Brief Report

Combined right hemicolectomy and pancreaticoduodenectomy for locally advanced right hemicolon cancer

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ABSTRACT: Extracolonic invasion of the duodenum and/or pancreatic head rarely occurs in patients with right hemicolon cancer. However, when necessary, combined radical operation is a challenge to the surgeon. We reported 7 patients with locally advanced right hemicolon cancer who underwent combined right hemicolectomy (RH) and pancreaticoduodenectomy (PD) due to direct involvement of the duodenum or pancreatic head. This study included four males and three females with a mean age of 66.9±5.9 years. Computed tomography (CT) scans revealed right hemicolon cancer with duodenal invasion (5 patients) and pancreatic invasion (2). The mean operation time was 410±64 minutes and the estimated blood loss was 514±157 mL. After the operation, the mean postoperative hospital stay was 22.1±7.2 days. Five patients had postoperative complications. The mean follow-up time was 16.4±5.9 months. During this period, three patients died from tumor recurrence, one from postoperative complications, one from pulmonary disease, and two survived until the last scheduled follow-up. Five patients survived more than one year. Combined RH and PD for locally advanced right hemicolon cancer can be performed safely, thus providing a long-term survival rate in selected patients in a high-volume center.

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KEY WORDS: combined resection; pancreaticoduodenectomy; colectomy; colon cancer; direct invasion

Introduction

Locally advanced colorectal cancers, defined as the invasion of neighboring organs and structures without distant metastases, account for 5.2%-23.6% of all colorectal tumors at the presentation.[1] Extracolonic invasion usually appears in the rectum and sigmoid colon in which pelvic organs and tissues may be invaded, but it rarely occurs in the right colon or proximal transverse colon.[2, 3] Especially, right hemicolon cancer with direct infiltration of the duodenum and/or pancreatic head usually produces more morbidity, posing a surgical challenge.[3] Combined resection of multiple organs is recognized as the best therapeutic strategy for patients with locally advanced colon carcinoma without distant metastasis. Combined right hemicolectomy (RH) and pancreaticoduodenectomy (PD) is the best radical choice to treat locally advanced right hemicolon cancer.[1, 3-5] Locally advanced colorectal cancer seldom appears in the right side of the colon and reports on the occurrence are rare. The morbidity and long-term prognosis of patients with right colon carcinoma who have undergone combined RH and PD are not clear.[6, 7]

This report is to share our experience in seven patients who successfully underwent combined RH and PD to treat locally infiltrative right hemicolon cancer invading the duodenum and/or pancreatic head directly.

Methods

Patients

A total of 2 772 patients with right hemicolon carcinoma who had radical RH with or without multi-organ operation were analyzed. These patients were treated at the First Affiliated Hospital, Zhejiang University School of Medicine between January 2000 and December 2013. From the medical records, seven patients who had undergone combined RH and PD due to direct involvement

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of the duodenum or pancreatic head were identified.

The seven patients had symptoms of abdominal distension, upper abdominal discomfort, melena, anemia, or a change in bowel habits. One patient had jaundice and three patients had a palpable abdominal mass, but digital rectal examinations were negative. The preoperative cancer antigen 19-9 and carcinoembryonic antigen (CEA) levels were routinely tested in all patients. Preoperative computed tomography (CT) was routinely performed to evaluate local tumor invasion. Preoperative upper endoscopy, colonoscopy, and pathological affirmation of the diagnosis were carried out in all patients.

The indications for surgery included the following: 1) patients with histologically confirmed colon carcinoma; 2) patients without severe comorbid disease and tolerable to a radical multi-organ excision; 3) colon cancer which could not be dissociated from the pancreatic head or duodenum; 4) R0 resection feasible on account of preoperative evaluation and no distant metastasis; and 5) the surgical team who have sufficient operating skills and clinical experience to perform such a delicate operation.[1, 3, 6, 7] Patients with high surgical risk, distant metastasis, or secondary invasion of the pancreatic head and/or the duodenum rather than direct infiltration were excluded. And those who had local duodenal invasion that could be excised radically by a partial duodenal wall resection were also excluded.[1, 8]

Operations

After the right hemicolon was dissociated, a Kocher maneuver was made to completely separate the duodenum to create a distinct plane between the tumor and the superior mesenteric artery. Then the terminal common bile duct was separated and retracted for the ligation of the gastroduodenal artery. A tunnel was established in the plane anterior to the portal vein behind the pancreatic neck. The plane was established at the inferior margin of the pancreas medial to the arranged course of the superior mesenteric vein. The resectability of colon cancer was evaluated after entire separation of the right hemicolon and duodenum. The involvement of the duodenum or pancreas was evaluated after liberation of the original adhesions to the right hemicolon. If resection was feasible, RH was done according to a standard procedure. A stapled ileocolic side-to-side anastomosis was made. PD was performed with a standard procedure, and reconstruction was subsequently undertaken according to Child's reconstruction method.[9] After the resection and reconstruction, suction drains were placed into the pelvis and near the anastomotic stomas, and the abdominal wall wounds were closed.

The tumor stage was assessed according to the tumor-lymph node-metastasis (TNM) classification recommended by the American Joint Committee of Cancer.[10] Postoperative complications were categorized according to the reported criteria including the presence of pancreatic fistula (PF),[11] delayed gastric emptying (DGE)[12] and acute respiratory distress syndrome (ARDS).[13]

Statistical analysis

Demographic variables, intraoperative parameters, and postoperative data were recorded. In addition, all patients were asked to visit our outpatient department every month after discharge and the complications during the follow-up period were also recorded. Numerical data were presented as mean±standard deviation.

Results

Seven patients (4 males and 3 females) with locally advanced carcinoma of the right hemicolon invading the duodenum or pancreatic head had undergone combined RH and PD. The mean age of the patients was 66.9±5.9 years. The tumor was located at right colic flexure (3 patients) and the ascending colon (4). CT scans revealed duodenal invasion in five patients and pancreatic invasion in two. Preoperative upper endoscopies revealed colon tumors without mucosal involvement. The pathological results confirmed the diagnosis of right hemicolon cancer in all of the patients, and their preoperative CEA values were 9.3±6.9 ng/mL. The CA19-9 levels were normal in all patients. None of the patients underwent preoperative chemotherapy. The demographic variables of the patients are listed in Table 1.

The operations in all patients were performed successfully. The average operation time was 410±64 minutes, and the estimated blood loss was 514±157 mL. Blood was transfused intraoperatively in all patients with an average amount of 3.7±1.4 U. Pathological examination confirmed the involvement of the duodenum (5 patients) and pancreas (2). In addition, moderately differentiated adenocarcinoma (5 patients) and poorly differentiated adenocarcinoma (2) were confirmed histologically. According to the TNM classification system, stage $T_{4b}N_{1b}M_0$ (2 patients), stage $T_{4b}N_0M_0$ (3), stage $T_{4b}N_{2a}M_0$ (1), and stage $T_{4b}N_{2b}M_0$ (1) were defined. The intraoperative parameters are listed in Table 2.

After the operation, the postoperative hospital stay was 22.1±7.2 days. None of the patients died during the hospital stay. Five patients had postoperative complications including DGE (1 patient), ileus (2), wound infection (3), ARDS (2), and PF (1). The patients recovered after conservative treatments. Among them, five patients