Endoscopic ampullectomy: a Medical Research Institute experience

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General Surgery Department, Medical Research Institute, Alexandria University, Alexandria, Egypt, The aim of the study was to report the results of endoscopic ampullectomy in the management of tumors of the ampulla of Vater.

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Background
Ampullary tumors account for 10% of periampullary neoplasms and can occur sporadically or in the setting of familial polyposis syndromes. Although classified as benign, ampullary adenomas are premalignant neoplasms arising from the mucosa. It is thought that the adenoma-to-carcinoma sequence does occur for these lesions. Grossly and histologically, these lesions are similar to the adenomas arising in the mucosa of the large intestine. As regards the lesion assessment of ampullary tumors, multimodality tumor staging is essential before endoscopic resection, which includes endoscopic appearance, histology, endoscopic ultrasound, magnetic resonance cholangiopancreatography, and endoscopic retrograde cholangiopancreatography.

Patients and methods
From 2013 to 2015, 20 patients admitted to the Endoscopy Unit of the Medical Research Institute Hospital, Alexandria University, underwent endoscopic ampullectomy for presumed benign tumors of the ampulla of Vater with complete follow-up for 1 year until February 2016.

Endoscopic resection technique
Complete en-bloc excision of the entire neoplasm to the plane of the duodenal wall was carried out.

Results
Successful ampullectomy was performed in all cases. As regards the pathology of lesions, 10 (50%) patients had tubulovillous adenoma, seven (35%) patients had villous adenoma, one (5%) patient had tubulovillous adenoma with dysplasia, one (5%) patient had adenocarcinoma, and one (5%) patient had carcinoid tumor. Only three (30%) patients with proven malignancy underwent pancreaticoduodenectomy. There were no recurrences in all benign cases, with the only reported complication being bleeding in three malignant cases.

Conclusion
Endoscopic ampullectomy is a safe and effective therapy for papillary adenomas, when performed by experienced endoscopists. However, there is a substantial incidence of moderate-to-severe complications that the endoscopist must be prepared to identify and manage.

Keywords:
ampulla of Vater, ampullectomy, benign adenoma, endoscopic ultrasound, pancreaticoduodenectomy

Introduction

Ampullary tumors account for 10% of periampullary neoplasms and can occur sporadically or in the setting of familial polyposis syndromes [1]. Adenocarcinomas at this location exhibit more favorable biological behavior compared with similar tumors of the adjacent pancreas or common bile duct [2]. Although classified as benign, ampullary adenomas are premalignant neoplasms arising from the mucosa. It is thought that the adenoma-to-carcinoma sequence does occur for these lesions. Grossly and histologically, these lesions are similar to the adenomas arising in the mucosa of the large intestine [3].

Histopathological classification of benign neoplastic lesions of the ampulla of Vater includes the following: tubulovillous adenomas (40%), villous adenomas (30%), tubular adenomas (10%), and nonepithelial lesions (20%), such as adenomyosis, neurinoma, and rarely endocrine adenoma [4].

Standard surgical management of periampullary adenocarcinomas is resection by means of pancreaticoduodenectomy (PD). In experienced centers, PD is associated with low mortality rates, but high rates of perioperative morbidity [5].

Local excision of ampullary neoplasms was first described by Halsted in 1899 [6]. However, it failed to achieve widespread acceptance because of the high rate of tumor recurrence and good expertise in PD for peripancreatic tumors [7].

As regards the lesion assessment of ampullary tumors [8], multimodality tumor staging is essential before endoscopic resection, which includes endoscopic appearance, histology, endoscopic ultrasound (EUS), magnetic resonance cholangiopancreatography, and endoscopic retrograde cholangiopancreatography.

Endoscopic appearance

(1) Granular or villiform epiphytic lesions are the most common (Fig. 1).

(2) Smooth elevated lesions are less frequent but have a greater risk for invasive disease (Fig. 2).

(3) Umbilicated lesions are uncommon; these lesions are primary distal biliary epithelial neoplasms.

