Endoscopic Examination for Pancreatic Fistula

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NAKAGAWA, K., MOMONO, S., SASAKI, Y., FURUSAWA, A. and UJIIE, K. Endoscopic Examination for Pancreatic Fistula. Tohoku J. Exp. Med., 1989, 157 (1), 61-67 —— We have conducted endoscopic examination in 5 cases of postoperative pancreatic fistula, and discuss its clinical significance. The examination provided not only an observation of the fistula but also opportunity to irrigate the fistula for removal of foreign substances. The biopsy permitted histological examination for necrotic substances and the fistulous wall. Endoscopy made it easy to introduce a drain into the affected site and to judge when to remove the drain. Closure of the fistula was also attainable using fibrin glue. Consequently, the fistulas were closed within 1 month from the examination in all cases but one, in which death resulted due to carcinoma. The examination is an easy and safe technique. ——— endoscopic examination; pancreatic fistula

A conservative therapy including intravenous hyperalimentation (IVH) and drainage have been employed for postoperative pancreatic fistula previously (Jordan 1970). With this therapy, however, pancreatic fistulas are hardly ever cured and tend to develop into inveterate fistulas. Thus, in this study we adopted endoscopic examination as a radical therapy in 5 cases of pancreatic fistula, and discuss here its clinical significance.

METHODS

Observation of fistulas was made using an endoscope (Olympus choledochofiberscope B3R-type, external diameter of 6.5 mm, Olympus, Tokyo) more than 3 weeks after operation. In cases of narrow fistulas, the fistula was dilated prior to the endoscopic examination from 8 to 10, 12 and 14 Fr by use of a Nelaton tube every other day. The endoscopic examination required no specific premedication. The fistulogram, which should prove the fistula to be firmly formed or not, was carried out before the endoscopic examination. The endoscope was moved ahead deeper while observing the internal fistula through it. When pus blocked the view, the abscess was irrigated thoroughly with saline. Any foreign bodies found in the cavity of the abscess, such as silkworm-gut or local hemostatic substances, were picked up with the biopic forceps and removed. Identification of necrotic substances in the abscess or peripheral tissues of the fistula was made by biopsy when necessary. Contrast medium was injected through the endoscope for fistulogram, and the drain was introduced to the affected site. In cases without abscess, fibrin glue was applied to the
fistula for closure.

**Case Report**

*Case 1: a 50-year-old man*

Pancreaticoduodenectomy was performed in this patient because of a pancreatic cyst. After the operation, an anastomotic leakage occurred at the pancreatojejunostomized site, and pus containing pancreatic juice emerged from the drain. IVH was then performed with intravenous administration of antipancreatic enzyme and antibiotics. Furthermore, the fistula was irrigated daily with 20 ml of 0.2% povidoneiodine in order to prevent infection. An endoscopic examination was carried out 36 days after the operation, and the absence of necrotic tissue in the fistula was confirmed (Fig. 1). Furthermore, it was ascertained macrohistologically that the fistulous wall was composed of granulation tissue, and the drain was then removed. The fistula closed within 10 days of the endoscopic examination. The patient remained healthy at last follow-up 7 months after the endoscopic examination with a normal serum amylase level and no fluid collections on computerized tomography of the pancreas.

*Case 2: a 64-year-old woman*

The patient received abdominoperineal resection of the rectosigmoid because due to direct infiltration of sigmoid cancer into the rectum. Furthermore, during the operation, while the splenic flexure was being separated, the spleen was damaged, so that splenectomy was also unavoidable. After the operation, since pus still continued to emerge from the drain settled at the splenic bed, a fistulogram was taken on the 75th day after the operation, and an image of the abscess and pancreatic duct was observed (Fig. 2). Although the conservative therapy including abrosia and fistulous irrigation was attempted, pus was continued to form. When the endoscopic examination was carried out on day 113 after the operation, a wad of silkworm-gut was observed forming an abscess (Fig. 3). Six pieces of

Fig. 1. Fistulous endoscopy in case 1. Necrotic substance is not observed in the fistula.
silkworm-gut were removed using the bioptic forceps, and pus excretion from the abscess through the drain was decreased. In the fistulogram, the cavity of the abscess disappeared and only the pancreatic duct was observed (Fig. 2). While the decision to remove the drain was being considered, the liver metastatic lesion grew and the general condition was
aggravated, which led to the patient's death on day 192 after the operation. The fistula was about to close.

**Case 3: a 52-year-old man**

Pancreatectoduodenectomy was performed in the patient because of the presence of pancreatic cancer. After the operation, an anastomotic leakage occurred at the pancreatojejunostomized site, and pus started oozing out through the drain. Then, the conservative therapy including abrosia and fistulous irrigation was performed. However, since the leakage was not resolved, the endoscopic examination was carried out 36 days after the operation. A piece of silkworm-gut was recognized in the abscess, and it was picked up with the bioptic forceps. Fistulous irrigation was continued daily, and pus excretion gradually decreased. The fistula closed 23 days after the endoscopic examination and the patient appeared well at last follow-up 11 months later.

