Medicine in the Elderly

Endoscopic therapy for bile duct stones in a geriatric population

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Summary: During the 5 year period to May 1988, 137 consecutive patients (age range, 65–102 years; median 84 years) with a diagnosis of choledocholithiasis, were referred to The Middlesex Hospital Geriatric Department. Endoscopic sphincterotomy was successful in 96.2% of cases and immediate biliary drainage was achieved in all but one of these patients. Stones were cleared endoscopically in 73.3% and surgically in 4.7% of cases. Long-term stenting was employed in 14.3% of patients. The 30 day mortality after endoscopic or surgical treatment was 4.7% (six deaths), although death was probably unrelated to therapy in half the cases. Deaths were due to procedural cardiorespiratory arrest (1), pancreatitis (1), pneumonia (2) and cerebrovascular accident (2). Endoscopic treatment is effective even in a high-risk geriatric population. After sphincterotomy patients with intact gall bladders should be managed expectantly.

Introduction

Choledocholithiasis is a common and treatable cause of illness in elderly patients. Common bile duct stones and cancer together account for more than 70% of cases of jaundice in patients over the age of 75 years,¹ although stones may be present without jaundice in one quarter of cases.² In this latter group presentation may be non-specific and diagnosis can be elusive.³ Although surgery for choledocholithiasis is generally safe and effective in young patients (less than 60 years), the mortality rises dramatically in extreme age.⁴ In this population of individuals with diminished physiological reserve, the mortality for common bile duct exploration may reach 9%, particularly when sepsis and jaundice are present.⁵ The dangers of surgery should not be under-estimated, especially in the over 80 year old group. Those who survive the operative risks may well experience a period of prolonged hospital stay and decline in functional independence. For these reasons endoscopic sphincterotomy (ES) is now widely used to treat common bile duct stones in elderly and high-risk patients,^{6–8} many of whom still have intact gall

bladders.^{9–12} Although increasing numbers of elderly patients are being referred to all gastrointestinal units for therapy, the Middlesex Geriatric Department receives referrals almost entirely restricted to the frail and very elderly population. These patients are both chronologically and biologically aged and may truly be described as 'geriatric'. It is important to know whether the excellent results of sphincterotomy are equally applicable to this group of patients. This paper therefore presents the results of endoscopic therapy for common bile duct stones in patients referred to the department of geriatric medicine.

Patients and methods

During the 5 year period to May 1988, 137 consecutive geriatric patients were submitted to attempted endoscopic sphincterotomy for presumed symptomatic choledocholithiasis. Diagnosis was made after consideration of both clinical and ultrasound findings. There were 98 females and 39 males aged 65–102 (mean and median 84 years).

Seventy-eight cases (57%) were referred by geriatricians, 31 (23%) by surgeons, 18 (13%) by physicians and 10 (7%) by general practitioners. Initial presentation to hospital was non-specific in

42 patients (31%). These patients were referred with falls, confusion, failure to cope or with a deterioration in functional ability. At the time of referral for ES, jaundice was present in 93 patients (68%), but the serum alkaline phosphatase level was elevated in a further 25 patients (18%). The serum bilirubin was below 100 $\mu\text{mol/l}$ in 104 patients, between 100 and 200 $\mu\text{mol/l}$ in 27 patients and above 200 $\mu\text{mol/l}$ in six patients. Sepsis was present in 75 patients (55%). Fifteen patients (11%) had acute pancreatitis. Twenty-two patients (16%) were initially referred with a diagnosis of malignancy. Thirty patients (22%) had previously undergone cholecystectomy. All patients were considered either unfit or very high risk cases for surgery. Only 35 patients were not receiving long-term medication. Drug therapy had been instituted most commonly for cardio-respiratory diseases (60 patients), and arthritis (25 patients). Other patients were receiving medication for diabetes, Parkinson's disease and cerebrovascular disorders. Many patients were receiving multiple medication. Functional capacity was not formally documented but 12 patients had previously suffered a fractured neck of femur and seven patients a stroke. Ten patients were chronically moderate to severely confused but in these cases recurrent cholangitis had prejudiced functional ability and community placement. Ten patients had superficial pressure sores and nine had been catheterized acutely before transfer.

All procedures were performed on in-patients, the majority (130) being referred from other hospitals. Endoscopy and sphincterotomy were performed under intravenous sedation using standard techniques.^{13,14} Where stones could not be extracted, drainage was provided by the placement of naso-biliary tubes or by double pig-tailed stents.¹⁵ Eighty-eight per cent of procedures were performed by one endoscopist (JRC). Intravenous fluids were given peri-procedurally and patients received routine chest physiotherapy following endoscopy. Pulse, blood pressure and oxygen saturation were monitored during the examination. All patients received prophylactic antibiotics (usually mezlocillin) before ES, and these were continued for 48 hours following therapy in patients with gall bladders *in situ*.

