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Case Report

Biodegradable stent insertion for ischaemic colorectal strictures: Tiger country

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A B S T R A C T

We describe our initial experience with the use of biodegradable (BD) stents in benign ischemic colorectal strictures with two cases. The first case is of a 40-year-old male with a history of retroperitoneal sarcoma who developed a benign stricture in the descending colon postsurgical and radiotherapy treatment. Balloon dilation was required in order to pass the delivery system. The patient experienced significant pain postdeployment and post procedure computed tomography scan demonstrated a small perforation requiring an emergency laparotomy. The second case is a 61-year-old male with a history of retroperitoneal sarcoma who also developed an ischemic stricture in the descending colon after surgical excision. Using a combined fluoroscopic and endoscopic approach 3 separate BD stents were inserted over a 17-month period improving clinical symptoms of intermittent obstruction. These symptoms reoccurred after stent disintegration and the patient was definitively managed surgically with colostomy formation. The use of BD stents, although appealing, does not provide an adequate long term result. Additionally, more flexible, smaller calibre systems are required for deployment in tortuous environments.

Keywords: Colorectal; Stents

Introduction

Benign colorectal strictures can develop secondary to ischemic or radiation colitis as well as an anastomotic strictures.[1] Management of ischemic strictures can be technically challenging requiring various treatment modalities including radiological, endoscopic, and in some cases a surgical approach.[1,2] Endoscopic balloon dilation is a common approach to managing such strictures; however, this has a variable long term success rate.[3] Insertion of a self-expandable metal stent (SEMS) either via a radiological or endoscopic approach has been reported in the upper gastrointestinal (GI) tract; however, in the lower GI tract is associated with high complications rates.[4] Complications with the use of such stents include perforation and stent migration additionally one study reported recurrent obstructive symptoms in 53% of their patient irrespective of migration.[5] Furthermore, unlike in the oesophagus, fully covered, removable enteral stents are not readily available. There have been significant advances in the development of biodegradable (BD) stents potentially overcoming the shortcomings of permanent stents.[6] The use of BD stents has been reported in the upper GI tract;[7] however, there is little supportive literature with its use in the lower GI tract. Advantages of BD stents include a longer therapeutic effect than balloon dilatation and no need for a removal procedure. Additionally due to the uncovered nature of the stent they are more stable and less prone to slippage.[7]

We present 2 cases of off-licence insertion of BD polydioxanone stents as treatment for ischaemic strictures.

Case Report

Permission was obtained from the Hospital Institutional Review Board for the insertion of an uncovered BD oesophageal stent SX-ELLA (Ella-CS, Hradec Kralove, Czech Republic) into the colonic ischemic strictures.

Procedures were performed under conscious sedation and analgesia (intravenous midazolam and fentanyl) titrated using a bispectral monitoring system target of 80 to 85.[8,9] Predilatation was not performed unless the delivery system could not be passed.

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Case 1

A 40-year-old male with a history of retroperitoneal sarcoma in the left iliac fossa, with excision and postoperative radiotherapy four years prior was investigated for intermittent constipation and abdominal discomfort. Lung metastases were also previously surgically removed. Computed tomography (CT) colonography revealed a stricture in the descending colon (Fig. 1A), no local tumour recurrence and no metastatic disease. Insertion of the BD stent was done using fluoroscopic guided insertion of a 150 cm Laureate hydrophilic guide wire (Merit Medical Systems, South Jordan, UT, USA) through the stricture with the aid of a 65 cm KA2 catheter (Merit Medical Systems) once in position the hydrophilic wire was exchanged for a stiff 260 cm wire (Merit Medical Systems). Initial attempt to advance the stent delivery mechanism beyond the stricture over a stiff wire was not successful. Balloon dilatation initially to 12 mm and subsequently to 16 mm (EverCross; ev3, Plymouth, MN, USA) (Fig. 1B) was performed before successful placement of the stent (Fig. 1C). A 25 × 135 mm SX-ELLA BD oesophageal stent (Ella-CS) was deployed with initial expansion to 50% to 60%. Immediately after deployment the patient complained of prolonged abdominal pain despite further analgesia. A postprocedure CT revealed a tiny area of perforation adjacent to the lower end of the stent and small volume free intraperitoneal gas (Fig. 1D). An emergency laparotomy was performed the next day with formation of an end transverse colostomy with covering of the perforation site with omentum. The patient was discharged 2 days allowing him to attend the birth of his child with no further intervention, surgery or reported complications after one year follow-up.

