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Original Research

Surgical outcomes of pancreaticoduodenectomy in young patients: A case series

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HIGHLIGHTS

- The most common pathological diagnosis in the YA was adenocarcinoma followed by SPT.
- PD in YA when performed in tertiary centers with good surgical experience is relatively safe.
- The incidence of post-operative complications in the YA was comparable to that in the adult group.
- Delayed gastric emptying developed significantly in adult group II than YA group.

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ABSTRACT

Background: Pancreaticoduodenectomy (PD) is a complex procedure for management periampullary neoplasms The aim of our work is to report the surgical outcomes after PD in young adult (YA) (<35 years) and to compare it to a adult patients who underwent PD.

Methods: We retrospectively analyzed the data of all patients who underwent PD in the period from January 1993 to December 2016. The primary outcome was the rate of total postoperative complications. Secondary outcomes included postoperative pathology, exocrine and endocrine function and survival rate.

Results: 58/975 patients (5.9%) were YA and the majority of them were females. The incidence of post-operative complications in the YA was comparable to that in the adult group. Delayed gastric emptying developed significantly in adult group than YA group (0.008). The overall survival was significantly higher in the YA (P = 0.0001). The most common pathology in the YA was adenocarcinoma (41.4%) and solid pseudopapillary tumor (SPT) (29.3%). No significant difference as regards postoperative pancreatic exocrine and endocrine function in both groups.

Conclusion: PD in YA when performed in tertiary centers with good surgical experience is safe. The most common pathological diagnosis in the YA was adenocarcinoma followed by SPT.

1. Introduction

Pancreaticoduodenectomy (PD), a complex radical procedure, is considered a cornerstone in the management of pancreatic head and periampullary neoplasms [1]. The procedure entails resection of the pancreatic head and performing a challenging pancreatic anastomosis which requires certain degree of surgical training and expertise. Due to the complexity of the procedure, a significant risk of morbidity and mortality exists. The incidence of post-operative complications after PD is reported to range from 20 to 40% [1–3].

Many studies were performed trying to identify factors increasing the risk of post-operative complications. These risk factors included patient's age, body mass index, pre-operative jaundice, intra-operative blood loss, consistency of the pancreas, pancreatic duct diameter, type of pancreatic reconstruction, use of somatostatin analogues and surgeon's experience [4–7].

As pancreatic and periampullary pathologies are uncommon in young populations, Pancreaticoduodenectomy (PD) is not a frequently performed procedure in pediatric and young adults [8–10]. In a statistical review performed by the National Cancer

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institute, the incidence of pancreatic tumors in young population (below 19 years) is 0.19 per million populations [11,12].

Given this rare incidence in young adult population, the impact of young age on the short-term and long-term outcomes after PD is not well studied. In fact the literature is relatively deficient in this area with the largest published series to our knowledge only including 22 patients [13].

The aim of our work is to report the surgical outcomes after PD in young adult population (<35 years) and to compare it to a cohort of adult patients who underwent PD at our institute at the same study period.

2. Patients and methods

After Institutional Review Board approval, we retrospectively analyzed the data of all patients who underwent PD at Gastrointestinal Surgical Center, in the period from January 1993 to December 2016. The hospital peri-operative records have had the policy of entering the data in a prospectively maintained database since 2000 and before 2000, the data were collected from the patients files. The data included demographic data, operative measuring the pancreatic and bile duct diameters intra-operatively and postoperative outcomes. It is a routine to record the history to rule out exocrine pancreas dysfunction. Patients under 35 years were defined as young adults according to previous studies [14,15]. The adult cohort represents adult patients who underwent PD in the same study period at our institute. Patients data were collected in a web based hospital registry. This case series study has been reported in line with the PROCESS criteria [16]

2.1. Operative technique

All patients underwent a subtotal stomach preserving PD through a bilateral subcostal incision. The dissection was performed using diathermy with ligation of major vessels and recently, harmonic or ligasure was introduced and used in dissection. The bile duct and pancreatic diameters were measured by a ruler. Pancreatic texture was defined soft or firm according to the operating surgeon or the senior assisting surgeon. All patients underwent regional lymphadenectomy, which included resection of nodes to the right side of the superior mesenteric vessels, and inferior vena cava (retropancreatic, supradudenal, peripancreatic, hepatic artery, infrapyloric, subpyloric, hepatic artery, celiac).

