Endoscopic papillectomy: Indications, techniques, and results

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Abstract

Endoscopic papillectomy (EP) is currently accepted as a viable alternative therapy to surgery in sporadic ampullary adenoma and has been reported to have high success and low recurrence rates. At present, the indications for EP are not yet fully established. The accepted criteria for EP include size (up to 5 cm), no evidence of intraductal growth, and no evidence of malignancy on endoscopic findings (ulceration, friability, and spontaneous bleeding). Endoscopic ultrasound (EUS) is the imaging modality of choice for local T staging in ampullary neoplasms. Data reported in the literature have revealed that linear EUS is superior to helical computed tomography in the preoperative assessment of tumor size, detection of regional nodal metastases and detection of major vascular invasion. Endoscopic ampullectomy is performed using a standard duodenoscope in a similar manner to snare polypectomy of a mucosal lesion. There is no standardization of the equipment or technique and broad EP methods are described. Endoscopic ampullectomy is considered a “high-risk” procedure due to complications. Complications of endoscopic papillectomy can be classified as early (pancreatitis, bleeding, perforation, and cholangitis) and late (papillary stenosis) complications. The appropriate use of stenting after ampullectomy may prevent post-procedural pancreatitis and papillary stenosis. Tumor recurrence of benign lesions occurs in up to 20% of patients and depends on tumor size, final histology, presence of intraductal tumor, coexisting familial adenomatous polyposis (FAP), and the expertise of the endoscopist. Recurrent lesions are usually benign and most can be retreated endoscopically.

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Key words: Endoscopic papillectomy; Papillary neoplasms; Major duodenal papilla; Endoscopic retrograde cholangiopancreatography; Endoscopic sphincterotomy

Core tip: Endoscopic papillectomy is a relatively safe and effective therapy and should be established as a first-line therapy for adenomas of the major duodenal papilla. Accurate staging of the tumor is important in the selection of patients. Performed by experienced endoscopists leads to successful tumor eradication in over 85% of patients with ampullary adenomas.

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INTRODUCTION

Endoscopic papillectomy (EP) was first reported by Suzuki et al. Endoscopic papillectomy is currently accepted as a viable alternative therapy to surgery in sporadic ampullary adenoma and has been reported to have high success and low recurrence rates.

In the present report, several issues relating to EP...
were assessed: indications, optimal papillectomy technique, complications, and results.

**DEFINITION**

The term “endoscopic papillectomy” refers to resection of the mucosa and submucosa of the duodenal wall, in the area of the anatomical attachments of the ampulla of Vater, including the tissue around the bile duct and the pancreatic-duct orifices.

Endoscopic papillectomy differs from surgical “ampullectomy” which consists of resection of the ampulla of Vater, via a duodenotomy, including resection of pancreatic-head tissue, followed by separate reinsertion of the common bile duct and main pancreatic duct into the duodenal wall.

**INDICATIONS**

The most critical point in EP is assessment of the indication. At present, the indications for EP are not yet fully established. These could be dictated by the collection of features that can predict complete removal of a lesion, while minimizing procedure-related morbidities.

The accepted criteria for EP include size (up to 5 cm), no evidence of intraductal growth, and no evidence of malignancy on endoscopic findings (ulceration, friability, and spontaneous bleeding)\(^2\-9\).

The indications for EP are evolving\(^\[10\]-16\]. The application of piecemeal resection when appropriate, resulted in a gradual increase in the size of the tumor resected\(^17\). Intraductal extension less than 1 cm does not seem to be an absolute contraindication for EP, because the tumor can be exposed to the luminal side with balloon sweeping and, thus, resected completely\(^18\)-24. Cancer in adenoma without invasion of the muscularis propria of the duodenum, pancreas, or extension along the bile or pancreatic duct is also a possible indication for this treatment\(^21\)-23.

It is important to note that, on some occasions, EP may be indicated as a total biopsy\(^26\).

**PRE-OPERATIVE ASSESSMENT**

A common pre-operative problem is achieving a reliable distinction between benign and malignant papillary tumors.

