

# Human Fibrin Sealants and Postoperative Fistulas: 25 Cases

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## **Abstract**

Human fibrin sealant was used to accelerate the healing process in a total of 25 fistulas: 9 intestinal, 2 biliary, 1 vaginal, and 13 pancreatic. All patients received adequate nutritional support, and their secretions were reduced by pharmacological treatment. They underwent repeated X-ray check-ups to achieve a proper positioning of the drainages and to control the healing process. As soon as the fistulas showed a regular tract and a low outflow, they were treated with fibrin sealant. Quick and stable healing was obtained in 22 cases. In three patients we obtained only a reduction of secretions and lumen.

## **Introduction**

Fistulas are frequent and life-threatening complications of abdominal surgery. They prolong hospitalization and therefore entail an individual and social cost. Precise operative techniques and full preoperative correction of nourishment needs are considered useful in preventing fistulas.

Post-operative fistulas can be divided into "early" and "delayed" fistulas. Early fistulas (before the sixth or seventh postoperative day) are usually due to errors in surgical technique. This kind of fistula does not benefit from the physiological adhesions which occur after all operations, and its secretions spread into the abdominal cavity. These fistulas are associated with a high mortality rate and frequently require second-look surgery ranging from simple suture of the leaking anastomosis or local drainage to wide surgical demolitions. Delayed fistulas (after the seventh postoperative day) are more common and benefit from the physiological scarring of the organism. They usually require only conservative treatment consisting of purely medical treatment, sometimes associated with interventional radiology, for example:

- Fasting with total parenteral nutrition and sufficient caloric intake for the patient's condition and for the postoperative catabolic phase with the target of reducing physiological secretions
- Almost complete pharmacological suppression of pancreatic, intestinal, and biliary secretions, using somatostatin or analogues

- Prevention and treatment of septic complications with antibiotic prophylaxis or, in the case of positive cultures, specific antibiotic therapy
- Compensation of losses and general restabilization of the patient
- Washings, to clean the fistula and to buffer secretions
- Protection of the skin against aggressive secretions, especially pancreatic and biliary secretions
- X-ray check-up to the fistula's shape and the position of the drainages for removing the secretions as quickly and directly as possible [1, 2]

We believe that the latter morphological aspect is very important since it is the goal of all conservative therapies. The initial morphological aspect of fistulas may influence their healing, depending on whether the path is simple and straight or complex and ramified with inadequately drained side sacs requiring further radiological and surgical maneuvers to achieve good drainage. The presence or absence of drainages, their position in relation to the fistula, type of fistula (pancreatic, jejunal etc.), and the possible occurrence of septic or hemorrhagic complications can also influence healing as well as the fistula's outflow [1, 2].

In treating the fistulas that we observed we used all the above conservative methods to obtain a low-outflow straight fistula with sufficiently a small lumen to be sealed with fibrin glue.

### ***Materials and Methods***

Since October 1983 we have treated 25 patients with fibrin sealant. Two further patients were excluded from further treatment and underwent surgery: a woman previously treated for a perirectal abscess drained through the rectum, who had a presacral intestinal cyst and a man affected by a ramified perineal fistula. Both of these patients underwent surgery. The 25 patients were as follows: One had vaginal fistula after hysterectomy and Hartmann's operation due to cancer of the rectum. Nine had intestinal fistulas, one after Kock's reservoir ileostomy due to inflammatory bowel disease, one gastrocutaneous fistula after pancreatic pseudocyst marsupialization, one following external biliary drainage, four fistulas, one esophagojejunostomy after total gastrectomy due to gastric cancer, two with fistula after left colectomy due to rectum cancer. Thirteen had pancreatic fistulas: six after pancreaticoduodenectomy (two for pancreatic cancer, two for ampullary cancer, and two for endocrine tumors), two after left pancreatectomy (one for chronic pancreatitis, one for cystoadenoma) one after excision of an insulinoma in the head of the pancreas and three after surgical treatment of acute necrotizing pancreatitis (one after percutaneous drainage of a pseudocyst, one necrosectomy and drainage, one cystojejunostomy). Two had biliary-cutaneous fistulas after atypical right hepatectomy for hepatic echinococcosis.