Endoscopic appearances as a whole are less reliable in predicting deep invasion.

Histology
Preoperative biopsy and intraoperative frozen sections provide only a small sample of a larger lesion; the presence of invasive disease can be missed, and hence these methods may give a false sense of security [8].

Endoscopic ultrasound
EUS assessment should be considered for large lesions or those for which there is concern for invasive cancer, as its accuracy has been reported to be between 63 and 72.7%, with accuracy improving at higher T stages [9].

Magnetic resonance cholangiopancreatography
It allows for noninvasive assessment of the distal common bile duct (CBD) and PD to detect ductal dilatation, intraductal extension (IDE), and anatomical variants such as pancreas divisum; its accuracy is reported at 81%, in the hands of expert pancreaticobiliary radiologists [10].

Endoscopic retrograde cholangiopancreatography
Despite multimodality staging, IDE may only be identified at endoscopic cholangiography at the time of resection.

Figure 1
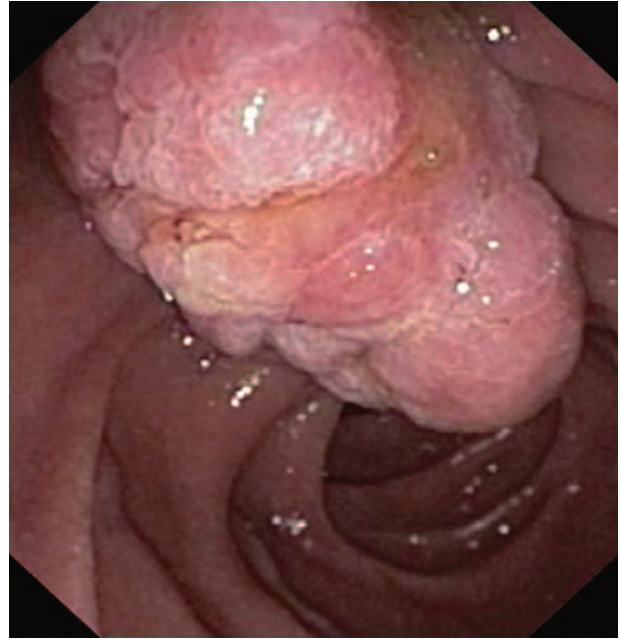
Villiform exophytic lesion.

Figure 2

Smooth elevated lesion.

Pancreatic or biliary sphincterotomy may assist in providing pancreaticobiliary drainage after papillectomy and simplify attempts to access the CBD and PD for stent placement and also in postprocedure surveillance.

If IDE is limited to the papilla (and not beyond the duodenal wall) then en-bloc excision can still be achieved.

Even in highly advanced endoscopic centers, endoscopic ampullectomy remains a 'high-risk' procedure due to its complications. Complications of endoscopic papillectomy may be pancreatitis, bleeding, perforation, or cholangitis and late development of papillary stenosis [11,12].

The most common complication is pancreatitis (5–15%) and bleeding (2–16%) [13–15]. Despite the fact that most postprocedure pancreatitis episodes are mild and resolve with conservative management, only some authors report that the use of stenting after ampullectomy may prevent postprocedural pancreatitis and papillary stenosis [16–18].

Mortality after endoscopic ampullectomy is rare, but it was reported to be 0.4% [19].

Aim of the study
The aim of this study was to report the results of endoscopic ampullectomy in the management of tumors of the ampulla of Vater.

Patients and methods
From 2013 to 2015, 20 patients admitted to the Endoscopy Unit of the Medical Research Institute Hospital, Alexandria University, underwent endoscopic ampullectomy for presumed benign tumors of the ampulla of Vater.

Presentations of the patients vary from jaundice in 15 patients (75%), abdominal pain in three patients (15%) to accidentally discovery in two patients (10%). The protocol of the study was approved by the ethical committie of the Medical Research Institute,Alexandria University.

Preprocedure protocol
Punch biopsies were taken from all studied patients and sent for pathological examination to detect our exclusion criteria:

(1) Malignant lesions.
(2) Lesion size more than 3 cm.
(3) Ulcerated lesions.

