Endoscopic management of pancreatic fistulas secondary to intraabdominal operation

A. Fischer, S. Benz, P. Baier, U. T. Hopt

Department of Surgery, University of Freiburg, Hugstetterstrasse 55, D-79106 Freiburg, Germany

Abstract

Background: Pancreatic fistulas may arise secondary to several disorders of the pancreas. Although ∼70% of pancreatic fistulas close with nonoperative management, this course of treatment usually takes several weeks or even months. To reduce this long period, closures with fibrin glue have been attempted in the past. In this study, we describe the course, management, and outcome of eight patients with postoperative external pancreatic fistulas of the pancreatic body and tail that arose after oncologic operations in the upper abdomen.
Methods: All eight cases were treated by external drainage, insertion of an endoprosthesis into the pancreatic duct, and closure of the fistula with fibrin glue.
Results: Immediately after this intervention, secretion from the fistulas was absent in all cases. None of the patients developed abscesses, recurrent fistulas, or complications associated with the fibrin glue.
Conclusion: The early endoscopic management of postoperative pancreatic fistula with an approach combining internal drainage of the pancreatic duct and external occlusion of the fistula with fibrin glue is expeditious and beneficial.

Key words: Fistula — Pancreas — Endoscopy — Fibrin glue — Prosthesis

Pancreatic fistulas are a possible complication after various disorders of the pancreas. The most common reasons are inflammatory, traumatic, postoperative, or iatrogenic. Irrespective of their etiology, pancreatic fistulas may cause a whole string of complications, such as abscess, bleeding, pseudocyst, and necrosis. Therefore, an expeditious and possibly minimally invasive management is desirable. For many years, pancreatic fistulas have been managed either surgically, by pancreatic resection or internal drainage (e.g., pancreaticojejunos-

tomy, Roux-en-Y), or conservatively, by drainage over a long period of time. However, recently, new strategies have become more popular.

Very encouraging have been obtained results at reducing the incidence of and managing postoperative pancreatic fistulas by using fibrin glue. In 1991, Kram et al. [11] described a method for applying fibrin glue directly to penetrating pancreatic injuries or to the tissue after pancreatic resection. Penetrating injuries were treated by completely filling the defect with a 1–2-ml fibrin glue plug. Sutures or staple lines related to the operative management of traumatic injuries were sealed intraoperatively with 4–6 ml of fibrin glue. Postoperatively, none of the patient developed pancreatic fistulas, abscesses, or pseudocysts. In contrast to our procedure, no additional internal drainage was used. In the 1980s at the same institution, 29% of patients operated on for pancreatic trauma developed fistulas [19]. At that time, no fibrin glue was used.

The first results of the endoscopic occlusion of gastrointestinal fistulas with fibrin were reported in 1990. Lange et al. [12] succeeded in closing 11 of 16 gastrointestinal fistulas using a flexible endoscope, which was advanced percutaneously along the fistula tract to seal the fistulas with fibrin glue. Until then, the endoscopic management of pancreatic fistulas usually consisted of papillotomy or transpapillary drainage of the pancreatic duct. This is a highly effective therapeutical option but may still be very time-consuming [4, 16]. Engler et al. [6], however, needed three fibrin applications through a catheter passed retrogradely into the pancreatic duct, at 2-day intervals, to close a pancreaticocutaneous fistula. We hypothesized that the combination of both fibrin glue and internal drainage of the pancreatic duct would be highly effective in the treatment of pancreatic fistulas.

Patients and methods

Over a 2-year period, eight patients with external pancreatic fistulae underwent pancreatic fistula occlusion with fibrin glue using an endo-

---

Correspondence to: A. Fischer

Table 1. Operative data for eight patients with external pancreatic fistula after oncologic upper abdominal operations

No. of patients	Operations
3	Resection of the pancreatic tail for pancreatic tumor
2	Gastrectomy with extended perigastric lymph node dissection
2	Splenectomy for splenomegaly
1	Tumor debulking with splenectomy for ovarian cancer

scopic technique. All cases were pancreaticocutaneous fistulas originating from the pancreatic body and tail after oncologic operations (Table 1). A pancreatic fistula was defined as pancreatic fluid discharge for >7 postoperative days. The maximal amylase concentrations in the discharged fluid ranged between 37,000 and 150,000 U/L, and the lipase concentration ranged between 44,000 and 630,000 U/L. The median discharge volume was 110 ml per day (range, 50–210). Before the intervention, fistulas had persisted for 12 days to 3 months. All patients were nil by mouth from the beginning of the treatment until the 7th day after fistula closure. Somatostatin or analogues were not used.