On the basis of endoscopic appearance alone, ampullary adenomas cannot always be distinguished from ampullary carcinomas or non-adenomatous polyps (carcinoid tumors, ganglioectytic paragangliomas, etc.)\(^27\)-29. Ulceration, friability, and spontaneous bleeding are generally related to malignant lesions. The increased application of magnifying endoscopy and narrow-band imaging can assist in selecting candidates for endoscopic therapy\(^30\)-31.

A definitive tissue diagnosis is a prerequisite for appropriate management, but malignancy may be missed in up to 30% of tumors in the major duodenal papilla when forceps biopsy specimens are obtained\(^32\)-34. Moreover, the coexistence of carcinoma within adenoma cannot be excluded by pre-procedural biopsy. Some authors advocate deeper biopsy after sphincterotomy for accurate diagnosis of endoscopic biopsy\(^35\). A prospective study, however, reported that sensitivity was found to be 21% before and 37% after sphincterotomy, concluding that endoscopic forceps biopsies do not allow for reliable preoperative diagnosis of ampullary tumors\(^36\). Thus, in some cases, endoscopic papillectomy can be recommended as a diagnostic tool prior to surgery, due to the high false-negative rate of biopsy\(^37\).

**STAGING**

Endoscopic ultrasound (EUS) is the imaging modality of choice for local T staging. Data reported in the literature have revealed that linear EUS is superior to helical Computed tomography (CT) in the preoperative assessment of tumor size, detection of regional nodal metastases and detection of major vascular invasion in patients with periampullary malignancies\(^37\)-43.

Many experts agree that lesions less than 1 cm in diameter without suspicious signs of malignancy (ulceration, induration, bleeding and/or biopsies showing high-grade dysplasia or carcinoma), do not require EUS, but this needs further prospective study and validation\(^3\). Intraductal ultrasound (IDUS) using a 20 MHz frequency probe may be more accurate in visualizing the mucosal layers compared with standard echoendoscopes\(^44\)-47.

EUS/IDUS are able to accurately detect involvement of the bile and pancreatic ducts. Tumor extension into either ductal system can also be assessed by endoscopic retrograde cholangiopancreatography (ERCP). This should be performed before ampullectomy if EUS is not available or the findings on EUS are equivocal. Although the presence of intraductal extension of tumor generally indicates the need for surgery, it has been shown that tumor extension of ± 1 cm into the common bile duct or pancreatic duct can be further resected and ablated endoscopically\(^18\)-20.

CT scan, magnetic resonance imaging (MRI), and positron emission tomographic scans are highly sensitive for the detection of distant metastases. In the assessment of nodal involvement, MRI has been found to be superior to both CT and endoscopic ultrasound\(^38\).

**TECHNIQUE**

Endoscopic ampullectomy is performed using a standard duodenoscope in a similar manner to snare polypectomy of a mucosal lesion. There is no standardization of the equipment or technique and broad EP methods are described. There are also no guidelines regarding the power output and the mode of electrotherapeutic current (cutting or coagulation), the use of adjunctive interventions, such as submucosal injection, post-ampullectomy ablative therapy, and prophylactic stent placement. The need for prophylactic antibiotics prior to ampullectomy has not
been established[48].

The procedure starts with cannulation of both the bile duct and pancreatic duct, and the ducts are partially filled with contrast to ensure easy recannulation after the major papilla is resected. To preserve access to the pancreatic duct, some experts have included methylene blue in the contrast injected into the pancreatic duct to assist in identifying the pancreatic orifice.

Once delineation of the biliary and pancreatic ducts has been made a standard polypectomy snare and blended electrosurgical current (50-60 J) are generally used. The papillary tumor is snared at the base, and constant tension is applied to the snare loop during electrosurgery until the lesion is transected. Aggressive efforts to retrieve all resected tissue in all patients for histopathologic evaluation are mandatory (Figure 1).

Balloon-catheter-assisted papillectomy has also been advocated to facilitate en bloc resection mainly of flat papillary tumors[18,19].

For lesions which are not resectable “en bloc”, piecemeal polypectomy is recommended. However, en bloc resection is fundamental in the treatment of neoplastic lesions, because this allows more precise histopathologic evaluation of the resection specimen[19,48].

