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Treatment of Labial Fistula Communicating with the Duodenal Stump After Gastrectomy

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Male, 70
Final Diagnosis: Labial fistula
Symptoms: Intractable discharge
Medication: —
Clinical Procedure: Intraluminal drainage via a rectus abdominis musculocutaneous flap
Specialty: Surgery

Objective: Unusual setting of medical care

Background: Anastomotic failure after gastroenterological surgery is usually treated by intraperitoneal drainage and a mature ductal fistula. A ductal fistula may develop into a labial fistula. Although a ductal fistula is controllable, a labial fistula is intractable. We report a case of a labial fistula that communicated with the duodenal stump after gastrectomy. This condition was successfully treated by intraluminal drainage with continuous suction (IDCS) via a rectus abdominis musculocutaneous flap (RAMF).

Case Report: A 70-year-old male underwent distal gastrectomy with intentional lymphadenectomy because of advanced gastric cancer. Digestive reconstruction was completed by the Billroth II method. Pancreatic leakage, intraperitoneal abscess, and anastomotic failure of gastrojejunostomy occurred after surgery. The duodenal stump was ruptured at postoperative day (POD) 26, and ductal fistula associated with the duodenum was observed. Unfortunately, this ductal fistula developed into a labial fistula at POD 90, and a high output of duodenal juice was observed. Additional surgery was proposed at POD 161. The broken stump and labial fistula were covered by a pedunculated RAMF, and a dual drainage system (a combination of a Penrose drain and a 2-way tube) travelled through the RAMF. The tip position of the drainage system was located in the duodenum, and the IDCS was effectively introduced. The secondary ductal fistula finally matured through the RAMF, and was subsequently closed at POD 231. The intractable labial fistula was successfully treated, and the patient was discharged at POD 235.

Conclusions: A high-output labial fistula, which communicated with the duodenal stump after gastrectomy, was refractory in our patient. Effective IDCS through an RAMF was useful for replacement of the labial fistula with a secondary ductal fistula.

MeSH Keywords: Anastomotic Leak • Drainage • Fistula • Myocutaneous Flap • Rectus Abdominis

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Background

Anastomotic failure after gastroenterological surgery causes leakage of digestive juice [1–4]. Duodenal stump leakage after gastrectomy is also a clinical issue [1–3,5], and the patient's age and duodenal transection/mobilization are considered risk factors [3]. Entero-cutaneous fistula may subsequently develop if intraperitoneal drainage is effectively established, and this complication can be treated by a mature ductal fistula [1,4,6]. However, severe infection (e.g., abscess, peritonitis, or sepsis) may lead to a fatal outcome. Intensive management is generally required to recover from life-threatening conditions of duodenal stump leakage after gastrectomy [1,2], and a surgical approach is often required to recover from a serious status [1–3,5,7].

Entero-cutaneous fistula prolongs the therapeutic duration and a well-considered therapeutic strategy is required. A ductal fistula may develop into a labial fistula [8,9] which is accompanied by mucosal eversion. A labial fistula associated with the digestive tract has refractory symptoms and affects the postoperative course because a labial fistula usually has a high output of digestive juice. Although a mature ductal fistula can be well controlled [4,6], a labial fistula is generally intractable [8,9].

We report a case of a high-output labial fistula that communicated with the duodenal stump after gastrectomy. This thought-provoking case was successfully treated by intraluminal drainage with continuous suction (IDCS) via a rectus abdominis musculocutaneous flap (RAMF). Furthermore, a specialized drainage system through the RAMF worked well to make a secondary ductal fistula. This case study also includes a discussion of the therapeutic potential of IDCS via an RAMF to replace an intractable labial fistula with a controllable ductal fistula.