The first step in the procedure was the percutaneous insertion of a 27 Ch silicon drain into the inflammatory peripancreatic area under sonographic or CT guidance. To achieve a stable fistula tract, this drain remained in place for ≥14 days. Two weeks after the drain was inserted, fistula closure was carried out. An endoscopic retrograde pancreatography (ERP) was performed to rule out pancreatic duct obstruction. At the same time, a prosthesis (Solopass 7 Ch, 5 cm) was inserted into the duct. To avoid stent-induced damage of the pancreatic duct, only short stents were used. In none of the cases was the fistula bridged by the prosthesis. Thereafter, a fistuloscopy was done with a bronchoscope (Olympus BF 1T10), and the fistula was rubbed with a cyto brush or pair of biopsy forceps. Any extant necrotic sequesters were then removed with the forceps. Next, a Duploject catheter was placed in the fistula. After removal of the bronchoscope, the fistula was filled to skin level with fibrin through the catheter.

Results

There was no additional morbidity or mortality due to the intervention. Immediately after fistula occlusion, fistula secretion was absent in all eight cases. An average of 8.6 ml (range, 6–10) of fibrin glue was used for each patient. In three cases, the patients complained of some abdominal pain and fever after the intervention. None of the cases required further intervention. In none of the cases was there evidence of fistula on ERP when the prosthesis was removed 4 weeks after fistula closure. None of the patients developed an abscess, recurrent fistula, or complications associated with fibrin glue, such as pancreatic duct occlusion, thrombosis, embolism, or necrosis.

Discussion

Any upper abdominal invasive procedure in the vicinity of the pancreas places the patient at risk of developing fistulas. The incidence of postoperative pancreatic fistula is reported to be between 4% and 52%, depending on the etiology and definition used [1, 9, 15, 19, 20]. External fistulas occur in ~4–6% of patients after surgical interventions on the pancreas [1] and in ~33% after trauma [9].

Fig. 1. Gastrografin is administered via the silicon drain before intervention. A communication between the pancreatic duct and the fistula is demonstrated.

The success rate for the nonoperative nonendoscopic management of pancreatic fistulas is ~70% [9]. However, the average occlusion time is very long [14]. If pancreatic fistula closure does not occur after several weeks of conservative treatment, an operative approach is necessary. The success rate of surgical management is >80% [13], but a mortality rate of 8% and a morbidity rate of 13% have been reported. Therefore, minimally invasive procedures are highly desirable to shorten this time and to increase the success rate.

The series of patients with postoperative pancreaticocutaneous fistulas presented here shows that our approach of combining internal pancreatic duct drainage and external fistula occlusion yields a high success rate. Moreover, we have observed no morbidity related to the procedure so far. This approach combines two procedures that have already been used successfully in treating patients with pancreatic fistula. Occlusion of a fistula tract using fibrin glue has been reported to be successful in single cases [6, 12]. However, it seems obvious that drainage of the pancreatic duct to relieve the pressure from the fistula, and thus from the fibrin clot, would further improve these results [7, 8, 10, 17, 18, 21, 22]. All of our patients were on parenteral nutrition. The use of octreotide has been shown to be effective in the management of pancreatic fistula [2, 3, 5]. However, it has not been used in conjunction with our combined procedure.

In conclusion, our data suggest that early endoscopic management as described here is beneficial in cases of postoperative external pancreatic fistula. This therapeutic strategy is less invasive than surgery and seems to have a high success rate. In case of failure, there is no disadvantage for later operative management.

