Received: 2013.09.18
Accepted: 2014.03.11
Published: 2014.07.29

ISSN 1941-5923
© Am J Case Rep, 2014; 15: 322-325
DOI: 10.12659/AJCR.889793

A Novel “Salvage” Indication to Intestinal Derotation Procedure: Reconstruction after Duodenopancreatectomy

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Conflict of interest: None declared

Patient: Male, 77
Final Diagnosis: Pancreatic tumor
Symptoms: Jaundice
Medication: —
Clinical Procedure: Intestinal derotation procedure
Specialty: General surgery

Objective: Rare disease

Background: The purpose of the present paper is to stress the relevance for surgeons of being familiar with the procedure of intestinal derotation. This procedure is usually ignored by atlases of surgical technique and only few dedicated papers have been published since its first descriptions both in the U.S. and Europe more than 50 yrs ago.

Case Report: The occasion for this message has been provided by a recent application of this procedure, which has also provided a brand new indication to it. In the case which is reported in the paper the reconstruction, after the resection phase of Whipple procedure, appeared impossible. As a matter of fact, a lipomatosis of the jejunal mesentery reaching up the vasa recta made impossible to raise up the jejunum in order to perform anastomoses with the remaining pancreas and the bile duct. After a minute in which we felt lost, intestinal derotation solved the problem.

Conclusions: In conclusion, intestinal derotation represents a valuable technical tool, which in very selected cases may be helpful in solving otherwise insoluble surgical problems. Therefore, it seems to be a necessary part of the armamentarium of any good surgeon.

MeSH Keywords: Intestinal Derotation • Mesenteric Lipomatosis • Duodenopancreatectomy

Full-text PDF: <http://www.amjcaserep.com/abstract/index/idArt/889793>

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Background

Intestinal derotation procedure and its various steps have been originally described by a few world-wide recognized authorities in surgery such as P. Valdoni, R. B. Cattell, and C. Couinaud in the 1960s as a useful technique to use in solving some very specific and otherwise insoluble surgical problems [1–3]. The operation, which usually does not appear in the atlases of surgery, aims at reproducing the embryological intestinal disposition before the second stage of rotation takes place around the mesenteric axis at the 10th week. At that time, the first and second parts of the duodenum are "normally" situated, but the third and fourth parts descend vertically downward along the right side of the superior mesenteric artery; the small bowel lies to the right side of the midline and the colon is confined to the left side of abdomen. The main indications to this procedure have been stated by the above-mentioned authorities and confirmed by a few subsequent reports dealing with the topic [4–7]. They consist of: duodenal obstruction due to mesenteric artery syndrome, the impossibility of performing an ileo-anal anastomosis due to an insufficient elongation of ileal mesentery, and neoplasms/ulcers of the third and fourth duodenal portion.

Here, we present a novel and particularly fit indication to this uncommon procedure: the impossibility of reconstruction after the resection phase of the Whipple procedure, due to mesenteric lipomatosis with an insufficient compliance of the jejunal mesentery.

Case Report

An 80-year-old man complaining of jaundice and uncompensated diabetes was admitted in our hospital. The routine evaluation included a CT scan, which showed a 3-cm neoplasm of the head-uncinate process of the pancreas, with no apparent nodal/vascular involvement. Therefore, surgery was scheduled. The resection phase included, as usual, the following steps: cholecystectomy, omental detachment, mobilization of the hepatic flexure and ascending colon, kocherization of the duodenum, isolation and resection of the common hepatic duct, transection of the gastric body, division of the pancreatic neck and of the ligament of Treitz, with jejunal transection 15 cm distally to the duodeno-jejunal junction, complete removal of the retro-portal lamina, and wide lymphadenectomy.

As soon as the operative specimen was removed, it was realized that a huge mesenteric lipomatosis, which was not recognized by the preoperative CT scan, would make the reconstruction phase very difficult. As a matter of fact, lipomatosis removal and/or mobilization were impossible because it involved the jejunal vascular arcades up to the vasa recta. On

Figure 1. After omentectomy and right colon mobilization – Kocher manoeuvre, section of Treitz ligament and of the peritoneum along dotted line according to the figure is accomplished, in order to completely mobilize the duodenum and the duodeno-jejunal angle.

Figure 2. Complete detachment of the root of the mesentery from the posterior peritoneal sheet.

the other hand, it was so bulky as to prevent jejunal mobilization up to the pancreas, the bile duct, and the gastric remnant.

Figure 3. The derotation manoeuvre in a clockwise fashion.

