Dear Editor,

Use of a Minnesota tube to tamponade bleeding from an ileorectal anastomosis

A previously well 54-year-old man of Chinese descent presented to the emergency department after a collapse at home as a result of severe haematochezia. He had passed at least 2 L of maroon stool per rectum in the preceding 12 h.

On admission to the emergency room, he was diaphoretic, pale but stable (pulse 75 b.p.m., blood pressure 120/80). His haemoglobin was 8.7 g/dL, and he was transfused 3 units of packed red blood cells (PRBC). An upper gastrointestinal endoscopy was carried out, showing a non-bleeding 2 cm deep diverticulum in the second part of the duodenum. A tagged red cell scan was similarly unable to locate the source of bleeding.

A colonoscopy was planned for the next day. Overnight, massive rectal bleeding recommenced resulting in haemodynamic instability (pulse 110 b.p.m., blood pressure 40/– mmHg). Repeat haemoglobin was 6.1 g/dL. Eight units of PRBC and 7 units of colloid (Gelofusine) were given. He underwent an emergency total colectomy, with creation of an ileorectal anastomosis and a defunctioning loop ileostomy. The colectomy specimen contained a wide-mouthed proximal ascending colonic diverticulum with adherent clot and a 3-mm-diameter ulcerated arterial vessel in its wall.

Postoperatively, the patient was transferred to the intensive care unit for ventilatory support. He had developed pulmonary oedema as a result of massive fluid and blood product resuscitation.

Forty-eight hours after surgery, bleeding recommenced per rectum at the rate of 200 mL/h. The patient developed a transfusion-related coagulopathy, with activated partial thromboplastin time (APTT) 76, international normalized ratio (INR) 1.2 and platelet count 54×10^9/L. Further testing showed an acquired Factor XI and XII deficiency. A colonoscopy was carried out. Visibility was poor, but bleeding appeared to arise from the stapled anastomosis. There was no blood in the ileostomy 60 cm proximal to the anastomotic site or from the intervening ileal segment between stoma and ileorectal anastomosis. Fresh-frozen plasma and platelet transfusions only temporized bleeding. In view of the persisting coagulopathy, endoscopic intervention was favoured over further surgery.

Endoscopic evaluation using an Olympus paediatric video gastroscope showed masses of adherent clot at the anastomosis. The endoscope was passed per rectum traversing the anastomosis until it surfaced from the ileostomy in the left iliac fossa. A silk thread was attached to an Abbott Teflon jejunal feeding tube. The thread was pulled into the biopsy channel using biopsy forceps. The gastroscope was then retracted, and in doing so, the thread was pulled through the anus. An attempt was made to pull the attached feeding tube from the ileostomy to the anus, but, because of tortuosity in the pelvis and some resistance, it was feared that it might lacerate the bowel. Therefore, a 9-French nasogastric tube (NGT) was threaded over the silk and pushed proximally from the rectum. With some retraction from above, the NGT emerged from the ileostomy with ease.

The distal (gastric) tip of a Minnesota tube (MT) was subsequently tied to the end of the NGT. The two tubes were then pulled back down into the ileostomy and out through the anus. Eight centimetres of the gastric suction part of the MT was visible externally.

With the gastric balloon present in the rectum, 200 mL of air was pumped into the MT with a Toomey syringe, to give a pressure of 80–100 mmHg. The balloon was adjusted digitally to make a snug fit in the upper rectum. The oesophageal balloon was then inflated to 40 mmHg and anchored with slight tension to the abdominal wall with tape. Figures 1 and 2 show the anatomical configuration.

Following these manoeuvres, no further bleeding occurred. Pressure was released from the balloons for 5 min every 12 h before they were repositioned. The patient's condition and coagulopathy had stabilized within 24 h. After 48 h the balloon was deflated and then removed at 60 h. Although the patient had no further rectal bleeding, he remained in hospital for a total of 22 days as a result of a postoperative delirium. Subsequent uncomplicated reversal of the ileostomy took place 14 weeks after his original colectomy.

We report a novel case in which all the features of the MT were optimally used to tamponade lower gastrointestinal bleeding in a postsurgical setting. Existing published literature describes the use of Foley catheters[1,2] and a Sengstaken tube[3] and one case of an MT[4] to achieve haemostasis after rectal bleeding. However, in these cases, the orientation of the balloon was probably not crucial given the more diffuse nature of the lesions, for example bleeding rectal angiodysplasia, excision of a large 'carpet-like' rectal polyp and the native anatomy of the rectum and colon. Our patient's postsurgical anatomical configuration more closely approximated that of the