Case Report

A 70-year-old male visited our hospital because of anemic symptoms. The clinical diagnosis of advanced gastric cancer was made and he underwent distal gastrectomy with intentional lymphadenectomy. Digestive reconstruction was completed by the Billroth II method. Definitive diagnosis was based on pathological findings and was categorized as T4aN2M0 stage IIIA according to TNM classification [10]. It has been reported that intentional lymphadenectomy increases the risk for postoperative pancreatic leakage [11], and pancreatic leakage was actually observed after surgery in our patient. Because intraperitoneal abscess and panperitonitis occurred, additional laparotomy with intraperitoneal lavage and drain placement were performed at postoperative day (POD) 3. Although intraperitoneal drainage was continued thereafter, the patient's infectious status with peritonitis did not improve. The drain discharge involved duodenal juice, and the pancreatic leakage caused delayed anastomotic failure at POD 9. Therefore, an additional laparotomy was proposed. Intraoperative findings showed that the pancreatic leakage caused anastomotic failure of the gastrojejunostomy. The patient's severe infectious state meant that we needed to perform open drainage. The drainage wound was placed at the abscess cavity around the pancreas head, and drainage tubes were placed around the pancreas and nearly at the anastomotic failure of gastrojejunostomy. Intravenous hyperalimentation via central venous catheter (i.e., parenteral nutrition) was not introduced due to the patient's severe infectious status. Enterostomy was added to manage the nutritive state. Intraperitoneal drainage and enteral alimentation via an enterostomy were postoperatively continued.

Pancreatic leakage caused a delayed rupture of the duodenal stump at POD 26, and a duodenal–cutaneous fistula was observed. A drainage tube was additionally placed into the duodenum via a ductal fistula, which was associated with the duodenal stump, and simple intraluminal drainage was started. Thereafter, pancreatic leakage was slowly reduced. Nutritional improvement led to well-developed normal granulations around the wound and ductal fistula. A mature ductal fistula that communicated with the gastrojejunostomy was obtained, and anastomotic failure of the gastrojejunostomy was healed at POD 60.

Unfortunately, the ductal fistula that communicated with the duodenal stump developed a labial fistula at POD 90 (Figure 1A, 1B). The high-output labial fistula caused a large amount of discharge of digestive juice (>500 mL/day). Additionally, skin erosion was refractory because of uncontrollable exposure to digestive juice. The labial fistula became intractable as expected, and deliberate management was urgently required.

An additional surgical approach was thoughtfully proposed at POD 161 because conservative treatment at that time did not appear to be possible. Under general anesthesia, the whole skin layer around the labial fistula was removed (Figure 1C). The cranial edge of the left abdominal rectus muscle was uncoupled from the costal arch, and the inferior epigastric artery area was preserved as a feeder of the pedunculated RAMF. The broken duodenal stump and labial fistula were covered by the pedunculated RAMF, which was derived from the left abdominal rectus muscle (Figure 1D). Furthermore, a dual drainage system, which was composed of a Penrose drain and a 2-way tube (Salem Sump; Medtronic, Dublin, Ireland), travelled through the RAMF (Figure 2A, 2B**)**. A meshed skin graft, which was harvested from the inside part of the left thigh, was transplanted to an inherent defect of the abdominal wall because of RAMF