The first patient treated was affected by a vaginal fistula after Hartmann's operation and was kept on conservative therapy for over 1 year with no benefit. All patients underwent fistulography for detecting the diameter, length, and

source of the fistula: if necessary, the drainage was repositioned under radiological control [3]. If the fistulous tract was grossly linear, the fibrin sealant (rapid reconstitution) was prepared and injected through a radiopaque double-lumen catheter. Under fluoroscopic control, the glue was applied as close as possible to the origin of the fistulous tract. In some cases a hydrosoluble radiopaque medium was added to the sealant to control the point of glue application under fluoroscopic view. In all patients the repositioning of the drainage was performed under radiological control. The patients with gastrointestinal, pancreatic, or biliary fistulas underwent complete parenteral nutrition with functional exclusion of the intestinal tract affected by the fistula.

### ***Results***

Of 13 patients with pancreatic fistulas 10 required only one sealant application, which completely and definitively cured the fistula with no complication. In three patients, each of whom had previously received pancreaticoduodenectomy for pancreatic cancer, only a reduction in the fistula's outflow and lumen were achieved. One week later the sealant was successfully applied for the second time in all three patients. In six of nine patients with enteric fistulas the pathology resolved completely with a single application of the sealant. The treatment was unsuccessful in two patients with enteric fistulas: one who had had gastrotomy during surgery for marsupialization of a pancreatic pseudocyst 10 years earlier and one who had had Kock's ileostomy after total colectomy due to inflammatory disease.

One patient who developed a fistula on esophagojejunostomy after total gastrectomy died 1 week after sealing for massive intestinal infarction. Both biliary fistulas and the vaginal fistula were successfully treated with fibrin sealant.

### ***Discussion***

Fistulas may appear after abdominal surgery. They can be classified not only according to their etiology but also according to the nature of their secretion and flow. A generally accepted treatment is total parenteral nutrition, pharmacological suppression of secretions, antibiotic therapy, and drainage procedures. X-ray examination is essential to evaluate the effectiveness of treatment: when healing cannot be achieved quickly by medical treatment drainage procedures are mandatory to make the fistulous tract smooth and straight enough so that all secretions as well as the injected washing fluids or contrast media can be easily aspirated through the catheter. If collateral branches or cavities are detected, additional catheters must be positioned. Only at this time can fibrin sealant treatment be helpful; earlier use is not likely to be effective, while delayed treatment is useless because late healing could occur anyway with no time gain.

The use of fibrin sealant is beneficial since it forms a physiological barrier against organic secretions. It is self-shaping, and its pressure prevents the out-

flow of secretions through the fistula, diverting them through their natural channels. When the obstructive effect of the sealant ceases with the end of the antifibrinolytic action of the aprotinin and degradation of the thrombin, new granulation tissue has grown to close the fistula. In our experience, no local or general infection and no allergic reaction or other complications possibly due to the presence of the glue were observed. The technique has proven simple and easy to repeat. In some cases which would otherwise have required a surgical treatment sealing shortened the healing time. The savings in time and diminution in risk justify the comparatively high cost of the sealant. Although the number of patients who have received this treatment is still low, the results are satisfactory and encouraging for the future.

### ***References***

1. Costantino V, Petrin P, Pasquali C, Liessi G, Pedrazzoli S (1992) Use of fibrin sealant in the treatment of pancreatic fistulas. In: Pederzoli P (ed) Pancreatic fistulas. Springer, Berlin Heidelberg New York, pp 201–210
2. Costantino V, Pedrazzoli S, Miotto D, Pescarini L (1985) Trattamento delle fistole con l'uso della colla di fibrina umana (Tissucol), risultati preliminari della nostra esperienza. *Acta Chir Ital* 41: 756–760
3. Miotto D, Feltrin GP, Costantino V, Petrin P, Pedrazzoli S, Chiesura M (1985) Riposizionamento e completamento dei drenaggi chirurgici addominali. *Chir Triv XXV* (1): 83–86