ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN ELDERLY PATIENTS

Wen-Hsiung Chang[1,2]*, Wei-Yi Lei[1,2]

[1]Division of Gastroenterology, Department of Internal Medicine, Mackay Memorial Hospital, and
[2]Mackay Medicine, Nursing and Management College, Taipei, Taiwan.

─── SUMMARY ───

Endoscopic retrograde cholangiopancreatography (ERCP) is effective in the investigation and treatment of pancreatic and biliary disease. As the prevalence of bile duct stones and malignant disease and the risk of surgery rise with age, studies on the therapeutic success of ERCP in the elderly become more popular. There have been publications documenting the safety of ERCP in elderly patients from the age of 65 to 85 years. Recent studies have also shown that ERCP is safe and effective in those aged 90 years and older. Outcomes of ERCP in terms of success and complication rates are similar to those in younger patients. Therefore, the decision to undergo ERCP should be determined by clinical need, and age alone should not be a contraindication to endoscopic intervention. Here, we review the indications, pre-procedure preparation, sedation and analgesia, monitoring/procedural care, complications, and outcomes of diagnostic and therapeutic ERCP in the elderly. [International Journal of Gerontology 2007; 1(2): 83–88]

Key Words: elderly patients, endoscopic retrograde cholangiopancreatography

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is an invasive procedure that combines the use of endoscopy and fluoroscopy for diagnosing and treating many pancreatic and biliary diseases. It has been used worldwide for the last 40 years. Although a diagnosis may be obtained non-invasively in certain conditions using ultrasonography, helical computed tomography, and magnetic resonance cholangiopancreatography, none of these methods allow for therapeutic intervention[1].

In developed countries, increasing proportions of the population now survive to an advanced age with progress in pharmaceutical technology, better intensive medical care, and improvements in preventive medicine[2]. As the population ages, the incidence of biliary and pancreatic pathologies also increases[3], leading to an increased demand on the medical services to care for these patients. By the age of 70, cholelithiasis and choledocholithiasis are found in 33% of the population of the United States[4]. Since the prevalence of bile duct stones and malignant biliary disease and the risk of surgery rise with age, ERCP is of particular value in elderly patients. This review will focus on the indications, pre-procedural preparation, sedation and analgesia, monitoring/procedural care, complications, and outcomes of diagnostic and therapeutic ERCP in the elderly.

Indication and Contraindication

Indications for ERCP have been proposed in a consensus statement by the National Institutes of Health in 2002[5], and several points were modified in a guideline published by the American Society of Gastrointestinal Endoscopy in 2005[6]. The indications for ERCP among the elderly are largely the same as those for adults, with few variations in the relative frequency based upon the development of age-related diseases, such as biliary

*Correspondence to: Dr Wen-Hsiung Chang, Division of Gastroenterology, Department of Internal Medicine, Mackay Memorial Hospital, 92, Section 2, Chung-Shan North Road, Taipei 104, Taiwan.
E-mail: d220533864@yahoo.com.tw

tract disease, cancer, and gastrointestinal ischemia. The absolute and relative contraindications are similar to middle-aged or young adults, without respect to age.

However, decisions about therapeutic ERCP often cannot be based on guidelines, because studies leading to the guidelines have usually excluded older patients. Decisions need to be made individually in view of the increased risk caused by age-related diseases, such as cardiac and pulmonary dysfunction. Significant risk may outweigh the acknowledged benefits of a procedure. Ethical issues are also raised by the use of diagnostic or therapeutic procedures in patients with a limited life expectancy. The procedures should be restricted to situations where life expectancy will likely be extended or quality of life improved. Furthermore, physiologic age and prognosis must be considered in the elderly.

Pre-procedural Preparation

The preparation of elderly undergoing ERCP is similar to that used for upper gastrointestinal endoscopy. Informed consent should be obtained and documented before the patient is medicated. They must have ingested no solid for at least 6 hours and no liquid for at least 4 hours before the procedure, which is the same as for young adults[7]. Pharyngeal anesthesia is often administered in the form of lidocaine spray or other topical agents. To reduce duodenal motility, parenteral glucagon may be useful.

As elderly patients are more likely to have cardiovascular disease and implanted cardiac devices, one must exercise caution with electrocautery use as there is potential for inhibition of pacemaker or false detection of ventricular tachyarrhythmia[8]. Before the use of electrocautery, pacemaker-dependent patients should be programmed into an asynchronous pacing mode, and intracardiac defibrillators should be inactivated. Continuous rhythm monitoring must be used until the defibrillator is reactivated after the procedure. Currently, there are well-defined recommendations about management of patients with pacemaker and implantable cardioverter defibrillators[8–10].