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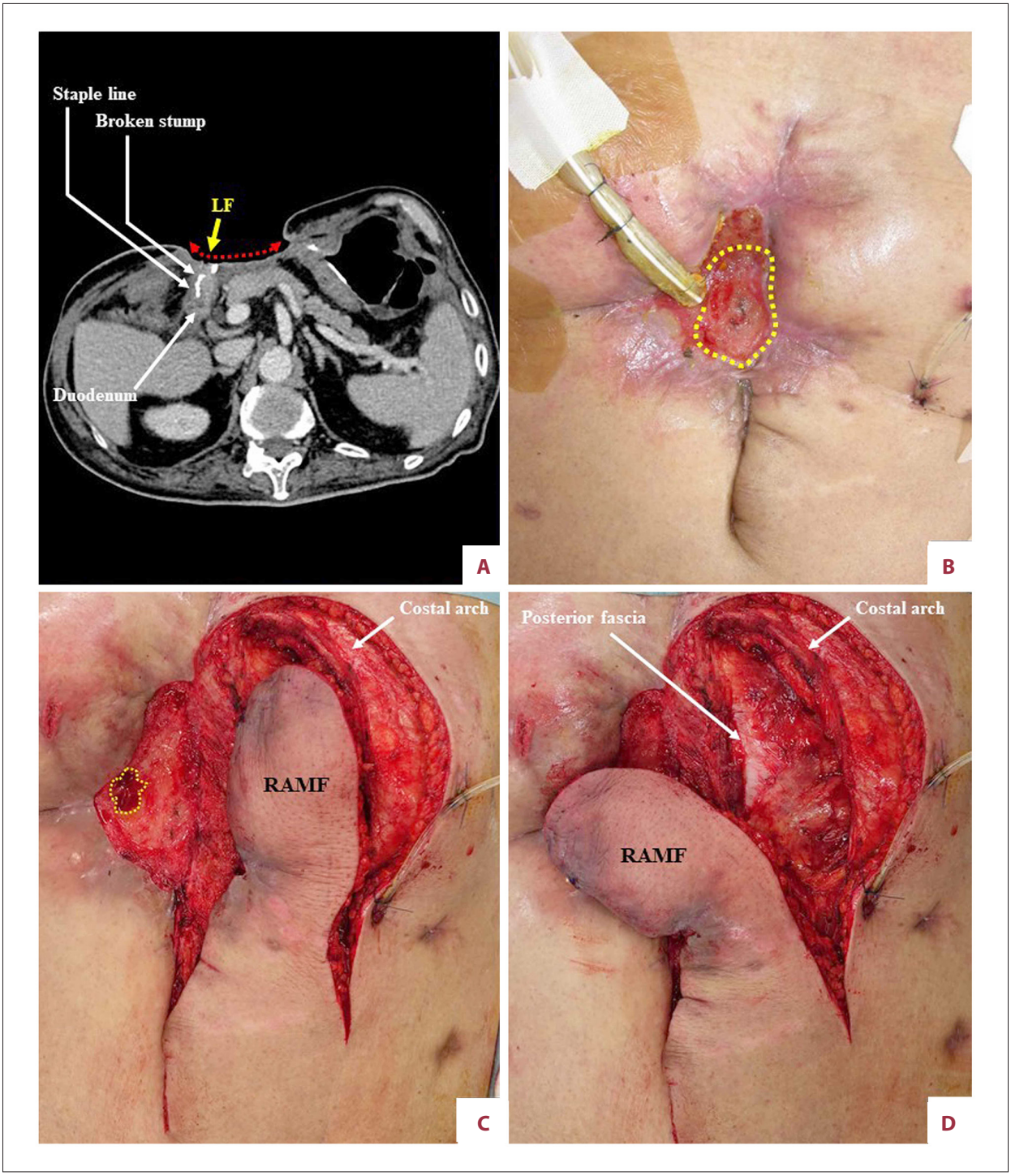

Figure 1. (**A, B**) Normal well-developed granulations around the open drainage wound (red dotted arrow) were observed. Although simple intraluminal drainage was continued, the ductal fistula (DF) that communicated with the duodenum stump unfortunately developed a labial fistula (LF) (yellow dotted area) at postoperative day (POD) 90. The high-output LF caused a large amount of discharge of digestive juice and skin erosion was refractory because of uncontrollable exposure to digestive juice. (**C**) The whole skin layer around the LF (yellow dotted area) was removed. The cranial edge of the left abdominal rectus muscle was uncoupled from the costal arch, and the inferior epigastric artery area was preserved as a feeder of the pedunculated rectus abdominis musculocutaneous flap (RAMF). (**D**) The broken duodenal stump and LF were covered by the pedunculated RAMF.

