Colonic Anastomotic Stenoses and Memotherm Stent Fracture: A Report of Three Cases

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Abstract
Deployment of a Memotherm colonic stent (Bard, Angiomed, Karlsruhe, Germany) across anastomotic strictures, following anterior resection, is described in three patients. Two patients presented with symptoms of colonic obstruction. Two of the patients had previously undergone unsuccessful balloon dilatation of the stricture. In the third, in addition to the anastomotic stricture, there was local tumor recurrence. Initially, stenting provided effective relief of symptoms. However, in all three patients, fracture of the stents occurred at intervals of 3–7 months after insertion. This use and complication of colonic stenting has not been reported previously.

Key words: Colon, stenosis and obstruction—Stents and prostheses—Interventional procedures

Since the first descriptions of colonic stenting by Spinelli et al. [1] and Itabashi et al. [2] in 1993, there have been several recent reports of the success of endoluminal stenting in relieving the symptoms of acute colonic obstruction secondary to malignancy. Stenting can be used to achieve temporary decompression prior to definitive surgery [3] or as palliation in patients with colonic obstruction and inoperable disease [4].

Colon cancer can also occur following colonic resection, due to the development of benign anastomotic strictures or colonic obstruction. While anastomotic strictures may respond to balloon dilatation [5], recurrent narrowing can occur. Further surgery in these circumstances can be difficult, particularly with low colorectal anastomoses. Permanent colostomy formation may be necessary.

Treatment of anastomotic strictures with stents is possibly an alternative course of management. The use of stents in colonic anastomotic strictures has not, to our knowledge, been reported previously and the durability of stents in this situation is unknown.

Case Reports
Case 1
A 63-year-old man had undergone an anterior resection 18 months previously for a Duke’s B colonic carcinoma. An anastomotic stricture developed 10 months postoperatively. Balloon dilatation of the stricture was undertaken on five occasions over a 7-month period with temporary relief, but rapid recurrence of symptoms. Following an emergency admission for acute colonic obstruction an 80 × 30-mm Memotherm colonic stent (Bard, Angiomed, Karlsruhe, Germany) was deployed across the stricture using fluoroscopic guidance. Stenting produced immediate relief of symptoms with colonic decompression. Six months after stenting the patient complained of passing metallic fragments per rectum. Pelvic radiographs demonstrated stent fracture, although the position of the stent remained satisfactory (Fig. 1). Over the next 5 months further stent fragments were passed, although no recurrence of obstructive symptoms occurred.

Case 2
An 86-year-old man underwent an anterior resection for Duke’s B adenocarcinoma. Two years postoperatively, symptoms of abdominal obstruction developed and contrast and CT examinations demonstrated an anastomotic stricture with local tumor recurrence. Curative resection was not possible (Fig. 2). A 100 × 30-mm Memotherm stent was deployed across the stricture. Three months after stenting the patient complained of abdominal pain and vomiting. Abdominal radiographs showed no obstruction, but demonstrated fracture of the mid-portion of the stent. After a further 2 months frank colonic obstruction developed with further stent fracture (Fig. 3). A second 100 × 30-mm Memotherm stent was deployed overlapping the initial stent, with relief of symptoms. The patient died 3 weeks later from cardiorespiratory failure.

Case 3
A 65-year-old man underwent an anterior resection for a large tubovillous adenoma with a defunctioning ileostomy. An anastomotic stricture developed which was treated by balloon dilatation on three occasions. Restenosis occurred following each dilatation. Following the third dilatation a local perforation at the anastomosis was identified. An 80 × 25-mm Memotherm stent was deployed across the stenosis (Fig. 4). Ileostomy closure was undertaken. Seven months following stenting the patient presented with tenesmus and rectal bleeding. Abdominal radiographs demonstrated fracture of the stent with distal migration into the rectum. The stent was removed under anesthesia (Fig. 5).

Discussion
In the three cases described, colonic stenting provided rapid relief of the symptoms of colonic obstruction. Due to the distal nature of the anastomotic strictures stenting was a technically easy procedure in all cases. The use of stents in benign colonic strictures has not been described.
Previous usage of colonic stents has been linked to short-term implantation, for preoperative use or for palliation. The mean survival in Díaz et al.’s series of palliative stent insertion was 130 days [4]. While one of our patients had tumor recurrence and a poor prognosis, the other two had no evidence of local recurrence and long-term stenting was envisioned. Stenting of benign anastomotic strictures has been described in the esophagus and gastroduodenal region [6, 7] but not, to our knowledge, in the colon. The two patients with benign strictures had both undergone multiple attempts at balloon dilatation with stricture recurrence developing after each attempt. One of the patients had had several admissions for colonic obstruction; in the other, closure of a defunctioning ileostomy was prevented by the anastomotic stricture. Surgical management of low colorectal anastomotic strictures is difficult. Resection and re-anastomosis may not be possible and a permanent colostomy may be required. As balloon dilatation was deemed to have been unsuccessful, anastomotic stenting was thought to be a reasonable option. The third patient had, in addition to the anastomotic stenosis, local, inoperable tumor recurrence and stenting was performed for palliation.

The durability of stents inserted across benign colonic anastomotic strictures is unknown. There are relatively few reports of fracture of stents made from either nitinol or other materials. However, fracture of Memotherm stents has been reported in the biliary system [9] and in vitro tests [10]. Fracture of non-nitinol stents has been reported in the venous system [11].

Peck and Wattam [9] have suggested that nitinol and stent design may predispose to fracture. Siegertteter et al. [10] suggest that constant bending forces may be implicated in stent failure. The fibrotic process responsible for benign anastomotic strictures, which persists despite successful stent placement, could produce a constant compressive force. Similarly, acute stent angulation could produce a constant bending force. Although, following deployment, none of the stents in our series demonstrated acute angulation, the