Submucosal injection of dilute epinephrine is suggested as a means of lifting the tumor from the wall; this may also decrease the risk of bleeding. It is uncertain, however, whether epinephrine injection reduces the risk of bleeding and perforation[11,20,50].

If residual neoplastic tissue remains after snare excision this should be destroyed. Argon plasma coagulation is the most frequently used modality due to the non-contact approach that limits the depth of tissue injury[9,48,50,51].

Many authorities suggest that placement of a pancreatic stent reduces the risk of papillectomy-related pancreatitis, minimizes the risk of stenosis of the pancreatic duct orifice and allows safer use of adjunctive coagulative therapies, however, this theory is unproven. Others advocate pancreatic stent placement only if the pancreatic duct does not drain after papillectomy[52-55]. The only prospective, randomized, controlled trial to evaluate the role of prophylactic pancreatic duct stenting for the reduction of post-ERCP pancreatitis after endoscopic papillectomy showed a statistically significant decrease in the rate of post-procedure pancreatitis in the stent group[56]. There are no data on the length of the duct to be stented. Most pancreatic stents will spontaneously migrate out of the pancreatic duct within 2 wk of insertion. This is confirmed by an abdominal X-ray at 2 wk. A stent that remains in situ is removed endoscopically.

Figure 1  Aggressive efforts to retrieve all resected tissue in all patients for histopathologic evaluation are mandatory. A: Endoscopic view of a 3 cm neoplastic lesion of the major papilla; B: The lesion is entirely entrapped by the endoscopic snare; C: The lesion is completely resected (en-bloc resection); D: The resected specimen is retrieved by a Roth Net® device (US Endoscopy, Mentor, OH, United States); E: A plastic stent is implanted into the main pancreatic duct to prevent post-papillectomy pancreatitis; F: Duodenal view 6 mo after papillectomy. No evidence of recurrent disease is observed.
Prophylactic biliary stenting to reduce the risk of post-procedural cholangitis has not been widely performed and cannot be uniformly recommended at this time unless there is concern about inadequate biliary drainage after a papillectomy.

**COMPLICATIONS**

Endoscopic ampullectomy is considered a “high-risk” procedure due to complications. Complications of endoscopic papillectomy can be classified as early (pancreatitis, bleeding, perforation, and cholangitis) and late (papillary stenosis) complications.

The overall rate of complications after ampullectomy reported from large, tertiary care referral centers varies between 8% and 35%, with the most common complications being pancreatitis (5%-15%) and bleeding (2%-16%)\[14,17,31,58-61\]. Most bleeding episodes can be controlled by conservative management and endoscopic haemostasis. Most post-procedural pancreatitis episodes are mild and resolve with conservative management only. Late complications include the development of pancreatic or biliary stenosis (0%-8%) and can be treated with sphincterotomy, stents, and balloon dilation. The appropriate use of stenting after ampullectomy may prevent post-procedural pancreatitis and papillary stenosis\[52-57\]. As evidenced by a recent randomized trial, prophylactic rectal indomethacin significantly reduces the incidence and severity of post-ERCP pancreatitis providing an incremental benefit over temporary pancreatic stents\[62\].

Mortality after endoscopic ampullectomy is rare, but has been reported to be 0.4% (range 0%-7%) on average\[63\].

**OUTCOMES**

The results of endoscopic treatment of ampulla tumors reported in the literature are shown in Table 1. Outcome data of endoscopic ampullectomy are based on retrospective, heterogeneous case series. Because there is no consensus on the definition of “success” after endoscopic papillectomy, it is difficult to compare the outcome of the reported studies. Conventionally, “success” may be defined as complete resection of the tumor with endoscopic papillectomy (as the absence of endoscopically visible and histologically proven residual adenoma during a follow-up period of 3 to 6 mo).

Recurrence of benign lesions occurs in up to 20% of patients and depends on tumor size, final histology, presence of intraductal tumor, coexisting FAP, and the expertise of the endoscopist\[14,18-51\]. Recurrent lesions are usually benign and most can be retreated endoscopically.