Procedure details
Position
The procedure was carried out in prone position.

Premedications
(a) Indomethacin 50 mg suppositories were administered immediately before the procedure. (b) Preprocedural Ringer's lactate solution was administered to all patients at a dose of 20 ml/kg.

Anesthesia
Total parenteral anesthesia was induced using propofol infusion with no endotracheal intubation.

Postprocedure protocol

(1) Patients were transferred to the recovery room after the procedure and discharged on the same day once they were fully conscious.
(2) Oral intake was allowed after 2 h.
(3) Proton pump inhibitor 40 mg was administered twice daily for 2 weeks.
(4) Levofloxacin 50 mg was administered orally as a broad spectrum antibiotic for 5 days.

Resection technique
An oval wire polypectomy monofilament snare 2.4 mm Endo-Flex, Germany, was mounted on an electrosurgical generator WEM, Seguranca, Brazil, using a blend cutting current, with endoscopic pulses mode at 80 W. The snare was applied to the base of the adenoma, followed by applying the current under direct vision of side viewing endoscope Olympus TJF-145, Tokyo, Japan (Figs. 3 and 4).

The thin wire maximizes current density for swift transection of the papilla and limits dispersion of the energy, which may cause unnecessary injury to the pancreatic orifice, increasing the risk for a late stenosis.

The resected ampulla of Vater was then retrieved using an extraction basket (4 cm), Wilson-Cook Medical Inc., Dublin, Ireland (Figs. 5 and 6).

All resected tissues were sent for pathological examination.