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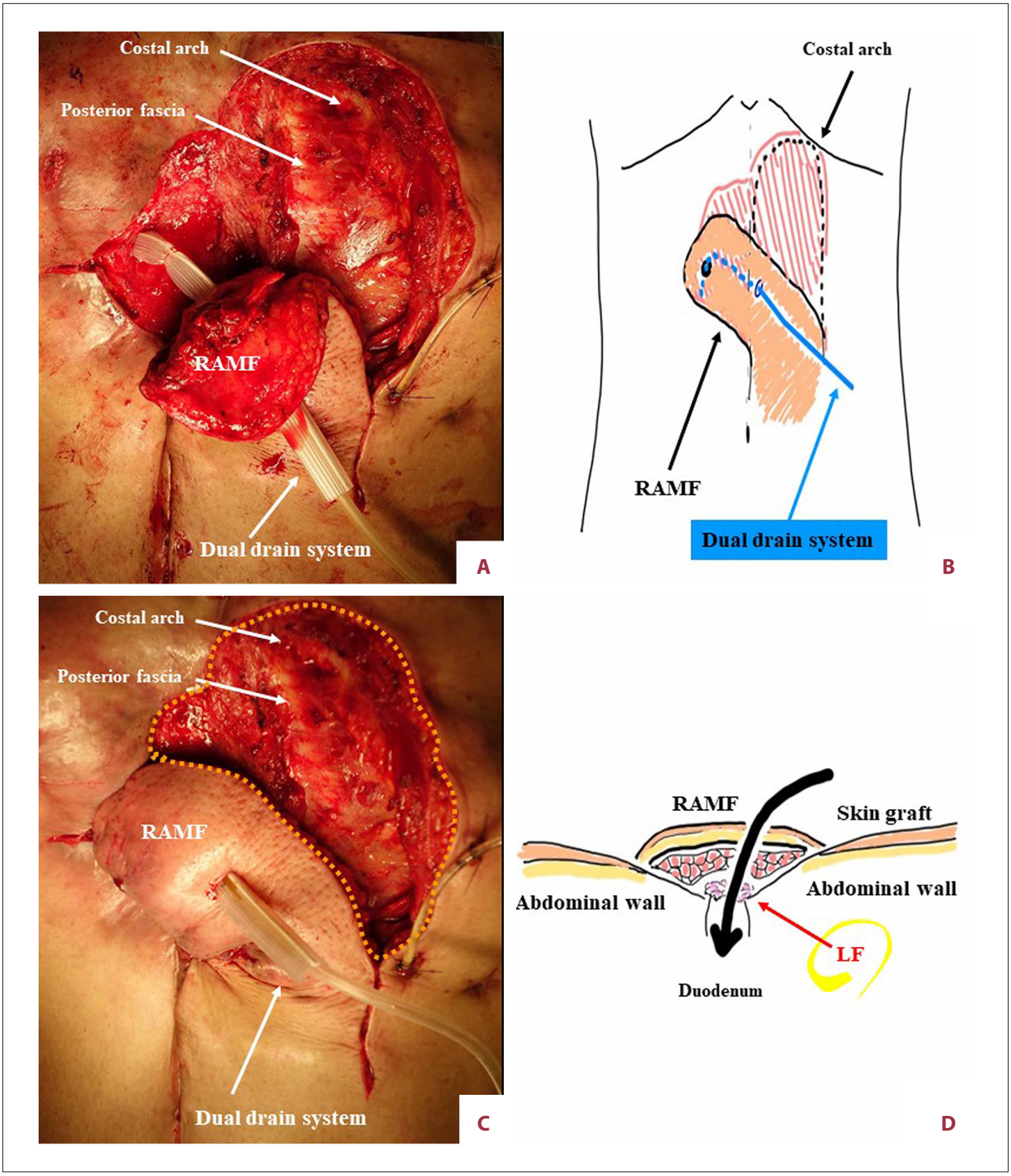

Figure 2. (**A, B**) The dual drainage system travelled through the rectus abdominis musculocutaneous flap (RAMF). (**C**) A meshed skin graft harvested from the inside part of the left thigh was transplanted to an inherent defect of the abdominal wall because of RAMF harvest (orange dotted area). (**D**) The tip position of the dual drainage system was located in the duodenum (black arrow). LF – labial fistula.