References

1. Baker RJ, Bass RT, Zajtchuk R, Strohl EL (1967) External pancreatic fistula following abdominal injury. Arch Surg 95: 556–566
2. Bassi C, Falconi M, Salvia R, Caldiron E, Butturini G, Pederzoli P (2000) Role of octreotide in the treatment of external pancreatic pure fistulas: a single-institution prospective experience. Langenbecks Arch Surg 385: 10–13

3. Berberat PO, Friess H, Uhl W, Büchler MW (1999) The role of octreotide in the prevention of complication following pancreatic resection. Digestion 60(Suppl 2): 15–22

4. Boerma D, Rauws EA, van Guilk TM, Huibregtse K, Obertop H, Gouma DJ (2000) Endoscopic stent placement for pancreatico-cutaneous fistula after surgical drainage of the pancreas. Br J Surg 87: 1506–1509

5. Brunaud L, Sebbag H, Marchal F, Verdier A, Bresler L, Tortuyaux JM, Boissel P (2001) Evaluation of somatostatin or octreotide efficacy in the treatment of external pancreatic fistulas. Ann Chir 126: 34–41

6. Engler S, Dorlars D, Riemann JF (1996) Endoskopische Fibrin-verklebung einer Pankreasgangfistel nach akuter Pankreatitis. Dtsch Med Wschr 121: 1396–1400

7. Fabre JM, Bauret P, Prudhomme M, Quenet F, Noel P, Baumel H (1995) Posttraumatic pancreatic fistula cured by a endoprosthesis in the pancreatic duct. Am J Gastroenterol 90: 804–806

8. Gane E, Fata'ar S, Hamilton I (1994) Management of persistent pancreatic fistula secondary to a ruptured pseudocyst with endoscopic insertion of an expandable metal stent. Endoscopy 26: 254–256

9. Graham JM, Mattox KL, Jordan Jr GL (1978) Traumatic injuries of the pancreas. Am J Surg 136: 744–748

10. Kochhar R, Goenka MK, Nagi B, Singh K (1995) Pancreatic ascites and pleural effusion treated by endoscopic pancreatic stent placement. Indian J Gastroenterol 14: 106–107

11. Kram HB, Clark SR, Ocampo HP, Yamaguchi MA, Shoemaker WC (1991) Fibrin glue sealing of pancreatic injuries, resections, and anastomoses. Am J Surg 161: 479–481

12. Lange V, Meyer G, Wenk H, Schildberg FW (1990) Fistuloscopy an adjuvant technique for sealing gastrointestinal fistulae. Surg Endosc 4: 212–216

13. Lipsett PA, Cameron JL (1992) Internal pancreatic fistula. Am J Surg 161: 479–481

14. Martin FM, Rossi RL, Munson JL, ReMine SG, Braasch JW (1989) Management of pancreatic fistulae. Arch Surg 124: 571–573

15. Papachristou DN, Fortner JG (1981) Pancreatic fistula complicating pancreatectomy for malignant disease. Br J Surg 68: 238–240

16. Saeed ZA, Ramirez FC, Hepps KS (1993) Endoscopic stent placement for internal and external pancreatic fistulas. Gastroenterology 105: 1213–1217

17. Schoefl R, Haefner M, Pongratz S, Pfeffel F, Stain C, Poetzi R, Gangl A (1996) Endoscopic treatment of fistulas and abscesses in pancreatitis: three case reports. Endoscopy 28: 776–779

18. Shim KS, Suh JM, Yang YS, Choi JY, Park YH (1993) Three-dimensional demonstration and endoscopic treatment of pancreaticoperitoneal fistula. Am J Gastroenterol 88: 1775–1779

19. Sims EH, Mandal AK, Schlater T, Fleming AW, Lou MA (1984) Factors affecting outcome in pancreatic trauma. J Trauma 24: 125–128

20. Suzuki Y, Kuroda Y, Morita A, Fujino Y, Tanioka Y, Kawamura T, Saitoh Y (1995) Fibrin glue sealing for the prevention of pancreatic fistulas following distal pancreatectomy. Arch Surg 130: 952–955

21. Wolfsen HC, Kozarek RA, Ball TJ, Patterson DJ, Traverso LW, Freeny PC (1992) Pancreaticoenteric fistula: no longer a surgical disease? J Clin Gastroenterol 14: 117–121

22. Zahid A, Saeed ZA, Ramirez FC, Hepps KS (1993) Endoscopic stent placement for internal and external pancreatic fistulas. Gastroenterology 105: 1213–1217