A short, 5-Fr 5-cm pancreatic stent was inserted in only one case (5%) after ampullectomy to protect the pancreatic orifice aiming to minimize the chance of developing pancreatitis, as there was no clear flow of pancreatic secretion after the procedure, and the stent was removed uneventfully after 15 days.
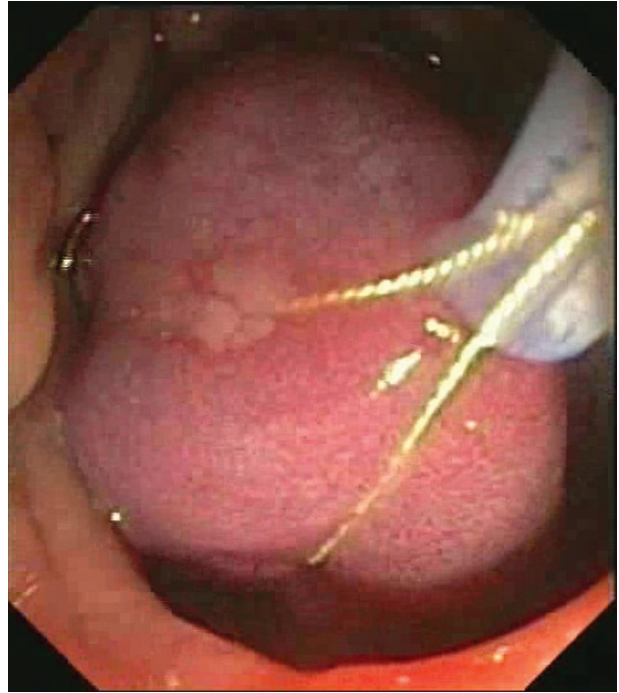
Postresection pathology was determined in all cases, and follow up of all cases was carried out with regular endoscopy after 1 month, after 3 months, 6 months,
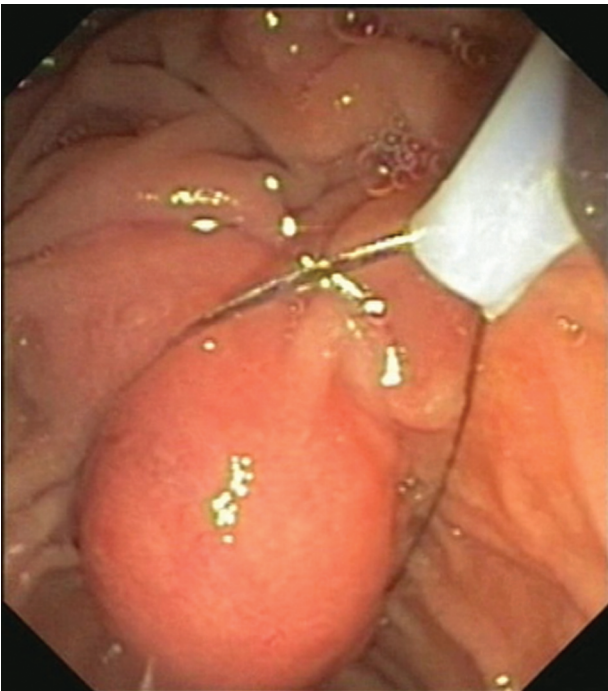
Figure 3
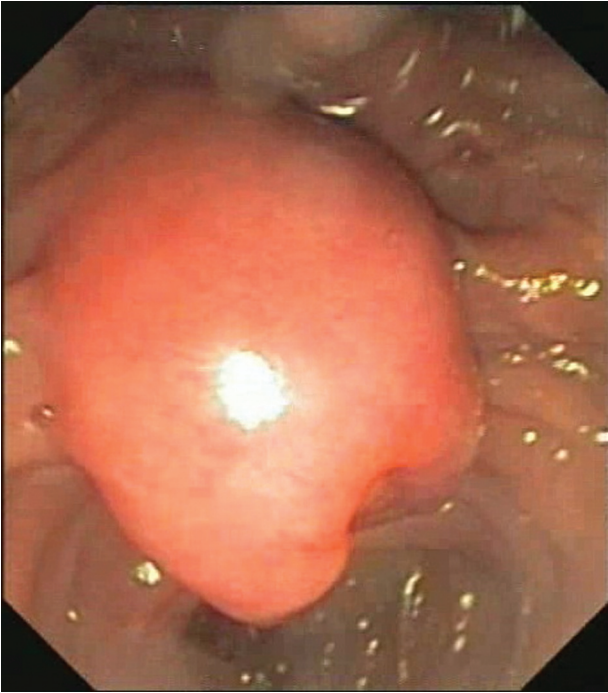
Endoscopic view of a 2.5cm neoplastic lesion of major papilla.
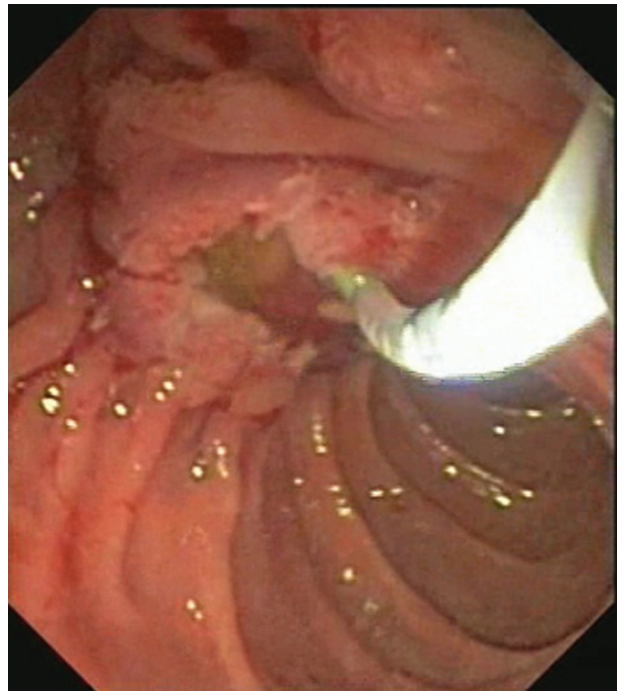
Figure 4

Application of the endoscopic snare.

Figure 5

Complete entrapment of lesion with dormia basket.

Figure 6

Complete resection of the lesion.

and 1 year after the procedure to detect any recurrences, or until death of patients.

Postprocedure complication was studied, such as perforation, bleeding, or pancreatitis.