Case 2

A 61-year-old male with a history of retroperitoneal sarcoma

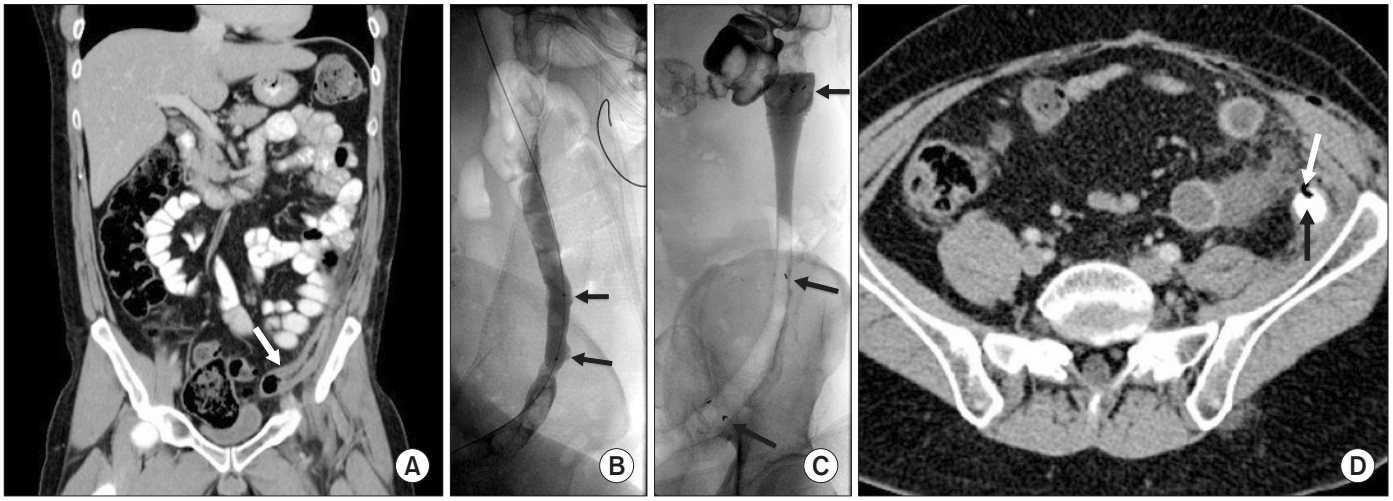

Fig. 1. (A) Coronal computed tomography (CT) demonstrating stricture within the descending colon (arrow). (B) Balloon dilation of the ischemic stricture (arrows). (C) Placement of biodegradable stent (arrows). (D) Axial CT demonstrating a locule of free air (white arrow) outside the lumen (black arrow) of the stent in keeping with perforation.

