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Original research

Surgical treatment and prognosis of 96 cases of intraductal papillary mucinous neoplasms of the pancreas: A retrospective cohort study

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HIGHLIGHTS

- Evaluate our strategy of surgical treatments for different types of IPMN.
- IPMN has a relative good prognosis.
- Main duct type and mixed type IPMN should receive surgical treatment.
- Small branch duct type IPMN without clinical manifestations need no surgery.

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ABSTRACT

Introduction: The indications, the extent and type of surgery for intraductal papillary mucinous neoplasm (IPMN) are still controversial. This study aimed to investigate clinical manifestation, individualized surgical treatment, and prognosis of IPMN of pancreas. **Methods**: The clinical data of 96 IPMN cases treated in our hospital between January 2006 and December 2013 were retrospectively analyzed. Among the 96 patients (58 male and 38 female), 46 were main-duct type, 29 were branch-duct type, 21 were mixed type. Pancreatectomy was performed on 78 cases, including pancreaticoduodenectomy on 43 patients, distal pancreatectomy on 25, segmental pancreatectomy on 6, and total pancreatectomy on 4. A regular follow-up without surgical treatment was performed on 18 cases with asymptomatic side branch IPMN less than 3 cm in diameter. Results: The overall postoperative morbidity rate was 33.3%, and there was no perioperative mortality. 46 cases were non-invasive IPMN, 32 cases were invasive IPMN including 14 cases with lymph node metastasis. The five-year survival rate for patients with non-invasive and invasive carcinomas was 96.2% and 35.2%, respectively. The prognosis of invasive cases with lymph node metastasis was significantly worse than those without lymph node metastasis. No progression was found during the follow-up in 18 asymptomatic small branch duct type IPMN patients. **Conclusion**: IPMN has a relative good prognosis. Main duct type and mixed type IPMN have a higher malignant potential, and should receive surgical treatment. Patients of branch duct type IPMN with lesion <3 cm in diameter and without clinical manifestations can be managed with close follow-up.

1. Introduction

Intraductal papillary mucinous neoplasm (IPMN) is a group of mucin producing cystic tumors frequently developed in the pancreatic duct. Various names have been introduced to describe these tumors since Ohhashi reported the first 4 cases of mucinous neoplasms of the pancreas leading to ectasia of the pancreatic duct in 1982 [1]. In 1996, the World Health Organization (WHO) classified cystic mucin producing pancreatic neoplasms into IPMN and mucinous cystic neoplasm (MCN). IPMN is defined as a mucin producing cystic pancreatic neoplasms with intraductal papillary projections of tall columnar epithelium, without subepithelial ovarian-type stroma, which distinguishes it from MCN [2]. With the improvement of imaging techniques, IPMN of the pancreas is being diagnosed with increasing frequency [3].

In addition to pancreatic intraepithelial neoplasia (PanIN), IPMN is the most important precursor lesion of ductal pancreatic cancer [4]. IPMN has variable malignant potential ranging from premalignant intraductal lesions to malignant neoplasms with invasive carcinoma. Compared to non-invasive IPMN, invasive cancers

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confer a distinct worse prognosis, with a 5-year overall survival of 36–70% [4,5]. Clinically, IPMN is classified into three types according to the involvements of pancreatic ducts: main duct (MD) IPMN, branch duct (BD) IPMN, and mixed type IPMN [6,7]. The malignancy risk of BD-IPMN, MD-IPMN and mixed type IPMN is 24.4%, 62.2% and 57.6%, respectively [7]. Due to the higher malignant potential, surgical resection is strongly recommended for MD-IPMN and mixed type IPMN patients. However, the indications, the extent and type of surgery for IPMN cases are still controversial [6,7].

In this study, we retrospectively analyzed the clinical data of 96 IPMN patients admitted to our hospital during the last 8 years, to evaluate our strategy of surgical treatments for different types of IPMN.

2. Methods

2.1. Patients

From January 2006 to December 2013, 96 IPMN patients were admitted to our hospital, including 58 males and 38 females (male: female ratio 1.53:1, age: 62.4 ± 7.8 years). All cases were diagnosed based on the findings of at least two imaging examinations including computed tomography (CT), magnetic resonance imaging (MRI), endoscopic ultrasonography (EUS), and endoscopic retrograde choledochopancreatography (ERCP). Fifty-four cases had tumors in the pancreatic head, 38 in the pancreatic body and tail, and 4 in the whole pancreas. MD-IPMN was defined by the presence of segmented or diffuse dilation of the main pancreatic duct >5 mm in diameter, without any other evident cause of obstruction. Cystic pancreatic lesions >5 mm in diameter that communicate with a non-dilated main pancreatic duct were considered to be BD-IPMN. Mixed type IPMN displayed the aspects of both MD- and BD-IPMN features [6,7]. According to these criteria, 46 patients were diagnosed with MD-IPMN, 29 with BD-IPMN, and 21 with mixed type. The typical CT findings of each type of IPMN were shown in Fig. 1.

