we designated the cut-point as 70 years of age was the fact that 70 years of age is still accepted as advanced age in developing countries as in Turkey.

Informed consent was obtained from all patients before ERCP. None of the patients took antiplatelet agents/anticoagulants prior to procedure. Topical pharyngeal anaesthesia was administered in all patients with 10% lidocaine spray. For premedication, midazolam (induction dose 3–4 mg for younger patients and 2 mg for older patients) and/or meperidine (induction dose 40–50 mg for younger patients and 25 mg for elderly patients) were used. Hyoscine N-butylbromide was used to slow intestinal motility. The dose of all medications was titrated according to patient need as well as duration of procedure. All procedures were performed by the two experienced ERCPists. Standardised techniques with the patients always positioned left-sided were used. ERCP procedures were performed by standard videoduodenoscope with 4.2 mm diameter accessory channels (Olympus, Japan). Blood pressure, heart rate and oxygen saturation were continuously monitored with automated pulse oxymetry.

Demographic data, clinical presentation, biochemical tests, ERCP procedures (e.g. precut papillotomy, stone extraction), ERCP diagnosis, complications and length of hospital stay were noted for both groups. Complications were classified according to the 1991 consensus guidelines [11]. Patients were followed up until discharge. These data were compared between the two groups.

Results were expressed as mean ± standard deviation. For statistical comparison Student’s t-test and the chi-squared test were used whenever appropriate. Differences were taken as significant when P<0.05.

Results

Sex distribution and biochemical findings of the groups were comparable. Younger patients presented with more atypical symptoms (malaise, vomiting, dorsal pain) compared with the elderly and the statistical difference was significant. Clinical characteristics and laboratory findings at presentation are shown in Table 1.

Periampullary diverticula was more common in the elderly (13.4% (n = 13) versus 5.9% (n = 12) and P<0.05). At the first attempt, ERCP was unsuccessful in 10 (5%) of 202

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Table 1. Age, sex, clinical presentation and biochemical findings of patients

<table>
<thead>
<tr>
<th>Age (mean ± SD), years</th>
<th>Group A (n = 202)</th>
<th>Group B (n = 97)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>70–79, n</td>
<td>49.83 ± 13.55</td>
<td>74.93 ± 4.20</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>80–89, n</td>
<td></td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>≥90, n</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Gender n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>102 (50.5%)</td>
<td>51 (52.5%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>M</td>
<td>100 (49.5%)</td>
<td>46 (47.5%)</td>
<td></td>
</tr>
<tr>
<td>ALT (mean ± SD)</td>
<td>142.26 ± 157.04</td>
<td>123.17 ± 119.95</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>AST (mean ± SD)</td>
<td>98.81 ± 108.27</td>
<td>107.18 ± 108.14</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>ALP (mean ± SD)</td>
<td>808.18 ± 720.94</td>
<td>918.78 ± 739.60</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>GGT (mean ± SD)</td>
<td>362.06 ± 368.73</td>
<td>361.26 ± 352.61</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Total bilirubin (mean ± SD)</td>
<td>6.04 ± 7.90</td>
<td>9.93 ± 11.16</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Pain</td>
<td>61 (30.2%)</td>
<td>27 (27.8%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Jaundice</td>
<td>39 (19.3%)</td>
<td>26 (26.8%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Pain + jaundice</td>
<td>53 (26.2%)</td>
<td>22 (22.7%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Fever + pain + jaundice</td>
<td>27 (13.4%)</td>
<td>21 (21.6%)</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Atypical symptomsb</td>
<td>22 (10.9%)</td>
<td>1 (1%)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

*Standard deviation.

bMalaise, vomiting, dorsal pain.