Sedation and Analgesia

Most patients undergoing gastrointestinal endoscopy require sedation or anesthesia. Guidelines concerning conscious sedation and monitoring have been published[11,12]. Because of the longer duration and more potential discomfort of the ERCP procedure, conscious sedation with intravenous benzodiazepines and frequent addition of analgesic opiates are usually necessary. Sedation in the elderly requires heightened attention to dosing and the increased sensitivity of these patients to standard sedatives. Decreased arterial oxygenation, reduced hepatic and renal clearance, reduced volume of distribution for pharmacologic agents, and increased risk of aspiration contribute to the potential cardiopulmonary complications of sedation in the elderly.

Drugs used for sedation in the elderly population should have a short half-life, limited side effects, and be administered at a slower rate and with a reduced total dose. While midazolam and narcotics are commonly used in younger patients, fentanyl has a quicker onset of action and shorter half-life, and is safer than meperidine in the elderly. Propofol is a respiratory depressant with a narrow therapeutic window, but it has been shown to be safe when used in elderly patients[13,14]. Using lower initial doses of sedatives with gradual titration to effect is a helpful guide in sedating the elderly[15]. Furthermore, to minimize the sedation risk, some studies have demonstrated the role of unsedated small-caliber endoscopy in elderly patients[16–18].

Monitoring and Procedural Care

Patients who are elderly or have concomitant medical problems may be at increased risk from sedation or the procedure itself. These patients require more complex or intensive monitoring around the time of endoscopic procedures. Appropriate attention to patient monitoring before, during and after the procedure, will help to minimize complications as well as to detect early signs of distress, so that resuscitative measures can be instituted.

Parameters for monitoring include significant changes in pulse, blood pressure, oxygen saturation, cardiac rhythm, and clinical and neurologic status. Continuous electrocardiographic monitoring is routine in high-risk patients, such as those with a history of cardiac dysfunction or arrhythmia history, the elderly population, and those in whom extensive procedures are anticipated. Oxygen supplementation can reduce the incidence of oxygen desaturation and should be used in patients with known cardiopulmonary dysfunction[19].

Complications

A variety of complications, which can be categorized as nonspecific (e.g., due to sedation or drug side effects) or specific due to the procedure itself, have been described. Most prospective series report an overall complication rate for ERCP or sphincterotomy of about 5–10%[20–23]. Five independent risk factors for complications identified by Freeman et al.[23] included: difficult cannulation, precut sphincterotomy, combined percutaneous-endoscopic procedure (method-related factors); sphincter of Oddi dysfunction, and cirrhosis (patient-related factors). However, multivariate analyses have not shown advanced age to increase the risk of overall complications of ERCP[23]. Several other studies have also shown no relationship between complications after ERCP and old age or coexisting medical conditions, except for liver cirrhosis[24,25]. The post-ERCP complications were defined according to published criteria[24,26,27].

Post-ERCP Bleeding

Bleeding during ERCP is often observed after sphincterotomy. About one-half of bleeding complications occur immediately after sphincterotomy; a delay of 24 hours to several days is observed in other patients[28–30]. Most bleeding episodes are graded as mild to moderate in severity based upon a consensus definition[26]:

1. Mild: clinical evidence of bleeding (i.e., not just endoscopic), hemoglobin drop of <3 g/dL, and no need for transfusion.
2. Moderate: need for transfusion (4 units or less), with no angiographic intervention or surgery.
3. Severe: transfusion of 5 units or more, or need for angiographic or surgical intervention.

Older series reported an incidence of post-endoscopic sphincterotomy hemorrhage of 2–5%[26]. However, with more experience and better techniques, the rate is 1–2% in more recent studies[21,23,31,32]. Sugiyama et al. reported ERCP-related bleeding in 2% of 70- to 89-year-old patients[33], similar to the rate of the young adults.

The risk is higher in those with coagulopathy, thrombocytopenia, cholangitis, large stones, presence of periampullary diverticulum and large sphincterotomy. Thus, before the procedure, patients should be screened for a history of excessive bleeding and the use of anticoagulants or antiplatelet agents. A platelet count and prothrombin time must also be routinely checked, especially among extremely elderly patients (age >90 years) who have significantly higher incidence of chronic concomitant illness such as neurologic and cardiovascular diseases[34].