Results

Two patients declined investigation. Endoscopic retrograde cholangiopancreatography (ERCP) failed in four patients: two after previous polygastrectomy, one with multiple periampullary diverticula and one with pyloric stenosis. Three patients after cholecystectomy had non-dilated ducts without calculi and were not, therefore,

submitted to ES. In 27 patients with dilated ducts ES alone was performed to facilitate the use of a balloon catheter to exclude stones. Choledochal stones were confirmed in 101 patients and ES was successful in 100 of these. Neither stone extraction nor drainage were achieved in two patients who successfully underwent early surgery. Both patients had large stones impacted in the lower common bile duct. Complete stone extraction was initially successful in 68 patients. Naso-biliary drains were inserted in seven patients. Two of these were submitted to early surgery and four had stones successfully removed at a second endoscopic procedure. In one patient, the naso-biliary drain was replaced by pig-tailed stents at a second later endoscopic procedure.

Twenty-five patients in whom stone extraction failed were treated by endoscopic stenting. In one patient this was facilitated by a combined endoscopic-percutaneous procedure. Five patients had stones removed at a second further endoscopic procedure. Five other patients suffered early deaths following stent placement, one after surgery. In 15 patients stents were inserted as definitive therapy.

Complications

There were six early deaths (Table I). Five of these patients had been treated with endoprostheses for large stones. All were jaundiced and septic at the time of ERCP. One patient was submitted to surgery one week following successful stenting but died the following day. One patient with a history of fluctuating jaundice and gall bladder stones was found to have a dilated common bile duct and a stricture of the pancreatic duct in the mid-body. An ultrasound-guided percutaneous biopsy was performed to exclude cancer. The patient developed pancreatitis and died 14 days later. Post-mortem examination revealed changes of acute on chronic pancreatitis. The 30 day mortality for patients undergoing therapy was 4.7% (6/128).

Seven patients suffered non-fatal complications (5.5%). Four patients developed cholangitis which responded to antibiotic therapy. Two patients were transfused 2 and 3 units, respectively, for post-sphincterotomy haemorrhage. One patient required catheterization for retention.

Surgery

Five patients underwent early surgery (5/137, 3.7%). One patient died (patient 5 of Table I). Four patients underwent successful surgery after failed endoscopic stone extraction. Four other patients underwent late elective cholecystectomy. One patient died.

Table I Details of early deaths

Patient	Age	Presentation	Treatment	Cause of death	Time of death
1	90	J and S	Stent and percutaneous drainage of empyema	Cardio-respiratory arrest	Procedural
2	96	J and S	Stents	Pneumonia	5
3	82	J and S	Stents	CVA	22
4	78	J and S	Stents	Pneumonia	5
5	88	J and S	Stents surgery	CVA	8
6	84	J	Endoscopic sphincterotomy (no stones)	Pancreatitis	14

J = jaundice; S = sepsis; CVA = cerebrovascular accident.

Follow-up

Long-term follow-up was available on 105 patients undergoing endoscopic therapy. The mean follow-up was 20 months (range 1–72 months). There were 22 non-biliary deaths and one patient died following late elective surgery after placement of pig-tailed stents. Fifteen frail patients with large stones were treated by long-term stenting. Two patients underwent elective surgery. Follow-up was not available in three patients. One patient died in an accident at 27 months. Nine other patients remain alive at a mean follow-up of 24 months (range 4–48). One patient has required further endoscopic therapy for recurrent cholangitis.

Overall results

ERCP failed in four patients. Endoscopic therapy was attempted in 128 patients. Sphincterotomy was successful in 96.2% (127/132). Stones were confirmed by cholangiography in 101 cases and suspected clinically in the four patients in whom ERCP failed. Clearance of stones was achieved endoscopically in 73.3% (77/105) and surgically in 4.7% (5/105). Successful endoscopic drainage (stone extraction or stenting) was provided in 91.4% (96/105) of patients with stones. Long-term stenting was employed at 14.3% (15/105) of patients with choledocholithiasis. After endoscopic or surgical treatment the 30-day mortality was 4.7% (6/128).

Discussion

The mortality in large sphincterotomy series is around 1%.^{8,15} The 30-day mortality in this study was 4.7%, although it may have been unrelated to endoscopic therapy in over half the cases. The five early deaths in patients treated by prostheses reflect their poor health rather than the treatment mode. In four of these, patient's liver function was

improving at the time of death.

It can be difficult to compare the results of endoscopic therapy and surgery because of different selection criteria.¹⁵ However, common bile duct exploration is certainly very dangerous in the elderly⁵ and the mortality may exceed 10%, particularly when surgery is performed as an emergency on patients with several risk factors.^{16,17} Management of patients following ES was made by referring consultants in all but seven patients who were admitted locally. Five patients underwent early surgery following failed stone extraction (one death). We would certainly recommend a non-surgical approach by endoscopic drainage with stenting followed by lithotripsy where appropriate. The need for cholecystectomy after ES in patients with gall bladders *in situ* still remains controversial. Although cholecystectomy can be safe in the elderly¹⁸ less than 10% of patients require cholecystectomy after ES.^{6,8,19} Elective cholecystectomy was performed in four patients following ES in this series; one patient died. In the group of patients under study it seems sensible to avoid surgery where possible and it is our policy to recommend expectant management.