**CONCLUSION**

Endoscopic papillectomy is a relatively safe and effective therapy and should be established as a first-line therapy for adenomas of the major duodenal papilla. Accurate staging of ampullary tumors is important in the selection of appropriate candidates for endoscopic or surgical therapy. Compared with surgery, endoscopic ampullectomy is associated with lower morbidity and mortality, and appears to be a preferred treatment modality for small benign ampullary tumors that have no intraductal extension. Endoscopic ampullectomy performed by experienced endoscopists leads to successful tumor eradication in over 85% of patients with ampullary adenomas.

**REFERENCES**

1. **Suzuki K**, Kantou U, Murakami Y. Two cases with ampullary cancer who underwent endoscopic excision. *Prog Dig Endosc* 1983; 23: 236-239
2. **Binmoeller KF**, Boaventura S, Ramsperger K, Soehendra N. Endoscopic snare excision of benign adenomas of the papilla of Vater. *Gastrointest Endosc* 1993; 39: 127-131 [PMID: 8495831 DOI: 10.1016/S0016-5107(93)70051-6]
3. **Silvis SE**. Endoscopic snare papillectomy. *Gastrointest Endosc* 1993; 39: 205-207 [PMID: 8495850 DOI: 10.1016/S0016-5107(93)70074-7]
4. **El Hajj II**, Coté GA. Endoscopic diagnosis and management of ampullary lesions. *Gastrointest Clin N Am* 2013; 23: 95-109 [PMID: 23168121 DOI: 10.1016/j.gican.2012.10.004]
5. **Zádorová Z**, Dvořák M, Hajer J. Endoscopic therapy of benign tumors of the papilla of Vater. *Endoscopy* 2001; 33: 345-347 [PMID: 11315897 DOI: 10.1055/s-2001-13693]
6. **Wong RF**, DiSario JA. Approaches to endoscopic ampullectomy. *Curr Opin Gastroenterol* 2004; 20: 460-467 [PMID: 15689680 DOI: 10.1097/00001574-200409000-00008]
7. **Catalano MF**, Linder JD, Chak A, Sivak MV, Rajimak I, Geenen JE, Howell DA. Endoscopic management of adenoma of the major duodenal papilla. *Gastrointest Endosc* 2004; 59: 225-232 [PMID: 14745396 DOI: 10.1016/S0016-5107(03)02366-6]

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**Table 1 Outcomes after endoscopic papillectomy**

| Ref. | Patients | Successful resection | Complications | Mortality | Recurrence | Need for surgery |
|------|---------|----------------------|---------------|-----------|------------|-----------------|
| Binmoeller et al\[2\] | 25 | 23 | 5 | 0 | 6 | 3 |
| Vogt et al\[52\] | 18 | 12 | 4 | 0 | 6 | NA |
| Zádorová et al\[56\] | 16 | 13 | 4 | 0 | 3 | 1 |
| Desilets et al\[57\] | 13 | 12 | 1 | 0 | 0 | 1 |
| Norton et al\[58\] | 26 | 12 | 5 | 0 | 2 | 1 |
| Bohmacker et al\[59\] | 87 | 74 | 29 | 0 | 15 | 17 |
| Catalano et al\[60\] | 103 | 83 | 10 | 0 | 10 | 16 |
| Cheng et al\[61\] | 55 | 39 | 12 | 0 | 9 | 4 |
| Han et al\[62\] | 33 | 20 | 11 | 0 | 2 | 2 |

NA: Not available.
Endoscopic ampullectomy as a method of total biopsy for possible early ampullary cancer. Dig Endosc 2012; 24: 291 [PMID: 22725127 DOI: 10.1111/j.1443-1661.2011.01214.x]

Kwon J, Lee SE, Kang MJ, Jang KY, Kim SW. A case of gangliocytic parangangioma in the ampulla of Vater. World J Surg Oncol 2010; 8: 42 [PMID: 20497533 DOI: 10.1186/1477-7819-8-42]

De Palma GD. Masone S, Siciliano S, Maione F, Falleti J, Mansueto G, De Rosa G, Persico G. Endocrine carcinoma of the major papilla: report of two cases and review of the literature. Surg Oncol 2010; 19: 235-242 [PMID: 19586767 DOI: 10.1016/j.suronc.2009.06.003]