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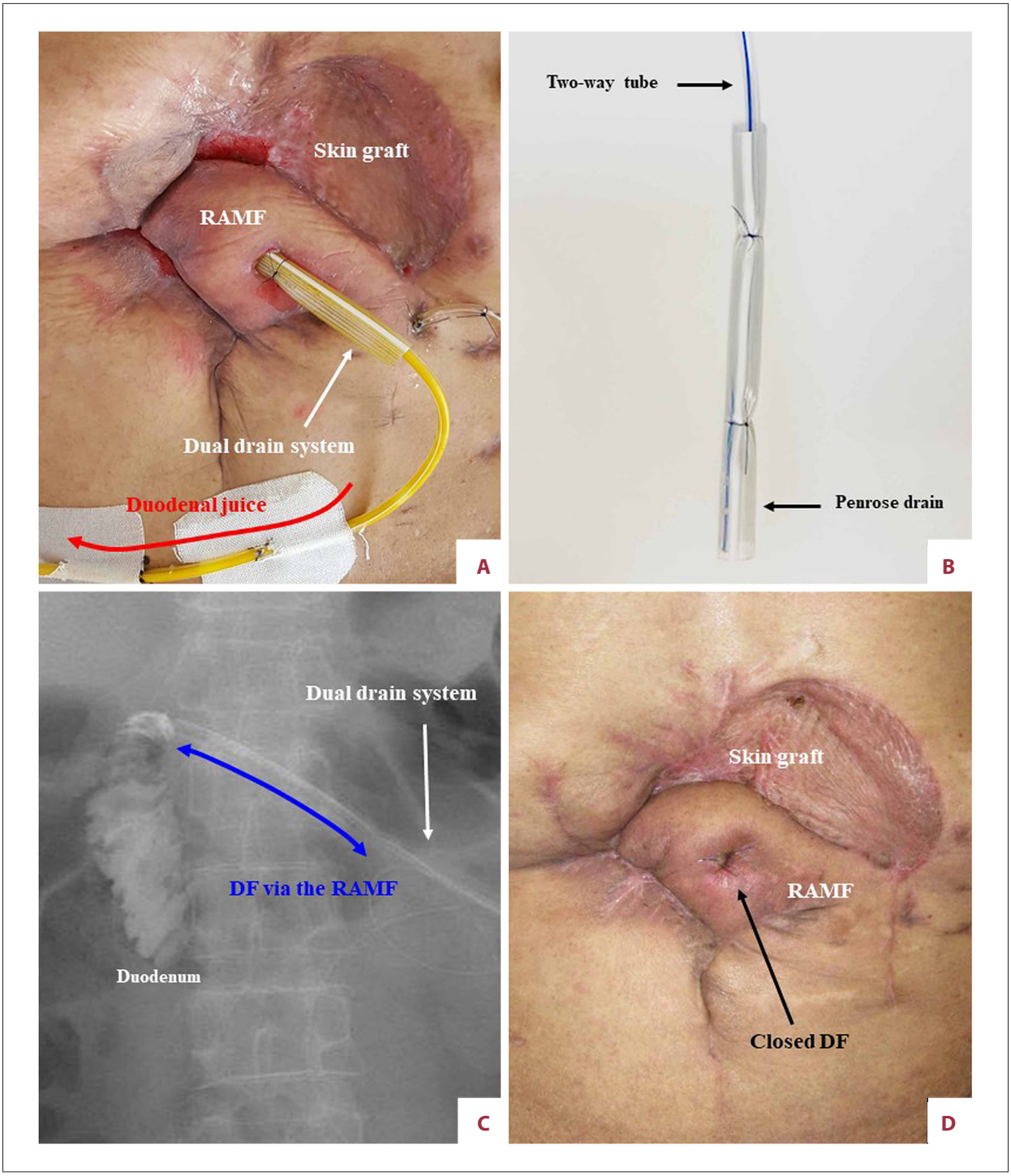

Figure 3. (**A**) Effective intraluminal drainage with a continuous suction (IDCS) via the dual drainage system, which penetrated the rectus abdominis musculocutaneous flap (RAMF), was continued and drain discharge clearly involved a large amount of duodenal juice. Subtle leakage between the labial fistula (LF) and RAMF disappeared because of effective IDCS and subsequent engraftment of the RAMF. (**B**) A 2-way tube accompanied the irrigation and drainage routes for continuous suction, and a Penrose drain involved a 2-way tube inside the drain. (**C**) Fistulography finding at postoperative day (POD) 201 was shown. The secondary ductal fistula (DF) matured through the RAMF (blue arrow) and the dual drainage system was removed at POD 201. (**D**) The secondary ductal fistula was well controllable and finally closed at POD 231.