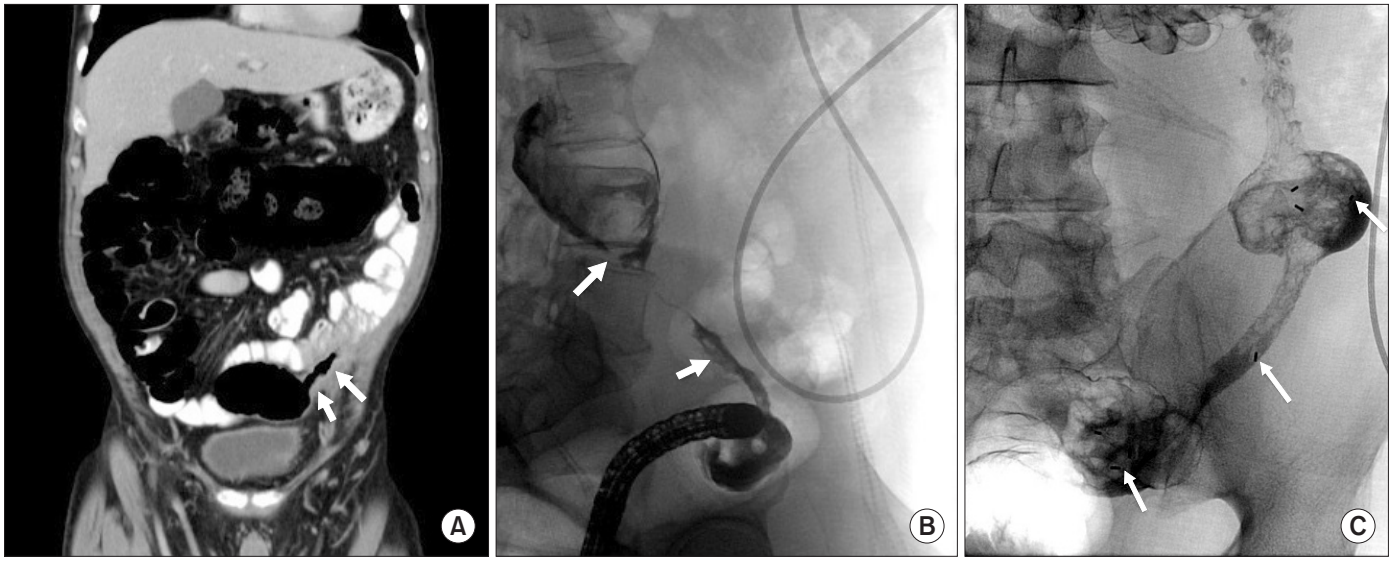

Fig. 2. (A) Coronal computed tomography (CT) demonstrating long segment ischemic stricture (arrows) in the descending colon. (B) Fluoroscopic demonstration of long segment stricture (arrows). (C) Deployment of biodegradable stent in the descending colon, arrows demonstrating stent markers.

(grade 2 spindle cell sarcoma) resected. A mesenteric recurrence was detected 2 years later and was resected. The patient developed per rectal bleeding and abdominal pain in the immediate post-operative period. A CT scan revealed abnormal thickening of the distal descending colon with surrounding inflammatory changes. A CT colonography 3 months later revealed a 7 to 8 cm stricture in the descending colon (Fig. 2A), with no surrounding inflammatory changes and adherent small bowel loops; but no evidence of tumour recurrence or metastatic disease. Endoscopic examination and biopsy confirmed benign pathology. Using a combined endoscopic and fluoroscopic approach the stricture was demarcated (Fig. 2B) and a 25 × 80 mm SX-ELLA BD oesophageal stent (Ella-CS) was deployed with immediate stent expansion 40% to 50% (Fig. 2C). The patient reported an improvement in symptoms with decreased pain and increased number of bowel movements of semi solid faeces. Five months later and after the BD stent had disintegrated, the patient was admitted with obstructive symptoms with stricture recurrence. Re-stenting was performed using combined endoscopic and fluoroscopic guidance, deployment of a 25 × 80 mm SX-ELLA BD oesophageal stent (Ella-CS). Immediate expansion was approximately 40% and postdeployment balloon dilatation was performed to 12 mm (EverCross) with a good result. The patient reported improvement of symptoms until 5 months later when he was again readmitted with obstructive symptoms due to stricture recurrence. Re-stenting was again performed under fluoroscopic guidance with a deployment of a 25 × 80 mm SX-ELLA BD oesophageal stent (Ella-CS) with predeployment dilatation to 11 mm and postdeployment balloon dilatation to 12 mm (EverCross) resulting in 50% stent expansion. The patient was readmitted 2 months later as an emergency with obstructive symptoms which resolved with conservative management. Continued management with a soft residue diet and regular laxatives controlled symptoms until an elective laparotomy with formation of end transverse colostomy 7 months after the latest BD stent insertion. There have been no recurrent symptoms over a one year follow-up period.

Discussion

Of the 2 patients with BD stents inserted for ischaemic colorectal strictures, one patient suffered immediate procedure related perforation likely attributable to the large inflexible delivery system passing through an angled, tight, fixed stricture, which was designed for less tortuous oesophageal deployment. Another patient had 3 BD stents inserted over a 17-month period, delaying the need for a surgical intervention and an end transverse colostomy. With increasing survival rates for patients with treated colorectal malignancy it is likely that an increasing numbers of patients will develop benign ischaemic strictures. BD stents did not prevent surgery in these cases but may have a role in delaying it with surgical intervention likely to give the best long term result. Surgical excision of the stricture with primary anastomosis may not be possible due to extensive fibrosis and a permanent defunctioning stoma may be the only option. Colorectal BD stent insertion is a potential treatment option; however, can be associated with a perforation risk with use of large inflexible 28 Fr oesophageal deployment devices. Development of appropriate delivery systems designed to allow safe deployment in large bowel may reduce this risk. Furthermore, longer delivery systems may also be required as some benign colonic strictures may be further away from the anal verge than oesophageal strictures from the mouth. Further data collection is needed to determine the best method of managing ischemic strictures in particular the role of balloon dilation prestent and poststent deployment; as well as the development of removable colorectal SEMS.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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