Uchiyama Y, Imazu H, Kakutani H, Hino S, Sumiyama K, Kuramochi A, Tsukinaga S, Matsuoka N, Nakayoshi T, Goda K, Saito S, Kaise M, Kamawmura M, Omar S, Tajiri H. New approach to diagnosing ampullary tumors by magnifying endoscopy: combined with a narrow-band imaging system. J Gastroenterol 2006; 41: 483-490 [PMID: 16799891 DOI: 10.1007/s00535-006-1800-7]

Itoi T, Tsuji S, Sofuni A, Itohaka F, Kurishita T, Tsuichita Y, Ishii K, Ikuechi N, Ishgrashi M, Gotoda T, Moriyasu F. A novel approach emphasizing preoperative margin enhancement of tumor of the major duodenal papilla with narrow-band imaging in comparison to indigo carmine chromoendoscopy (with videos). Gastrointest Endosc 2009; 69: 156-141 [PMID: 19026411 DOI: 10.1016/j.gie.2008.07.036]

Yamaguchi K, Enjoji M, Kitamura K. Endoscopic biopsy has limited accuracy in diagnosis of ampullary tumors. Gastrointest Endosc 1990; 36: 588-592 [PMID: 2279648 DOI: 10.1016/S0016-5107(90)71170-4]

Elek G, Györi S, Tóth B, Pap A. Histological evaluation of preoperative biopsies from ampulla vateri. Pathol Oncol Res 2003; 9: 32-41 [PMID: 12704445 DOI: 10.1007/BF03033712]

Bellizzi AM, Kabahle M, Stelow EB. The assessment of specimens procured by endoscopic ampullectomy. Am J Clin Pathol 2009; 132: 506-513 [PMID: 19762527 DOI: 10.1309/AJCPUZJWB8WA2HBC]

Bourgeois N, Dunham F, Verhest A, Cramer M. Endoscopic biopsies of the papilla of Vater at the time of endoscopic sphincterotomy: difficulties in interpretation. Gastrointest Endosc 1984; 30: 163-166 [PMID: 6735902 DOI: 10.1016/S0016-5107(84)7357-1]

Menzel J, Poremba C, Dietl KH, Böcker W, Domschke W. Tumors of the papilla of Vater—adequate diagnostic impact of endoscopic forceps biopsies taken prior to and following sphincterotomy. Ann Oncol 1999; 10: 1227-1231 [PMID: 10586341 DOI: 10.1093/annonc/10.10.1227]

Rivadeneira DE, Pochapin M, Grobmyer SR, Lieberman MD, Christos PJ, Jacobson I, Daly JM. Comparison of linear array endoscopic ultrasound and helical computed tomography for the staging of periampullary malignancies. Ann Surg Oncol 2003; 10: 890-897 [PMID: 14527907 DOI: 10.1245/ASO.2003.03.355]

Cannon MF, Carpenter SL, Elta GH, Nostrand TT, Kochman ML, Ginsberg GG, Stotland B, Rosato EF, Morris JB, Eckhauser F, Scheiman JM. EUS compared with CT, magnetic resonance imaging, and angiography and the influence of biliary stenting on staging accuracy of ampullary neoplasms.
De Palma GD. Endoscopic papillotomy

**Gastrointest Endosc** 1999; 50: 27-33 [PMID: 10385718 DOI: 10.1016/S0016-5107(99)70340-8]

39 Rösch T, Lorenz B, Braig C, Feuerbach S, Siewert JR, Schusdziarra V, Classen M. Endoscopic ultrasound in pancreatic tumor diagnosis. Gastrointest Endosc 1999; 40: 347-352 [PMID: 2070987 DOI: 10.1016/S0016-5107(99)70279-3]

38 Aziz LC, Broussard BL, Phadnis MA, Helin MJ, Eloubeidi MA, Varadarajulu S, Aronletti JP. Endoscopic ultrasound evaluation in the surgical treatment of duodenal and periampullary adenomas. World J Gastroenterol 2013; 19: 511-515 [PMID: 23382629 DOI: 10.3748/wjg.v19.i4.511]