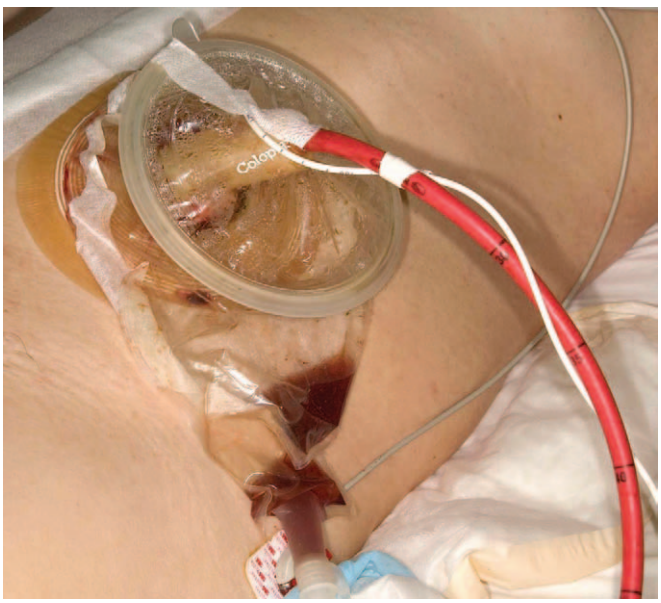

Fig. 1. Minnesota tube *in situ*, ileostomy view (photograph).

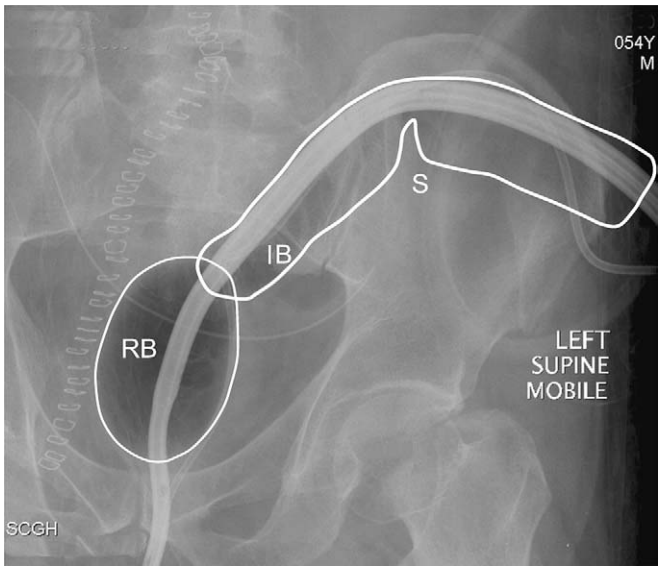

Fig. 2. Minnesota tube *in situ*, radiology. IB, ileal balloon; RB, rectal balloon; S, stoma (ileostomy).

upper gastrointestinal tract. The rectum was similar in size to the gastric fundus. The anastomotic line paralleled the oesophagogastric junction. The bleeding was similar to that arising from oesophageal varices. The ileum had an anatomy similar to the oesophagus. In this patient, a defunctioning ileostomy, 40 cm above the anastomosis, allowed the proximal end of the MT to be visible, permitting it to be secured as the designer intended.

We considered various options for pressure and volume for the MT. Excessive pressure could cause ischaemic necrosis of the rectal wall; however, underfilling would allow the MT to migrate proximally. Careful digital palpation of the balloon sufficed to confirm that it was both, comfortably inflated, exerting optimal pressure onto the rectal wall, and in a stable position.

In retrospect, the ileostomy was a useful safety feature of the patient's surgery making anastomotic bleeding simpler to treat. It enabled a coagulopathic patient to undergo non-surgical intervention, therefore avoiding further risks associated with anaesthesia and surgery. In future, the MT should be considered for tamponading rectal bleeding because it is the most available and the largest balloon available in the gastroenterology unit.

ACKNOWLEDGEMENT

The authors thank Miss Rachael Hohl for her clerical assistance with the manuscript.

REFERENCES

1. Baum RD, Slade M. Use of Foley balloon tamponade in transrectal prostate biopsy hemorrhage. *Urology* 1988; **32**: 181.
2. Naderi MJ, Bookstein JJ. Rectal bleeding secondary to fecal disimpaction: angiographic diagnosis and treatment. *Radiology* 1978; **126**: 387–9.
3. Roy MK, Rhodes M, Ruttley MS, Wheeler MH. Sengstaken tube for bleeding rectal angiodysplasia. *Br. J. Surg*. 1996; **83**: 1111.
4. McGuinness J, Winter DC, O'Connell PR. Balloon tamponade to control haemorrhage following transanal rectal surgery. *Int. J. Colorectal Dis*. 2004; **19**: 395–6.

BARRY J. MARSHALL,* MB BS, FRACP, FAA, FRS, Nobel Laureate
CYNTHIA H. SEOW,* MB BS, FRACP
MICHAEL D. LEVITT,† MB BS, FRACS
*Departments of *Gastroenterology*
and †General Surgery
Sir Charles Gairdner Hospital
Perth, Western Australia, Australia

doi: 10.1111/j.1445-2197.2007.04277.x