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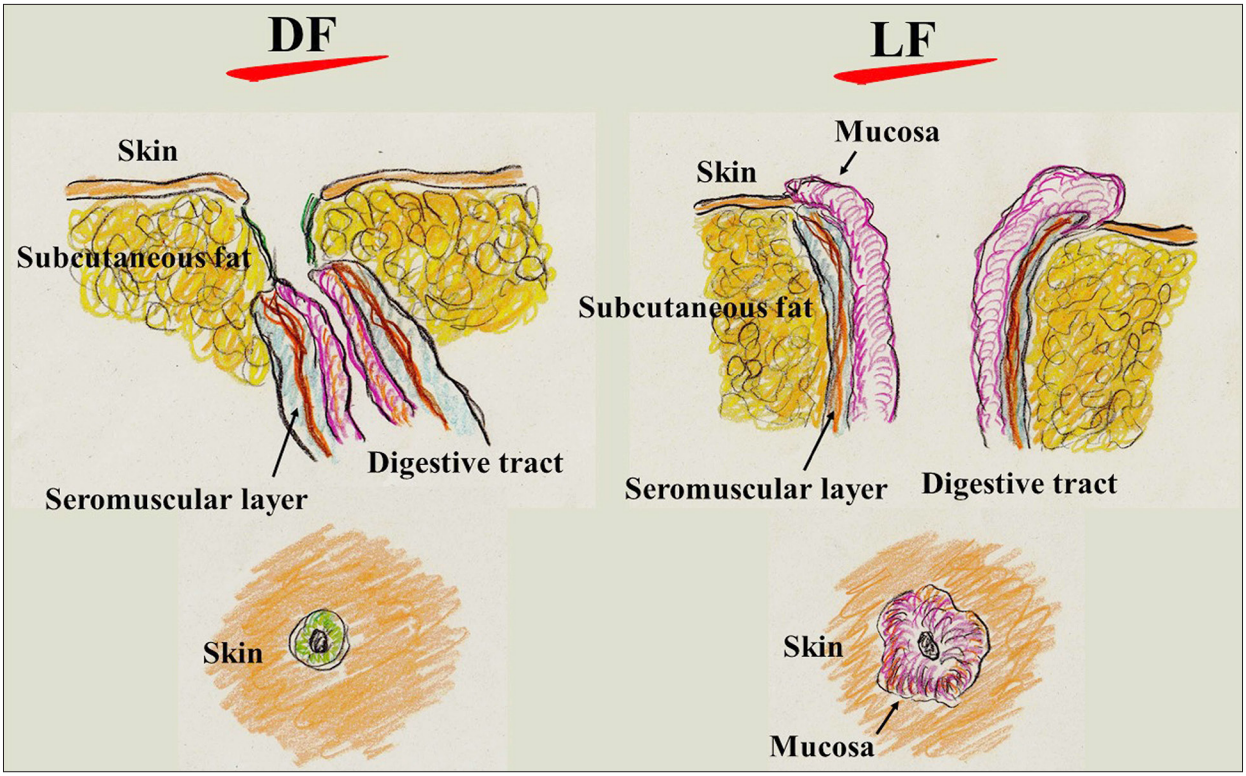

Figure 4. The differences between the ductal fistula (DF) and labial fistula (LF) are illustrated by schemas.