2.2. Surgical treatment

All the patients received either a surgical procedure or a close surveillance, according to a comprehensive assessment of clinical symptoms, imaging findings, and serum tumor markers (CEA and CA19-9). Indications for surgical treatment were as follows: (1) lesions involving the main duct of pancreas (MD—or mixed type IPMN); (2) BD-IPMN either with lesions >3 cm in diameter, or accompanied by clinical symptoms (abdominal pain or discomfort, jaundice, or apparent weight loss), or with elevated serum level of either CEA or CA19-9. For BD-IPMN patients with lesions <3 cm in diameter without any clinical manifestation or elevated serum tumor markers, a close follow-up was recommended at an interval of 6 months. If the patients presented with any indication for surgery during the surveillance, pancreatectomy would be recommended according to the location of the lesions. Surgical treatments were finally performed for 78 patients. The type of procedures was determined by the site and extent of the tumors, including pancreaticoduodenectomy in 43 cases whose tumors were located in the pancreatic head (34 cases of MD-type, 6 cases of mixed type, and 3 cases of BD-type), pancreatic body and tail resection in 25 cases with tumors located in the pancreatic body and tail (11 cases of MD-type, 11 cases of mixed type, and 3 cases of BD-type), segmental pancreatectomy in 6 cases whose tumors were located in the pancreatic neck (1 case of mixed type and 5 cases of BD-

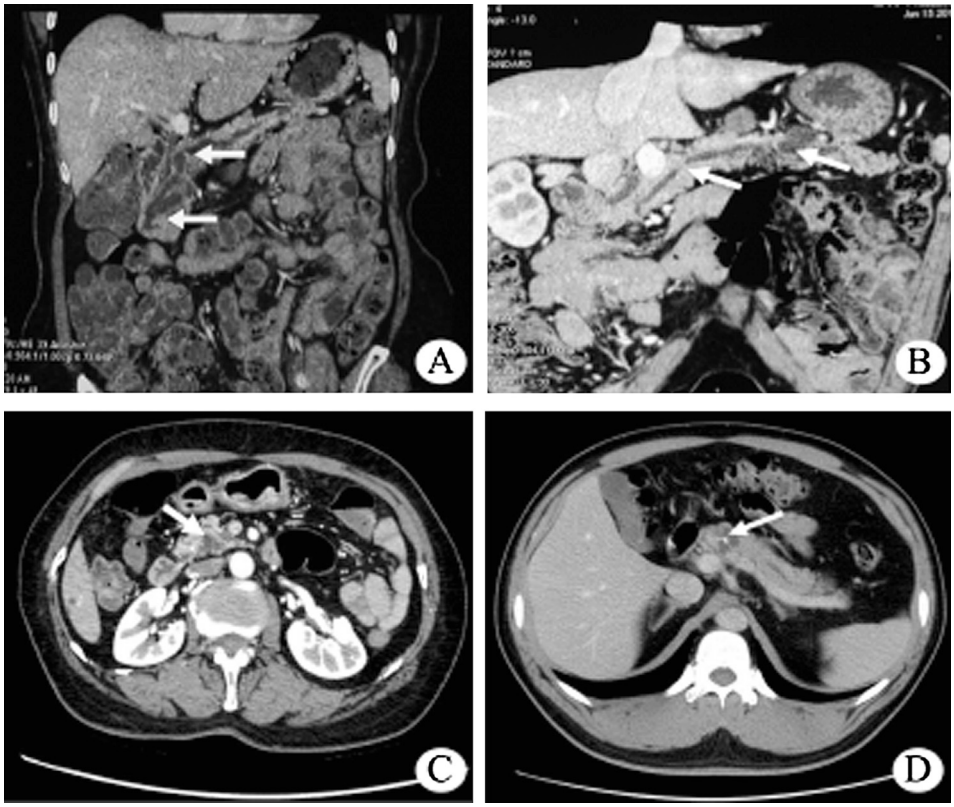

Fig. 1. Typical CT findings of different types of IPMN. A: MD-IPMN; B: Mixed type IPMN; C: BD-IPMN, located in the uncinate process; D: BD-IPMN, located in the neck of pancreas. White arrows indicated the cystic lesions and mural nodules.