International Journal of Surgery 18 (2015) 143–148

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original research

Surgical approach for tumours of the third and fourth part of the duodenum. Distal pancreas-sparing duodenectomy

Francisco J. García-Molina*, Francisco Mateo-Vallejo, Juan de Dios Franco-Osorio, Juan L. Esteban-Ramos, Iosvany Rivero-Henández

Department of General and Digestive Surgery, Hospital de Jerez (SAS), 11407, Jerez de la Frontera, Spain

HIGHLIGHTS

- Optimal surgical procedure for distal duodenal tumours remains controversial.
- There are few reports describing a partial duodenectomy of the distal duodenum.
- We report eight patients who underwent a pancreas-sparing distal duodenectomy.
- The main surgical approach follows the technique described by Cattell and Braash.

ARTICLE INFO

Article history:
Received 23 February 2015
Received in revised form
24 March 2015
Accepted 18 April 2015
Available online 24 April 2015

Keywords:
Pancreas-sparing duodenectomy
Segmental duodenectomy
Gastrointestinal stromal tumours
Duodenal neoplasms
Pancreatoduodenectomy

ABSTRACT

The anatomic complexity of the duodenum makes surgical resection challenging. We describe our experience with distal pancreas-sparing duodenectomy (PSD) for tumours that arise in the third and fourth parts of the duodenum. Between July 2008 and January 2012 eight patients underwent surgical resection for tumours in the distal parts of the duodenum. Short and long-term outcomes of treatment are retrospectively analyzed. We used the Cattell and Braash surgical approach in six patients. Seven patients underwent a segmental resection of the distal duodenum with a duodenojejunal anastomosis and in one case we performed a wedge local excision with primary closure. There were 5 gastrointestinal stromal tumours (GIST), 1 primary duodenal adenocarcinoma, 1 metastasis of a lung adenocarcinoma and 1 patient with malignant duodenocolic fistula caused by advanced sigmoid colon carcinoma. Median operating time was 200 min and median intraoperatory blood loss 162 mL. Three patients showed postoperative complications and one of them died. There was no reoperation. Median hospital stay was 10 days (range, 7–28 days). The patient with primary adenocarcinoma died after 12 months due to hepatic metastases. All of five patients with GIST are alive without recurrence (mean follow up of 65.6 months), as well as the patient with metastatic duodenal infiltration (45 months after surgery). Segmental resection of the third and fourth portions of the duodenum is reliable and feasible. The Cattell and Braash manoeuvre provides a good exposure and makes this kind of resection easier.

1. Introduction

The duodenum is the more likely portion of the small bowel to experience a malignant transformation per unit of length. Duodenal neoplasms account for 35% of all benign and 17% of all malignant small bowel tumours [1]. Gastrointestinal stromal tumours (GIST) are responsible for 30% of all the primary malignancies of the duodenum [2] and duodenal adenocarcinomas account for 55% of all adenocarcinomas that arise in the small intestine [3].

Anatomic complexity of the duodenum makes surgical management challenging and many surgical resection of duodenal tumours entails an associated pancreatic resection. Nevertheless, there are some situations where it is possible and safely to carry out a segmental duodenectomy (SD), also known as pancreas-sparing

Abbreviations: D3 and D4, third and fourth part of duodenum; GIST, gastrointestinal stromal tumours; PSD, pancreas-sparing duodenectomy; SD, segmental duodenectomy.

* Corresponding author. C/ Pedro Alonso no. 10–12, 5° B, 11402 Jerez de la Frontera, Cádiz, Spain.
E-mail address: pgmolina59@telefonica.net (F.J. García-Molina).

http://dx.doi.org/10.1016/j.ijsu.2015.04.051
1743-9191/

duodenectomy (PSD) [4–12] while avoiding the risk associated with pancreas resection.

We report our experience with PSD for tumours in the third and fourth portions of the duodenum.

2. Material and methods

Between July 2008 and January 2012 eight patients with distal duodenal tumours (third and/or fourth portion –D3, D4-), underwent surgically resection in our surgical department. A retrospective review of hospital records of all these patients was carried out. At least one of the authors was involved in every operation (FJGM). Technical aspects, peri-operative outcomes (morbidity and mortality rate during hospitalization or in the first 30 postoperative days) and survival rate are analyzed. A limited resection with pancreatic preservation (PSD) was carried out on all of them.

2.1. Surgical technique

The main surgical approach follows the technique originally described by Cattell and Braash (C–B manoeuvre) [13], which we summarized. 1) Gastro-colic ligament from the proximal transverse colon and reflection of the ascending colon are divided and medially mobilized along the embryologic fusion plane between the Toldt fascia and the posterior leaf of mesocolon. 2) Section of the mesentery root from distal ileum to the ligament of Treitz. By mobilizing the whole small intestine and right colon both medially and cranially the duodenum is exposed. 3) The distal duodenum and the proximal jejunum are mobilized by dissecting the peritoneum lateral to the duodenojejunal junction and ligament of Treitz, then the duodenum is passed under the superior mesenteric vessels towards the right side (Fig. 1A). Jejunum is sectioned including its mesentery as well as the duodenum proximal to the tumour. Dissection of D3 from the uncinate process of the pancreas is not especially difficult. Distal to the ampulla, duodenum is not adherent to the pancreas and blood supply distribution in this area consists of small traversing pairs of vessels (anterior and posterior) [14] (Fig. 1B).