Post-ERCP Pancreatitis

Acute pancreatitis is the most common and serious complications of ERCP[26]. It accounted for more than one-half of complications of endoscopic sphincterotomy in two large series[23,35]. In an analysis of 59 ERCP lawsuits in North America, 30 cases and six of 15 deaths involved pancreatitis[36]. Acute post-procedure pancreatitis is defined as a new or worsened abdominal pain with a rise in serum amylase at least three times the upper limit of normal at more than 24 hours after the procedure. It has three grades of severity[26]:

1. Mild: requiring admission or prolongation of a planned admission to 2–3 days.
2. Moderate: hospitalization of 4–10 days.
3. Severe: hospitalization of more than 10 days, or hemorrhagic pancreatitis, phlegmon or pseudocyst, or required intervention (percutaneous drainage or surgery).

Clarke et al.[2] found post-ERCP pancreatitis occurring in 5% (1/21) of patients 85 years of age and older, similar to the rate in younger patients[23]. Koklu et al.[37] reported that pancreatitis was more frequent in the younger group (age ≤69 years [2.5%] vs. ≥70 years [1.0%]). Rodriguez-Gonzalez et al.[38] did not find post-ERCP pancreatitis in their series. These findings may be related to the presence of pancreatic atrophy associated with advanced age[20,33,39]. Nevertheless, a correlation between age and the frequency of post-ERCP pancreatitis was not well demonstrated.

Post-ERCP Perforation

ERCP may be rarely complicated by perforation of the esophagus, stomach, duodenum, or jejunum. The risk is increased in patients with stenosis of any of these segments and in patients who have undergone gastrectomy[40]. Retroperitoneal duodenal perforation is most common, usually as a result of sphincterotomy. It was reported in 0.5–2.1% of sphincterotomies in a large series[26], though the relationship between age and the risk of perforation at ERCP was not mentioned.

Post-ERCP Septic Complications

Infection is one of the most serious complications of ERCP, including ascending cholangitis, liver abscess, acute cholecystitis, infected pancreatic pseudocyst, infection following perforation of a viscus, endocarditis, and endovasculitis. The most frequent is ascending cholangitis from incomplete stone clearance and inadequate drainage of obstructed biliary system.

The elderly are more susceptible to infection with various pathogenic organisms than middle-aged or young adults[41]. The age-related natural decline in the immune status may contribute to increased infection-related morbidity and mortality with age[42,43]. Thus, administration of prophylactic antibiotics before ERCP in patients with biliary tract obstruction is necessary, especially in the elderly, and antibiotics should be continued if drainage is incomplete or fails[44–46].

Rare Complications

A variety of rare complications have been reported, such as gallstone ileus, colonic perforation, hepatic or vascular trauma, pneumothorax, impaction of retrieval baskets, complications related to biliary and pancreatic stents. However, the incidence has not been proven to increase with age.

Other Risk Factors

In addition to the five independent risk factors for ERCP complications identified by Freeman et al.[23], several additional risk factors have also been suggested in other reports, including older age, comorbid diseases, small bile duct diameter, emergent procedure, peripapillary diverticulum, and Billroth II gastrectomy[47]. However, these conditions have not shown evidence to increase the risk of overall complications of ERCP.

The prevalence of periampullary diverticula seems to increase with age[48]. They can cause pancreatobiliary reflux, bile-duct stone formation, or pancreatitis[48,49]. They may also reduce the cannulation success rate from 92% to 62%[50]. However, Katsinelos et al.[34] stated that periampullary diverticula did not cause technical difficulties at ERCP or increase the risk of complications in elderly patients.

Outcomes

ERCP is safe and effective for diagnosis and treatment of pancreatobiliary disease. It has been demonstrated to be safe even itn elderly patients in the age range of 65–85 years[2,37,51–53]. Recent studies have shown that ERCP in patients aged 90 years and above is safe and is not significantly associated with an increased rate of post-ERCP complications or mortality when compared with those under the age of 90[33,34,38,39,54,55]. Nevertheless, these data are mainly from the West, and data from the East is scarce. Chong et al.[56] reported that ERCP is safe in the elderly Asian population, in agreement with previous published studies from the West.

Death from ERCP is rare (0.5%) and most often related to cardiopulmonary complications[47,57]. Although older age is thought to be the common risk factor, multivariate analyses have not substantiated it[47]. Mortality has been shown to be related to severity of illness and underlying malignancy, regardless of the success of the procedure[53,58].

Conclusion

ERCP is safe and effective in elderly patients, even in those aged 90 years and older. Outcomes of diagnostic and therapeutic ERCP in terms of success and complication rates are similar to those in younger patients. Therefore, the decision to undergo ERCP should be determined by clinical need, and age alone should not be a contraindication to endoscopic intervention.

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