

## Endoscopic stenting of high-output traumatic duodenal fistula

**To the Editor:** A 27-year-old man was admitted to the trauma unit after sustaining an epigastric gunshot wound. He was stable initially, but soon after arrival he had a major upper gastro-intestinal bleed and became shocked. Resuscitation continued and he underwent an urgent laparotomy. Multiple colonic bullet injuries were found, as well as a pancreaticoduodenal injury with a 2 cm penetrating injury in the head of pancreas and a 75% circumferential transection involving the second part of the duodenum with an intact ampulla. The injuries were treated by primary repair and drainage. He required 6 days of inotropic support in intensive care. He had two re-laparotomies for sepsis at which the repairs were intact and a feeding jejunostomy and pancreatic sump irrigation-drainage were added.

Thirteen days after the initial repair he developed a high-output duodenal fistula which drained 5 000 - 7 000 ml per day. A complete duodenal fistula was confirmed on contrast studies and visually by gastroscopy (Fig. 1). A further intra-abdominal drain was placed percutaneously after a computed

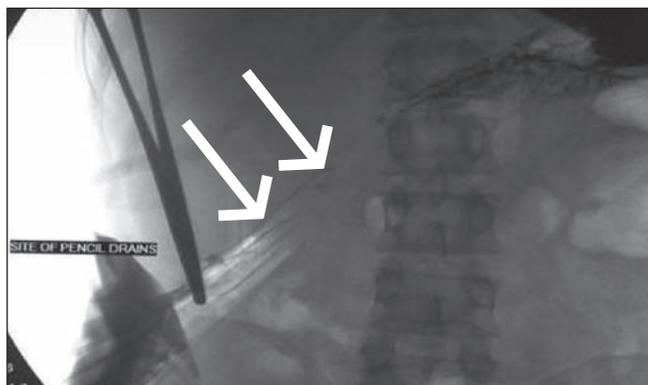


Fig. 1. Contrast meal demonstrating duodenal fistula (arrows) with no distal flow into the third part of the duodenum.

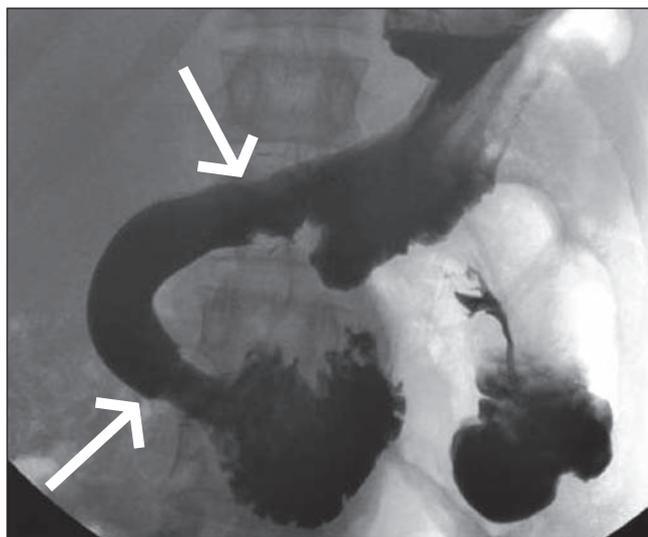


Fig. 2. Deployment of a fully covered removable self-expanding metal stent (arrows) across the duodenal fistula site with no leak.

tomography scan of the abdomen demonstrated an infected collection in the left flank. No decrease in the fistula output occurred despite total parenteral nutrition for 3 weeks. A fully covered removable self-expanding metal stent was placed endoscopically with the upper flange proximal to the pylorus. Fistula drainage ceased 5 days after stent deployment. A contrast study confirmed that the stent was patent with no leak (Fig. 2). Oral feeding was commenced and the patient was discharged 4 days later. A repeat contrast meal and follow-through after 6 weeks confirmed a completely healed duodenum. The stent had dislodged spontaneously and migrated into the colon (Fig. 3).

Penetrating trauma to the pancreaticoduodenal complex has a substantial morbidity and mortality owing to the high incidence of associated intra-abdominal and vascular injuries. Conservative management with primary duodenal repair and drainage of pancreatic injuries is now accepted practice.<sup>1-3</sup> Damage control laparotomy in severe pancreaticoduodenal injuries is used in selected patients. Pancreatoduodenectomy is reserved for stable patients with non-reconstructable injuries and disruption of the ampullary-biliary-pancreatic union, or those who have major devitalisation injuries of the pancreatic head and duodenum.<sup>3</sup>

Enterocutaneous fistulas are uncommon after laparotomy for trauma and occur in fewer than 1.5% of patients. One third of fistulas are duodenal in origin and result in significant morbidity and mortality with prolonged intensive care and hospital stay as well as increased cost.<sup>4</sup> Surgical closure of the fistula was inappropriate in our patient, and while novel techniques with Lipiodol or Gelfoam have been used to close duodenal fistulas, the high output and size of the fistula in our case prevented use of these methods.<sup>5</sup> Temporary endoscopic placement of removable, fully covered self-expanding metal stents has been used for upper gastro-intestinal fistulas following bariatric surgery. Acute leak and fistula closure occurred in 81 - 100% of the patients stented.<sup>6,7</sup> While most stents have been placed for gastrocutaneous fistulas along sleeve gastrectomy staple lines or for anastomotic dehiscences elsewhere in the gastro-intestinal tract, success

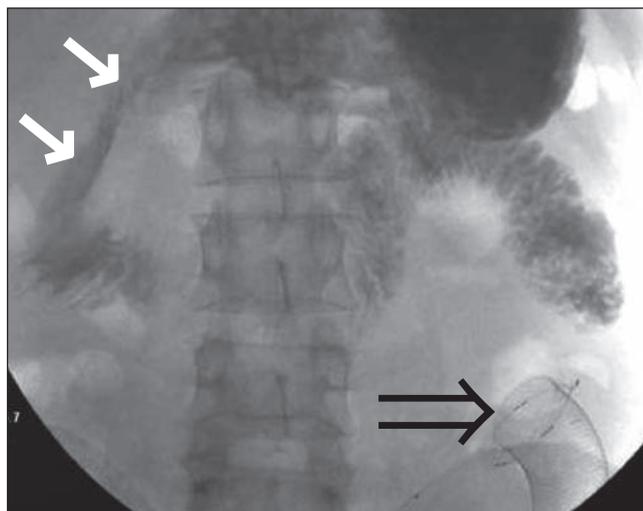


Fig. 3. Healed duodenal fistula (white arrows) with migration of the stent (open arrow) into the colon.

has been also reported with duodenocutaneous leaks.<sup>7</sup> Most series report removal of the stents after approximately 6 weeks. Migration of fully covered removable stents is a significant problem, and occurs in up to 58% of cases.<sup>6</sup> Dissolvable synthetic sutures have been used to minimise stent migration.<sup>7</sup> This first report expands the potential use of temporary stenting to include the management of complex high-output duodenal fistulas following trauma.

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