Figure 4. The final picture of the derotation manoeuvre with the jejunum ready for the anastomoses.

All the possible reconstruction routes (retromesenteric, transmesocolic, and antecolic) were attempted but appeared equally inadequate to allow tension-free anastomoses. The experience in mesenteric elongation for ileo-anal anastomosis, which is attainable by means of intestinal derotation, as pioneered by the founder of our surgical school, P. Valdoni, assisted us. This procedure seemed particularly indicated on this specific occasion since most of its steps had been already performed in the resection phase of the Whipple procedure. Given that

omental detachment, mobilization of the right colon, Kocherization of the duodenum with dissection of the duodeno-jejunal junction, and division of the ligament of Treitz were already done (Figure 1), only section of the root of the mesentery from the posterior peritoneal sheet was left. This was readily done down-upward (Figure 2) and, after the intestinal loop derotation in a clockwise fashion around the mesenteric axis (Figure 3), the final picture consisted of the entire small bowel in the right abdomen and the colon in the left (Figure 4). The elongation of the mesentery of the proximal jejunum was estimated at 8 cm, mainly due to the greater compliance after derotation of the mesenteric pedicle together with the automatic supramesocolic positioning of the jejunum. This allowed tension-free anastomoses, which were performed with the commonly-used techniques. The patency and flow effectiveness of the superior mesenteric vein were verified before the closure of the laparotomy by means of an intraoperative duplex scan. The postoperative course was uneventful apart from an unusually persistent cholestasis, which allowed hospital discharge on the 20th postoperative day with 6 mg/dl of serum bilirubin, which was probably due to an only postoperatively RM diagnosed sclerosing cholangitis. Pathological stage was T3N1M0 and sclerosing cholangitis was histopathologically confirmed in the operative specimen. Three months after surgery, the patient is doing well, with a complete regression of the cholestasis.

Discussion

We emphasize the relevance of the intestinal derotation procedure in solving some unexpected and otherwise insoluble surgical problems. Moreover, it identifies a novel indication to this procedure: the impossibility of reconstruction after the resection phase of duodenopancreatectomy, due to an insufficient compliance of the mesentery with an inadequate jejunal extension up to the pancreas and common hepatic duct.

The literature concerning this procedure is scarce and after the first descriptions [1–3] a substantial lack of information about it persisted for some years, reflecting its limited world-wide diffusion in the clinical practice with the 2 indications originally established: treatment of the mesenteric artery syndrome or of the neoplasms of the third/fourth duodenal portion, and lengthening of the ileal mesentery for ileo-anal anastomosis [4,8]. However, the importance of its role cannot be overemphasized. In the treatment of duodenal tumors, it allows an otherwise impossible duodeno-jejunal resection without duodenopancreatectomy, and after recto-colectomy, its capability of lengthening of the ileal mesentery helps the surgeon since it allows a tension-free ileo-anal anastomosis. It has also been applied with good results to facilitate the complete removal of the retro-portal lamina in pancreaticoduodenectomy [9].

Therefore, this procedure represents an important component of the armamentarium of any good surgeon, and recently its laparoscopic version has also been proposed [10].

During the last 3 years we have used it, as preoperatively planned, with good results: a) once for a duodeno-jejunal resection in a third duodenal portion GIST otherwise requiring duodenopancreatectomy; and b) twice in Barrett's adenocarcinoma after esophagectomy and total gastrectomy for an intrathoracic isoperistaltic colon interposition without division of ileo-colic vessels. However, in the present case the procedure was not preoperatively scheduled but it provided a brilliant solution of an unpredictable and otherwise insoluble problem, allowing the lengthening not of the distal ileum to the anus, as previously reported, but of the proximal jejunum up to the resected bile duct and pancreas. This indication, although intuitive, has not been, to our knowledge, previously described. Moreover, in this specific application, this procedure appears to be particularly straightforward and fast, since

almost all its steps are included in the duodenopancreatectomy. After the resection phase, in order to accomplish the derotation procedure, only the section of the avascular mesenteric root and the derotation manoeuvre remained to be performed in our patient. Omental detachment, mobilization of the right colon, Kocherization of the duodenum, and division of the ligament of Treitz with dissection of the duodenojejunal junction are steps involved in both intestinal derotation and the Whipple procedure, and all these steps had been already performed when we encountered the dismal impossibility of the reconstruction phase.

Conclusions

In conclusion, intestinal derotation represents a valuable technical tool, which in very selected cases may be helpful in solving otherwise insoluble surgical problems. Therefore, it seems to be a necessary part of the armamentarium of any good surgeon.

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