37 Ito K, Fujita N, Noda Y, Kobayashi G, Horaguchi J, Takasawa O, Ohana T. Preoperative evaluation of ampullary neoplasms with EUR and transpapillary intraductal US: a prospective and histopathologically controlled study. Gastrointest Endosc 2007; 66: 740-747 [PMID: 17905017 DOI: 10.1016/j.gie.2007.03.1081]

36 Will U, Bosseckert H, Meyer F. Correlation of endoscopic ultrasound diagnosis (EUS) for differential diagnoses between inflammatory and neoplastic lesions of the papilla of Vater and the periampullary region with results of histologic investigation. Ultraschall Med 2008; 29: 275-280 [PMID: 18491258 DOI: 10.1055/s-2008-1027327]

35 Cote GA, Edmundowicz SA. The Role of Endoscopic Ultrasoundography (EUS) and Endoscopic Retrograde Cholangiopancreatography (ERCP) in the Evaluation and Management of Ampullary Adenomas. Tech Gastrointest Endosc 2009; 11: 49-57 [DOI: 10.1016/j.gie.2009.03.004]

34 Menzel J, Hoepfner N, Sulikowski U, Reimer P, Heinecke A, Poremba C, Domshchke W. Polypoid tumors of the major duodenal papilla: preoperative staging with intraductal US, EUR, and CT—a prospective, histopathologically controlled study. Gastrointest Endosc 1999; 49: 349-357 [PMID: 10049149 DOI: 10.1016/S0016-5107(99)70269-0]

33 Itoh A, Goto H, Naitoh Y, Hirooka Y, Furukawa T, Hayakawa T. Intraductal ultrasound in diagnosing tumor extension of cancer of the papilla of Vater. Gastrointest Endosc 1997; 45: 251-260 [PMID: 9087831 DOI: 10.1016/S0016-5107(97)70267-4]

32 Menzel J, Domschke W. Gastrointestinal miniprobe sonography: the current status. Am J Gastroenterol 2000; 95: 605-616 [PMID: 10710047 DOI: 10.1111/j.1577-2171.2000.tb01832.x]

31 Ito K, Fujita N, Noda Y, Kobayashi G, Horaguchi J. Diagnosis of ampullary cancer. Dig Surg 2010; 27: 115-118 [PMID: 20553245 DOI: 10.1159/000286607]

30 Menees SB, Schoenfeld P, Kim HM, Elta GH. A survey of ampullary resection practices. World J Gastrointest Endosc 2009; 15: 3486-3492 [PMID: 19630102 DOI: 10.3748/wjg.v15.i34.3486]

29 Charteron JP, Deinert K, Schumacher B, Neuhaus H. Endoscopic resection for neoplastic diseases of the papilla of Vater. J Hepatobiliary Pancreat Surg 2004; 11: 245-251 [PMID: 15368108 DOI: 10.1007/s00535-004-0897-4]

28 Desilets DJ, Dy RM, Kue PM, Hanson BL, Elton E, Mattia A, Howell DA. Endoscopic management of tumors of the major duodenal papilla: Refined techniques to improve outcome and avoid complications. Gastrointest Endosc 2001; 54: 202-208 [PMID: 11474391 DOI: 10.1016/mge.2001.116564]

27 Norton ID, Gostout CJ, Baron TH. The role of endoscopy in ampullary and duodenal adenomas. Gastrointest Endosc 2006; 64: 849-854 [PMID: 17140885 DOI: 10.1016/j.gie.2006.08.044]

26 Jun DW, Choi HS. Is the endoscopic papillotomy safe procedure in periampullary tumors?. Korean J Gastroenterol 2005; 46: 247-250 [PMID: 16179847]

25 Lee SY, Jang KT, Lee KT, Lee JK, Choi SH, Heo JS, Paik SW, Rhee JC. Can endoscopic resection be applied for early stage ampulla of Vater cancer? Gastrointest Endosc 2006; 63: 783-788 [PMID: 16693538]

24 Katsinelos P, Paroutoglou G, Kountouras J, Beltsis A, Papaziogas B, Mimidis K, Zavos C, Dimiropolous S. Safety and long-term follow-up of endoscopic snare excision of ampullary adenomas. Endosc Surg 2006; 20: 608-613 [DOI: 10.1007/s00464-004-2278-0]