Our Institutional policy on pancreatic reconstruction method included pancreatico-gastrostomy (PG), simple loop pancreaticojejunostomy (PJ) and isolated loop PJ [17–20]. Duct to mucosa or invaginated type was performed. These techniques are described in details in previous papers (17–20). Biliary reconstruction was performed by end-to-side hepaticojejunostomy HJ (retrocolic), Gastric reconstruction was performed by an antecolic end-to-side gastrojejunostomy GJ 30 cm distal to the HJ. The type of reconstruction depends on surgeon choice or on randomization in the randomized study [17–20].

2.2. Post-operative management

Post-operatively, all patients routinely received intra-venous antibiotics and proton pump inhibitors. Somatostatin analogues were administered routinely for 4 post-operative days (100 μg octreotide subcutaneously every 8 h). Vital parameters and drain outputs were recorded every hour for the first day then at a 4 h interval afterwards.

Abdominal drains amylase levels were measured at the first, third and fifth post-operative days. Trans-abdominal ultrasonography was done only on clinical suspicion of any abdominal collections. In patients with smooth post-operative course oral intake was resumed on the 4th post-operative day.

2.3. Definition of complications

The severity of post-operative complications was graded according to the Dindo–Clavien complication classification system [21].

Regarding post-operative pancreatic fistula (POPF), the International Study Group for Pancreatic Fistula (ISGPF) definition was followed high amylase content of the drainage fluid, >3 times the upper normal serum value, at any time on or after 3rd post-operative day. POPF was graded according to the ISGPF into grade A, B and C according to the clinical course and the need for specific treatment or intervention [22].

Bile leak was defined according to the ISGPF as the presence of bile in the drained fluid persisting to post-operative day 4 [22]. As for delayed gastric emptying, the International Study Group of pancreatic Surgery (ISGPS) definition and grading was implemented [23].

Pancreatic exocrine function was evaluated by asking about the presence or absence of steatorrhea, presence of excess fat in the stool as a result of fat malabsorption (bulky stool that floats has pasty or greasy appearance, a foul smell, and it tends to stick on the sides of the toilet). Definition of pancreatic exocrine insufficiency is weak but there is a problem in detecting the fat in stool because the tests for detection unreliable postoperatively in our center so we depend on clinical history of steatorrhea. Endocrine function was assessed by measuring fasting blood glucose level (normal level: < 110 mg/dl). Diabetes mellitus (DM) was diagnosed based on World Health Organization study group on DM [24,25].

Patients were followed up 1 week after discharge then at 1, 3, 6 months intervals.

2.3.1. Assessments

The primary outcome was the rate of total postoperative complications. The severity of post-operative complications was graded according to the Dindo–Clavien complication classification system [21]. Secondary outcomes included total operative time (hours), hospital mortality, length of postoperative stay (days), time to resume oral intake, postoperative pathology, re-exploration, and survival rate.

2.3.2. Statistical analysis

Categorical variables are expressed as group percentages and were compared for independent samples using Chi-square test. Continuous data are presented as medians and were compared for independent samples using *t*-test. Survival was calculated and plots constructed according to the Kaplan-Meier method and life table method. The log-rank test was used for comparison of survival according to type of pathology (adenocarcinoma group and solid pseudopappillary tumour). All statistical tests were 2-sided, and the significance level was set at <0.05. Statistical analyses were performed using SPSS version 17 (Chicago, IL).

3. Results

3.1. Patients' characteristics

Patients' demographics and baseline data are represented in Tables 1 and 2. A total of 975 patients were included in this study. The young adult (YA) cohort (<35 years) included 58 patients.

Operative data is demonstrated in Table 3.