The overall success rate for endoscopic stone clearance is in the region of 90%.^{8,15} Successful stone clearance was achieved in 73% of our cases. The definitive aim of endoscopic therapy is to clear the bile ducts; however, adequate biliary drainage is the immediate aim, particularly in septic patients. In this series successful drainage was provided in over 90% of cases. Lithotripsy and chemical dissolution will improve clearance rates but in this frail elderly group it was felt expedient to use long-term stents in 15 patients rather than persisting in repeated endoscopic manoeuvres. Only one of these patients developed a biliary complication which was successfully treated by a second endoscopic manoeuvre.

This series represents an unselected consecutive group of elderly patients, the vast majority of

whom had complicating medical illnesses. No patient was refused endoscopic therapy. Nearly 70% were jaundiced and over half were septic at the time of referral for ERCP. There can be no doubt that endoscopic therapy is safer than surgery in the frail and elderly. It is reassuring that good results

can still be achieved even in a very high risk group. There is therefore every reason to provide access for endoscopic treatment to such patients. Refinements in endoscopic technique, together with aggressive resuscitation and early referral of patients will further improve results.

References

1. Croker, J.R. Biliary tract disease in the elderly. *Clin Gastroenterol* 1985, **14**: 773–809.
2. Anciaux, M.L., Pelletier, G., Atali, P. *et al.* Prospective study of clinical and biochemical features of symptomatic cholelithiasis. *Dig Dis Sci* 1986, **31**: 449–453.
3. Cobden, I., Lendrum R., Venables, C.W. & James, O.F.W. Gallstones presenting as mental and physical disability in the elderly. *Lancet* 1984, **i**: 1062–1064.
4. Doyle, D.J., Ward-McQuaid, J.N. & McEwen-Smith, A. The value of routine pre-operative cholangiography—A report of 4,000 cholecystectomies. *Br J Surg* 1982, **69**: 617–619.
5. Roukem, J.A., Carol, E.J., Lieu, F. & Jakimowicz, J.J. A retrospective study of surgical common bile duct exploration: Ten years experience. *Netherlands J Surg* 1986, **38**: 11–14.
6. Escourrou, J., Cordova, J.A., Lazorthes, F. *et al.* Early and late complications after endoscopic sphincterotomy for biliary lithiasis with and without the gall bladder in situ. *Gut* 1984, **25**: 598–602.
7. Mee, A.S., Vallon, A.G., Croker, J.R. & Cotton, P.B. Non-operative removal of bile duct stones by duodenoscopic sphincterotomy in the elderly. *Br Med J* 1981, **283**: 521–523.
8. Vaira, D., D'Anna, L.M., Dowsett, J. *et al.* Endoscopic sphincterotomy in 1000 consecutive patients. *Lancet* 1989, **ii**, 431–433.
9. Davidson, B.R., Neoptolemos, J.P. & Carr-Locke, D.L. Endoscopic sphincterotomy for common bile duct calculi in patients with gall bladder in situ considered unfit for surgery. *Gut* 1988, **29**: 114–120.
10. Martin, D.F. & Tweedle, D.E.F. Endoscopic management of common bile duct stones without cholecystectomy. *Br J Surg* 1987, **74**: 209–211.
11. Hansell, D.T., Millar, M.A., Murray, W.R. *et al.* Endoscopic sphincterotomy for common bile duct stones in patients with intact gall bladders. *Gut* 1988, **29**: A727.
12. Ingoldby, C.J.H., El-Saadi, J., Hall, R.I. & Denyer, M.E. Late results of endoscopic sphincterotomy for bile duct stones in elderly patients with gall bladder in situ. *Gut* 1989, **30**: 1129–1131.
13. Safrany, L. Duodenoscopic sphincterotomy and gallstone removal. *Gastroenterology* 1977, **72**: 338–343.
14. Cotton, P.B. Non-operative removal of bile duct stones by duodenoscopic sphincterotomy. *Br J Surg* 1980, **67**: 1–5.
15. Cotton, P.B. Endoscopic management of bile duct stones: (apples and oranges). *Gut* 1984, **25**: 587–597.
16. Crumplin, M.K.H., Jenkinson, L.R., Kassab, J.Y., Whitaker, C.M. & Al-Boutiahi, F.H. Management of gallstones in a district general hospital. *Br J Surg* 1986, **72**: 428–432.
17. Lygidakis, N.J. Operative risk factors of cholecystectomy—choledochotomy in the elderly. *Surg Gynaecol Obstet* 1983, **157**: 15–19.
18. Houghton, P.W.J., Jenkinson, L.R. & Donaldson, L.A. Cholecystectomy in the elderly: a prospective study. *Br J Surg* 1985, **72**: 220–222.
19. Neoptolemos, J.P., Carr-Locke, D.L., Fraser, I. & Fossard, D.P. The management of common bile duct calculi by endoscopic sphincterotomy in patients with gall bladder in situ. *Br J Surg* 1984, **71**: 69–71.