Results

The study was carried out on 20 patients admitted to the Endoscopy Unit of the Medical Research Institute Hospital, Alexandria University, suffering from

benign-looking ampullary adenomas during the period between January 2013 to January 2015 and all patients were followed up for 1 year after the endoscopic ampullectomy until January 2016.

Demographic characteristics of patients
There were 14 (70%) male and six (30%) female patients, with an average age of 56.6 years (range 39–89 years).

As regards the endoscopic appearance of the resected lesions, there were villiform exophytic lesions in 12 (60%) cases, smooth elevated lesions in seven (35%) cases, and umbilicated lesion in one (5%) case.

Pathology of lesions
Ten (50%) patients showed tubulovillous adenoma, seven (35%) patients showed villous adenoma, one (5%) patient showed tubulovillous adenoma with dysplasia, one (5%) patient showed adenocarcinoma, and one (5%) patient showed carcinoid tumor.

All patients underwent endoscopic ampullectomy, whereas only three (30%) patients with proven malignancy underwent PD.

We did not encounter any recurrence of the benign proven conditions during the follow-up period, although the three (30%) patients with malignant conditions died during follow-up.

The only complication encountered during the procedure was bleeding, and it happened in the three (30%) patients with malignant conditions, and it was successfully stopped endoscopically.

Discussion
Although the indications for EP are evolving [11,20–24], it has not been yet fully established. The recent advances in EUS has rendered it the modality of choice for T staging of ampullary adenomas, with data reported in the literature showing 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 in patients with periampullary malignancies [25–27].

In our research, because of lack of availability of EUS, we relied only on endoscopic appearance of ampullary tumors.

Bohnacker et al.[21] conducted a study on 106 patients between February 1985 and April 2004, which was a long period. Boix et al.[28] conducted a study on 21 patients during the period from January 1995 to February 2007, and Jung et al.[29] studied 22 patients from July 2003 to June 2008.

In our research, only 20 patients were included in the study because of the short period of our study as opposed to long periods in similar studies.

As regards the complications of ampullectomy, Bassan and Bourke [24] in their article reported that perforation, delayed bleeding, and pancreatitis are the most feared serious complications with different incidence rates reported in the literature [30].

Boix et al.[28] in their study reported that they had one case of mild bleeding (23.8%), two cases of mild pancreatitis, and two cases of moderate pancreatitis, whereas Espinel et al.[31] in their review reported that the overall complication rate of endoscopic ampullectomy is around 15%.

Ampullectomy-related mortality is very rare, occurring in about 0.3% of cases [32].

In our research, the only reported complication was bleeding in three (15%) patients and was treated with clipping and epinephrine injection.

The low rate of complication may be attributed to the small number of patients in our study, the experience of our endoscopists, and the successful insertion of stent in the pancreatic duct in one case, thus decreasing the incidence of pancreatitis and stricture.

In our research, successful excision of all adenomas was carried out in all patients with no recurrence rate apart from the three malignant cases, which was treated successfully with PD.

Different success rates were reported in the literature. Catalano et al.[33] reported that endoscopic treatment was successful in 83 patients (80%) and failed (initial failure or recurrent tumor) in 20 (20%) patients, and Zádorová et al.[34] reported successful excision of benign adenomas in 13 of 16 patients included in their study, with recurrence in three cases.

Binmoeller et al.[35] reported successful excision of benign adenomas in 23 of 25 patients included in their study and recurrence in six patients only.

Conclusion

Endoscopic ampullectomy is a safe and effective therapy for papillary adenomas, when performed by experienced endoscopists. However, there is a substantial incidence of moderate-to-severe complications that the endoscopist must be prepared to identify and manage.

Recommendations

Further studies are needed on a large scale of patients using EUS as an accurate method of diagnosis before ampullectomy.

Acknowledgements

The research focused on the experience of the Endoscopy Unit of the Medical Research Institute, Alexandria University in performing endoscopic ampullectomy for benign looking adenoma of the ampulla of Vader.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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