Pain, abdominal pain.
patients in group A and 9 (9.2%) of 97 in group B (P>0.05). Second attempts were successful in 15 of them (nine from group A and six from B) and the third attempt was performed successfully for one patient in group B. ERCP could not be performed in three patients because of previous gastric surgery in two (one each) and tumour infiltration in one (group A). Overall cannulation success was 99%. Duration of mean cannulation (11.15 ± 7.66 min in group A and 12.2 ± 8.3 min in group B) and total procedure duration (23.30 ± 12.93 min in group A and 25.41 ± 11.37 min in group B) were similar in both groups. Pancreatography ratio was comparable in both groups (34 (15.4%) in group A and 18 (18.6%) in group B). Precut papillotomy was performed in 100 (49.5%) and 55 (56.7%) group A and B patients, respectively; the difference was not statistically significant. Needle-knife papillotome was used in 33 (16.3%) patients in group A and 18 (18.6%) in group B (P>0.05). Precut papillotomy was achieved with standard sphincterotomy for the remainder. Endoscopic sphincterotomy was performed in 187 (92.5%) patients of group A and 92 (94.8%) patients of group B (P>0.05).

The ERCP results are shown in Table 2. In both groups, choledocholithiasis was the most frequent diagnosis. Almost all the benign biliary stenosis were due to previously cholecystectomy in both groups. Malignant biliary stenosis was more common in group B (P<0.05). In group A, among the malignant aetiologies, pancreatic carcinoma was the most frequent cancer (n = 18, 48.7%), followed by cholangiocarcinoma (n = 7, 18.9%), malignant lymph node or mass compression of the common bile duct (n = 7, 18.9%) and carcinoma of the ampulla (n = 5, 13.5%). There were 17 (48.6%) patients with pancreatic carcinoma, 7 (20%) with cholangiocarcinoma, 4 (11.4%) with statistically malignant lymph nodes or mass compression of the common bile duct and 7 (20%) with carcinoma of the ampulla in group B.

Complete clearance of bile duct stones at the first attempts was achieved in 96 of 105 (91.4%) group A patients and 44 of 49 (89.8%) group B patients; the difference was not significant. Mechanical lithotripsy was required for two patients in group A and three patients in group B. Six group A patients in whom stone clearance was unsuccessful because of large stones (n = 3), cannulation failures (n = 2) or retroperitoneal perforation (n = 1) during lithotripsy underwent second ERCP procedures. In group B, clearance of stones in five patients (two cannulation failures, two large stones and one retroperitoneal perforation) was achieved at the second attempt. Three group A patients in whom stone clearance was unsuccessful because of large stones underwent long-lasting biliary stents.

Forty-nine (24.2%) patients in group A and 29 (29.8%) in group B had an endoprosthesis inserted (P>0.05). A nasobiliary catheter was inserted in 19 (9.4%) and five (5.2%) patients in group A and B, respectively; statistical difference was unsignificant.

Sixteen (7.9%) group A and 11 (11.3%) group B patients developed ERCP-related complications (see Appendix 1 in the supplementary data on the journal website at www.ageing.oxfordjournals.org). In group A, six bleeding (all moderate and two needed two and three units transfusing), five pancreatitis (all mild), three perforation and two cholangitis were observed. In group B, six bleeding (two mild and four moderate and two needed two units transfusing each), two cholangitis, one pancreatitis (mild), one perforation and ileus were seen. The patient with ileus was unique and was given an operation; however, no obstructive cause was found in that case. Haemorrhage was controlled with a heater probe in actively bleeding patients and other cases settling spontaneously without the need for any intervention. Patients with pancreatitis and perforation became completely well in 2–3 days without any intervention other than supportive therapy.

Precut papillotomy was performed in 5 of 12 group A and 6 of 13 group B patients with periampullary diverticula. None of these patients had perforation or pancreatitis and only two (one each group) had bleeding (one mild and one moderate). Precut papillotomy (46.1% versus 58.3%), cannulation success (100% versus 98.8%), duration of cannulation (15.83 ± 8.74 versus 11.64 ± 8.14) and complications (15.3% versus 9.5%) were comparable in elderly patients with and without periampullary diverticula (P>0.05).

Twelve (nine group A and three group B) patients died within 5–30 days of the procedure (P>0.05). Causes of death were sepsis in six with malignant biliary stenosis, postoperative complications in four, and pulmonary emboli and acute respiratory distress syndrome in one each.

Length of hospital stay was comparable in both groups (15.53 ± 12.43 days in group A and 14.84 ± 11.56 days in group B).

### Discussion

In our study, we found that elderly patients who underwent ERCP presented with more specific symptoms and had more frequent malignant biliary diseases. Success and complications were similar in both younger and elderly groups. Our study suggests that ERCP is effective for both the diagnosis and treatment of biliary obstruction in elderly patients.