harvest (Figure 2C). The tip position of the dual drainage system was located in the duodenum (Figure 2D). Effective IDCS via the dual drainage system that penetrated the RAMF was continued at a pressure of –15 kPa, and drain discharge clearly involved a large amount of duodenal juice (Figure 3A). A 2-way tube was accompanied by irrigation and drainage routes for continuous suction, and the Penrose drain involved a 2-way tube inside the drain (Figure 3B). Although subtle leakage was initially observed between the labial fistula and RAMF, this leakage disappeared after IDCS (Figure 3A). Thereafter, with effective IDCS and subsequent engraftment of the RAMF, the secondary ductal fistula finally matured through the RAMF (Figure 3C). This secondary ductal fistula was well controllable, and the dual drainage system was removed at POD 201. The secondary ductal fistula was subsequently closed at POD 231.

An intractable labial fistula was successfully treated (Figure 3D) and the patient was discharged at POD 235. He has had no recurrence and metastases, and was in good health at 2 years after the initial surgery.

Discussion

A fistula that communicates with a broken duodenal stump is one of the refractory complications after gastrectomy because of high output of digestive juice. Although conservative treatments for this condition (e.g., injection of fibrin glue into the ductal fistula and intravenous administration of factor XIII or somatostatin analogs) have been reported [1,2,12–14], generally surgeons consider conservative management and simple intraperitoneal drainage may be not sufficient, even for ductal fistula. Surgical approaches (e.g., open drainage of the broken stump, percutaneous transhepatic duodenal drainage, percutaneous transhepatic diversion of biliary flow, and duodenal drainage via T-tube placement into the broken stump) have been previously documented [1,5,7,15–17]. In our case, open drainage was required. For our patient, the opened area became wider, not only for the broken stump, but also for the pancreatic leakage and anastomotic failure. This may be a possible explanation for why a ductal fistula developed into a labial fistula in our patient.

A labial fistula is generally intractable [8,9], although ductal fistula may be controllable [4,6]. Because the terminology of the ductal fistula and may be difficult to understand, we illustrated the differences between them by schemas (Figure 4). A pedunculated RAMF is accompanied by many perforating arteries through the rectus abdominis, and still maintains its own hypervascularity [18]. Although an RAMF is commonly used in the field of plastic surgery, its usefulness for postoperative fistulas after general surgeries (e.g., esophagocutaneous and rectovaginal fistulas) has been reported [19,20]. An RAMF has therapeutic potential for replacing an intractable labial fistula

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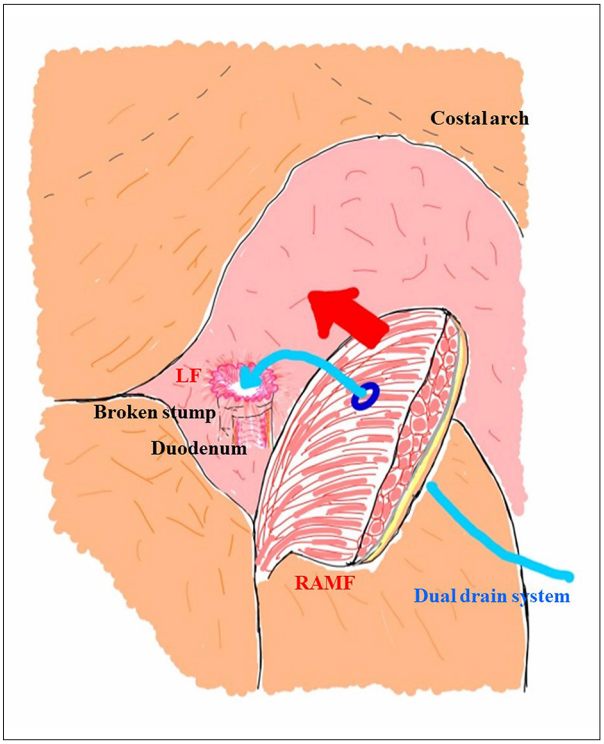

Figure 5. A pedunculated rectus abdominis musculocutaneous flap (RAMF) is accompanied by many perforating arteries through the rectus abdominis. Combination therapy with covering of a labial fistula (LF) by an RAMF (red arrow) and intentional drainage via the RAMF (light blue arrow) has therapeutic potential for replacing an intractable LF with a controllable ductal fistula, though effective drainage of the LF (i.e., IDCS by the dual drainage system in our case).