**Case 4: a 76-year-old man**

The patient received caudal pancreatectomy with partial resection of the transverse colon and kidney because of a direct infiltration of pancreatic cancer into these organs. In this operation, oxidized cellulose, which is a local absorbant hemostatic substance, was used against bleeding from the renal parenchyma. After the operation, pus containing pancreatic juice started oozing out through the drain settled at the pancreatectomized site. Since the cavity of the abscess was recognized in a fistulogram taken on day 20 of the operation, fistulous irrigation was carried out daily under IVH. The local hemostatic substance came out from the fistula with pus, although bit by bit, and so the endoscopic examination was conducted 26 days after the operation. In the endoscopic examination, the local hemostatic substance was found in large amounts in the fistula (Fig. 4) and was removed to the extent possible using the bioptic forceps while irrigating the fistula thoroughly. The irrigation was continued daily, and the excretion gradually decreased. In the following endoscopic examination, little hemostatic substance was observed in the fistula. Furthermore, in the fistulogram with the endoscope, since the cavity of the abscess was hardly recognizable, the drain was removed. The fistula closed 27 days after the first endoscopic examination and

![Fig. 4. Fistulous endoscopy in case 4. The left half of the picture shows the local hemostatic substance (26 days after surgery). The right half shows a little hemostatic substance (44 days after surgery).](image-url)
the patient appeared well at last follow-up 11 months.

Case 5: a 65-year-old man

The patient underwent total gastrectomy accompanied by splenectomy because of gastric cancer. After the operation, pus started oozing from the indwelling drain settled at the splenic bed, and abscess formation and pancreatic duct were found in a fistulogram taken 70 days following the operation. Under abrosia, fistulous irrigation was carried out daily, and this decreased the amount of excretion. However, since the fistula would not close, the endoscopic examination was conducted 94 days after the operation. The abscess was no longer observed, and the fistula was found to be made up of granulation tissue. The fistula was then charged with fibrin glue containing antibiotics sensitive to the bacteria detected. Immediately after that, pus excretion disappeared, and the fistula completely closed. The patient remained well at last follow-up 10 months after the endoscopic examination with a normal serum amylase level and no fluid collection on computerized tomography of the pancreas.

DISCUSSION

As radical operation has come to be frequently employed as a treatment for gastric or pancreatic cancer owing to improvement in operative technique and in pre-and postoperative management, there has been a growing increase in the occurrence of pancreatic fistula, as a postoperative complication (Longmire 1984; Matuno and Sato 1986). The pancreatic fistula causes a great deal of trouble in therapy, compared with other fistulas, because it includes pancreatic juice which fuses surrounding tissue leading to intraperitoneal bleeding or abscess formation.

In surgical therapy for postoperative pancreatic fistula, an adhesion or
inflammation in the surrounding tissue makes surgery difficult, and accordingly complicates proliferation of the time required for the operation (Jordan 1970). This imposes more stress on the patient. Moreover, since there occurs a relapse of fistula in more than a few cases, the conservative therapy is generally employed (Pederzoli et al. 1986). Usually IVH is performed in patients under abrosia in order to inhibit excretion of pancreatic juice and to improve nutrition (Dudrick et al. 1970). Furthermore, antipancreatic enzyme and antibiotics are intravenously administered, and pancreatic juice is positively taken out by drainage while the fistula is irrigated with povidone-iodine or saline containing antibiotics sensitive to the bacteria detected. If the cavity of the fistula narrows, the drain is exchanged for a thinner one and the insertion is gradually shortened to be taken out finally. With this conservative therapy most patients with pancreatic fistula can be cured, although generally it takes a long time to cure them, and in some cases complications appear such as intraperitoneal bleeding or sepsis resulting in misery. Thus, we have evaluated the endoscopic examination as a radical therapy for pancreatic fistula, and discuss its clinical significance in this study.

The 5 patients examined in this study first received the conservative therapy, but their fistulas were difficult to close. Therefore, they were subjected to the fistulous endoscopic examination between 26 and 113 days after surgery, when the fistula was completely formed. In Case 2, the fistula required dilation prior to endoscopic examination while in the other cases the endoscope was easily introduced into the fistulas. The fistula was irrigated with saline under direct observation. Furthermore, in Cases 1 and 4, necrotic substances and the fistulous wall were examined by biopsy in order to identify the tissue affected by necrosis or to pathologically examine for the recurrence of cancer. Moreover, silkworm-gut was removed in Cases 2 and 3 while a local hemostatic substance used in the surgery was removed in Case 4. In this way, sources of infection were removed. In cases which showed large amounts of pus excretion, a drain was introduced to the affected site. In Cases 2 and 4, a second fistulous endoscopic examination was carried out to observe changes in the abscess and to decide when to remove the drain. In case 5 since no abscess was recognized, the fistula was charged with fibrin glue in order to close it at that time (Nakagawa et al. 1988). From these results, the significance of the endoscopic examination for pancreatic fistula can be summarized as follows. 1) Irrigation of fistula under direct observation is possible with histological examination of the necrotic substance and the fistulous wall. 2) Foreign bodies such as silkworm-gut or local hemostatic substance, which are sources of infection, can be removed from the fistula. 3) Fistulogram of the abscess under direct observation is feasible with introduction of a drain into the affected site. 4) The examination makes it possible to judge when the drainage should be suspended. 5) The examination allows fistulous closure with fibrin glue. As described above, the endoscopic examination of pancreatic fistula
provides not only an observation of internal fistulas but also an effective treatment. In this study, all the inveterate cases of pancreatic fistula that had failed to be cured by prolonged conservative therapy, closure of the fistula was achieved within 1 month of execution of the endoscopic examination, except in one case because of death due to cancer.

Endoscopic examination of pancreatic fistula, as long as it is carried out after the fistula is firmly formed, is unlikely to extend inflammation to the surrounding tissue, and is an easy and safe technique. This endoscopic examination is considered to be an effective and positive therapy for pancreatic fistula.

References