Since the prevalence of bile duct stones and malignant biliary disease and the risk of surgery rise with age, studies on the therapeutic success of the endoscopic procedures in the elderly become more popular. Increasing proportions of the population now survive to an advanced age [9]. In parallel to those demographic changes, recent studies include reports of ERCP experiences in the extremely elderly [4–6, 9]. Although life expectancy is increasing in developed countries,
70 years of age is still accepted as advanced age in developing countries such as Turkey.

ERCP is accepted as safe and effective for diagnosis and especially for treatment of pancreatobiliary diseases in the elderly [12]. However, there are still a relatively small number of reports [4–10]. In those retrospective and prospective studies (Table 3), overall ERCP data of the elderly have been reported but they did not consistently compare the results with younger age groups. We have therefore performed a comparative prospective study of patients with naïve papilla undergoing ERCP to determine whether the incidence of procedure-related complications has increased with age. About one-third of our series were ≥70 years of age.

All the patients were symptomatic in both groups and most of them had typical presentation, although frequency was higher in the elderly (89.1 and 99% in group A and B, respectively). Atypical presentation was more common in the elderly group compared with the younger group, possibly due to a higher ratio of malignant biliary stenosis. Charcot's triad (jaundice, pyrexia, biliary pain) was also more common in the elderly, which may be due to a tendency to delay investigation and treatment for minor complaints and to avoid medical intervention unless absolutely necessary.

Diagnostic and therapeutic success was comparable in both groups and compatible with other reported series (Table 3). The ratio of precut sphincterotomy in our patient series was higher than usual. Among expert centres, some avoid precutting almost entirely, while others utilise precutting for as many as 40% of all sphincterotomies and even for diagnostic ERCP [13]. The decision for precutting should take into account the individual patient and endoscopist. Furthermore, an immediate decision for precut papillotomy in the appropriate patient can provide bile duct access without the need for an additional procedure [13]. Precut papillotomy, performed by different institutions, confers either no or an increased risk of pancreatitis. This may reflect either patient selection or expertise of the ERCPists [14]. Our centre is one of the most expert centres in Turkey (about 1,500 ERCP per year) and we perform precutting for more than 50% of cases. The complication rate of cases with precut sphincterotomy was 11.6% in the present series. Those have been reported to vary from lows of under 5% [15, 16] to highs of 20–30% [17, 18]. Since the purpose of our ERCP attempts is therapeutic in almost all cases of biliary diseases, we tried to avoid destruction of the pancreatic duct opening and performed precutting for selective biliary cannulation. Unwillingly contrast injection to the pancreas channel occurred in only 10.9% of patients with precutting in the present series.

Overall ERCP-related complications were similar in both groups. Most prospective series report an overall short-term complication rate for ERCP and/or sphincterotomy of about 5–10% [19–21]. The complication rate in our series (9%) was compatible with those reports. In the present series most of the complications were minor and none of them resulted in death. Bleeding was the most frequent complication in our study (3 and 6.2% in the younger and elderly group, respectively). Bleeding was managed by endoscopic therapy where needed. Although older series reported up to 20% of patients having bleeding [22], this ratio has been 1–2% in recent studies [17, 20, 23, 24]. Sugiyama et al. [6] reported ERCP-related bleeding in 2% of 70- to 89-year-old patients.

In the general population, the most common ERCP-related complication is pancreatitis [3, 10, 25]. Although