3. Results

Main demographic, clinical and surgical data of patients are summarized on Tables 1 and 2. There were 5 gastrointestinal stromal tumours (GIST), one primary adenocarcinoma, one metastasis from a lung adenocarcinoma and one duodenal infiltration from an advanced adenocarcinoma of sigmoid colon.

Six patients underwent the aforementioned surgical approach. An end-to-end manual duodenojejunostomy was performed with interrupted sutures. Reinforcement with a patch sponge of fibrinogen and thrombin (TachoSil®) was added. The ligament of Treitz was not repaired (Fig. 2) and perianastomotic drainage was always provided. In patient no. 8 an *en-bloc* removal of the sigmoid tumour and distal duodenum was performed with an end-to-end duodenojejunal anastomosis and a latero-lateral colo-colonic anastomosis. Catheterization of bile and pancreatic ducts was performed, due to the proximity of the papilla to the resection margin. In the remaining two patients (no. 2 and 4) the duodenum was approached through the ligament of Treitz without using the C–B manoeuvre. In patient no. 2 a wedge resection of the duodenal wall was performed and patient no. 4 had a segmental resection with an end-to-side manual duodenojejunal anastomosis. Tumour rupture occurred in patient no. 4 during tumour dissection. Tumour size ranged from 2 to 18 cm (Fig. 3).

The median operation time was 200 min (range, 80–285) and the median intraoperative bleeding was 162 mL (range, 100–400 mL). Three patients received a blood transfusion during the perioperative time. The median postoperative hospital stay was 9.7 days (range, 7–28 days).

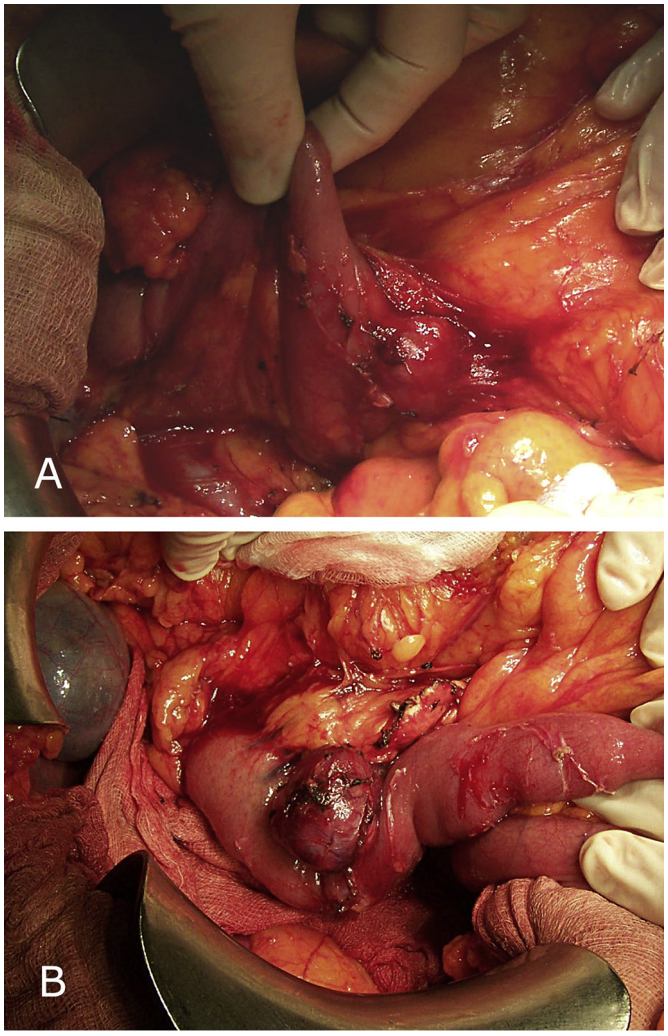

Fig. 1. Operative field, patient no. 3. A: GIST on D3 after the Cattell and Brassch approach, before uncrossing D3 and D4. B: Uncross of D3–D4 behind the superior mesenteric vessels; uncinate process of pancreas is separated from the duodenum.

Five patients did not experience any postoperative complications. Patient no. 4 was readmitted 48 h after being discharged with abdominal pain and vomiting. Due to low levels of haemoglobin he needed a blood transfusion but a high endoscopic exploration did not show any signs of bleeding. Subsequent clinical course was uneventfully. Patient no. 7 had high levels of amylase enzyme in the drainage secretion (not resembling biliar content), along with a delayed gastric emptying. An abdominal CT study using oral contrast ruled out an anastomotic leakage and both post-operative complications settled with conservative treatment. Patient number eight was admitted into the Intensive Care Unit after the operation with cardiogenic shock. Worsening during the following days resulted in the patient dead on the ninth day from multiple organ dysfunction syndrome. Abdominal drainage had a low output of clear secretion with high levels of amylase and dropped progressively.

The patient with duodenal adenocarcinoma (case no. 1) presented multiple hepatic metastases two months after surgery and died one year later. The five patients operated on for a GIST are alive without any sign of tumour recurrence with a median follow up of