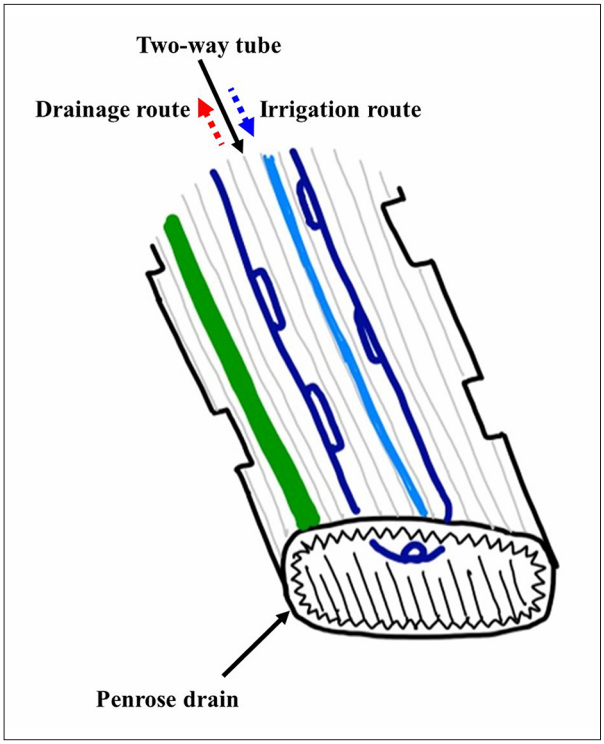

Figure 6. The Penrose drain involves a 2-way tube inside the drain. Placement of the Penrose drain prevents the mucosa being sucked into the suction tube. Moreover, a 2-way tube has irrigation and drainage routes (blue and red arrows), and an irrigation route locally provides air. The 2-way tube also prevents uptake of mucosa into the suction tube. Continuous suction at the pressure of –15 kPa was performed via the drainage route of a 2-way tube, and this drain discharge clearly involved a large amount of duodenal juice. Therefore, the dual drainage system enables effective IDCS. IDCS – intraluminal drainage with a continuous suction.

with a controllable ductal fistula, although effective drainage of the labial fistula is important (Figure 5).

High output of digestive juice strongly disturbs wound healing and fistula closure [5,21–24]. A large amount of discharge of digestive juice from the broken stump was clearly observed in our case, and we recognized that continuous and effective drainage of the broken stump was indispensable for successful treatment. In our case, a dual drainage system was crucial for treating a labial fistula (Figure 6). Briefly, a Penrose drain involved a 2-way tube inside the drain. Although careless continuous suction can easily cause tube occlusion and/or mucosal injury because of sucking up mucosa into the tip of the suction tube, this dual drainage system enabled IDCS. Therefore, placement of a Penrose drain prevented mucosa being sucked up into the suction tube. Moreover, a 2-way tube allowed for irrigation and drainage routes. The irrigation route can locally provide air and subsequently prevent uptake of mucosa into the suction tube. Therefore, this specialized drainage system in our case enabled effective IDCS. Moreover, effective IDCS through the RAMF was advantageous for creating a secondary ductal fistula.

We summarize the key points of IDCS through an RAMF for an intractable labial fistula in Figures 5 and 6. Effective IDCS through the RAMF worked well for replacement of a high-output labial fistula with a controllable ductal fistula.

Conclusions

A labial fistula that communicates with the duodenal stump after gastrectomy is generally refractory. Effective IDCS through an RAMF is important for replacement of a high-output labial fistula with a controllable ductal fistula.

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Acknowledgments

Yasuyuki Kamada and Tomohide Hori originally drew all illustrations.

Ethical approval

This report was approved by the Institutional Review Board of Shiga General Hospital, Moriyama, Japan.

Conflicts of interest

None.

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