Table 3. Reported series regarding elderly ERCP

<table>
<thead>
<tr>
<th>Author Year (reference no.)</th>
<th>Age range (year)</th>
<th>Study design</th>
<th>ERCP (n)</th>
<th>Procedure success (%)</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacMahon 1993 (7)</td>
<td>65–94</td>
<td>prospective</td>
<td>50</td>
<td>92</td>
<td>none</td>
</tr>
<tr>
<td>Deans 1997 (10)</td>
<td>≥65</td>
<td>prospective</td>
<td>677</td>
<td>?</td>
<td>2 deaths</td>
</tr>
<tr>
<td>Ashton 1998 (8)</td>
<td>75–100</td>
<td>retrospective</td>
<td>101</td>
<td>99</td>
<td>7 cholangitis</td>
</tr>
<tr>
<td>Sugiyama 2000 (6)</td>
<td>≥70</td>
<td>retrospective</td>
<td>403</td>
<td>98.5</td>
<td>3 pancreatitis</td>
</tr>
<tr>
<td>Clarke 2001 (9)</td>
<td>85–94</td>
<td>prospective</td>
<td>21</td>
<td>?</td>
<td>6 bleeding</td>
</tr>
<tr>
<td>Mitchell 2003 (4)</td>
<td>≥90</td>
<td>retrospective</td>
<td>23</td>
<td>91.3</td>
<td>3 cholangitis</td>
</tr>
<tr>
<td>Gonzales 2003 (5)</td>
<td>≥90</td>
<td>retrospective</td>
<td>126</td>
<td>90.5</td>
<td>1 pancreatitis</td>
</tr>
</tbody>
</table>

575
multiple risk factors for post-ERCP pancreatitis have been reported [13], our number of cases of pancreatitis was too low to have any interpretations. Pancreatitis was more frequent in the younger group (2.5 versus 1%), which is concordant with the literature [17, 19–21, 26].

Retropitoneal perforation was recognised in four patients (1.3%) and all became well with conservative treatment. The incidence of cholangitis following ERCP was too low in both groups ($P > 0.05$). The relatively low numbers of this complication in our series (1.3%) may be related to the use of biliary stents and nasobiliary catheters in patients in which clearance of the bile duct was considered incomplete.

Death from ERCP is rare (<0.5%) and most often related to cardiopulmonary complications [13, 27]. Although older age is thought to be among the commonly implicated factors increasing the risk, multivariate analyses have not substantiated that idea [27]. Similarly, deaths were mainly due to underlying diseases or surgery rather than older age in the present study.

The length of hospital stay was long for both groups. First, most of the patients had to wait because of the large number of patients. Secondly, the patients from rural areas were followed up longer because possible serious complications might occur.

In conclusion, ERCP is effective and safe even in elderly patients with naive papilla. Outcomes of ERCP for diagnostic and therapeutic success and complication rates are similar to those in younger patients. Precut papillotomy may be safely performed in elderly patients even with periamputal diverticula.

**Conflicts of interest**
We declare that there are no conflicts of interest.

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### Key points

- Endoscopic retrograde cholangiopancreatography (ERCP) is a widely used invasive procedure to evaluate and manage patients with anatomic evidence of bile or pancreatic duct obstruction.

- There are limited data about the utility and safety of ERCP in the elderly. In this study, we compared the outcomes of diagnostic and therapeutic ERCP in the elderly with a younger group.

- Both groups had similar success and complication rates.

- The more invasive procedures like precut papillotomy may be performed safely in the elderly.

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### References

A whole system study of intermediate care services for older people

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Abstract

Background: intermediate care (IC) services have been widely introduced in England and have the strategic objectives of reducing hospital and long-term care use. There is uncertainty about the clinical outcomes of these services and whether their strategic aims will be realised.


Design: a quasi-experimental study comparing a group of older people before and after the introduction of an IC service. A quota sampling method was used to match the groups.

Subjects: patients presenting as emergency admissions to two elderly care departments with falls, confusion, incontinence or immobility.

Intervention: a city-wide service in which a joint care management team (multi-agency, multi-disciplinary) assessed patient need and purchased support and rehabilitation from sector-based IC teams.

Outcomes: Nottingham Extended Activities of Daily Living score, Barthel Index, Hospital Anxiety and Depression score, mortality, readmission to hospital, and new institutional care placement at 3, 6 and 12 months post-recruitment.

Results: there were 800 and 848 patients, respectively, in the control and intervention groups. Clinical outcomes, hospital and long-term care use were similar between the groups. Uptake of IC was lower than anticipated at 29%. An embedded case–control study comparing the 246 patients who received IC with a matched sample from the control group demonstrated similar clinical outcomes but increased hospital bed days used over 12 months (mean +8 days; 95% CI 3.1–13.0).

Conclusion: this city-wide IC service was associated with similar clinical outcomes but did not achieve its strategic objectives of reducing long-term care and hospital use.

Keywords: intermediate care, older people, clinical trial, elderly