23 Pandolfi M, Marino M, Gabbrielli A. Endoscopic treatment of ampullary adenomas. JOP 2008; 9: 1-8 [PMID: 1812736]

22 Elmunzer BJ, Scheiman JM, Leeman GA, Chak A, Mosler P, Higgins PD, Hayward RA, Romagnoju J, Elta GH, Sherman S, Waljee AK, Repaka A, Atkinson MR, Cote GA, Kwon KS, McHenry L, Piraka CR, Wamsteker EJ, Watkins JL, Korsnes SJ, Schmidt SE, Turner SM, Nicholson S, Fogel EL. A randomized trial of rectal indomethacin to prevent post-ERCP pancreatitis. N Engl J Med 2012; 366: 1414-1422 [DOI: 22349412 DOI: 10.1016/nejmoa1111103]

21 Heinizow HS, Lenz P, Lenze F, Domagk D, Domschke W, Meister T. Feasibility of snare papillectomy in ampulla of vater tumors: meta-analysis and study results from a tertiary referral center. Hepatogastroenterology 2012; 59: 332-335 [PMID: 21940377 DOI: 10.5754/heg11414]

20 Han J, Lee SK, Park DH, Choi JS, Lee SS, Seo DW, Kim MH. [Treatment outcome after endoscopic papillotomy of tumors of the major duodenal papilla]. Korean J Gastroenterol 2005; 46: 110-119 [PMID: 16118521]

19 Dittrick GW, Mallat DB, Lamont JP. Management of ampullary lesions. Curr Treat Options Gastroenterol 2006; 9: 371-376 [PMID: 16942661 DOI: 10.1007/BF02735825]

18 Boix J, Lorenzo-Zúñiga V, Moreno de Vega V, Domènech E, Gassull MA. Endoscopic resection of ampullary tumors: 12-year review of 21 cases. Surg Endosc 2009; 23: 45-49 [PMID: 18596849 DOI: 10.1007/s00464-008-9666-3]

17 Jung MK, Cho CM, Park SY, Jeon SW, Tak WY, Kweon YO, Kim SK, Choi YH. Endoscopic resection of ampullary neoplasms: a single-center experience. Surg Endosc 2009; 23: 2568-2574 [PMID: 19360365 DOI: 10.1007/s00464-009-0464-9]

16 Irani S, Arai A, Ayub K, Bielh T, Brandabur JJ, Dorer R, Gluck M, Jiranek G, Patterson D, Schembere D, Traverso LW, Kozarek RA. Papillotomy for ampullary neoplasia: results of a single referral center over a 10-year period. Gastrointest Endosc 2009; 70: 923-932 [PMID: 19688181 DOI: 10.1016/j.gie.2009.04.015]

15 Jeannard-Malet O, Caillol F, Pesenti C, Bories E, Monges G,
Giovannini M. Short-term results of 42 endoscopic ampullectomies: a single-center experience. Scand J Gastroenterol 2011; 46: 1014-1019 [PMID: 21492053 DOI: 10.3109/00365521.2011.571711]

Kim JH, Kim JH, Hwang JC, Yoo BM, Moon JH, Lee DK, Kim HG, Cho YD, Lee DH, Park SH. Management after endoscopic snare papillectomy for ampullary adenomas. Hepatogastroenterology 2013; 60: 1268-1273 [PMID: 23492013 DOI: 10.5754/hge11604]

Ahn DW, Ryu JK, Kim J, Yoon WJ, Lee SH, Kim YT, Yoon YB. Endoscopic papillectomy for benign ampullary neoplasms: how can treatment outcome be predicted? Gut Liver 2013; 7: 229-245 [PMID: 23560162]

Vogt M, Jakobs R, Benz C, Arnold JC, Adamek HE, Riemann JF. Endoscopic therapy of adenomas of the papilla of Vater. A retrospective analysis with long-term follow-up. Dig Liver Dis 2000; 32: 339-345 [PMID: 11515633 DOI: 10.1016/S1590-8658(00)80028-6]
