Low dose intra-arterial vasopressin infusion as rescue treatment for small bowel bleeding with severe thrombocytopenia

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Introduction

Small bowel bleeding accounts for 5–10% of all patients presenting with gastrointestinal bleeding, and is most commonly caused by angiodysplasia. However, early recurrence of bleeding (within 30 days of catheter-based intervention) frequently occurred in patients with coagulopathy (platelet count less than $80\times10^3/mm^3$). This article discusses a patient with a bleeding tendency as a result of cirrhosis and severe thrombocytopenia, who had a bleeding small bowel angiodysplasia that was difficult to approach using embolisation but was successfully treated by intra-arterial vasopressin infusion. Pharmacists should verify the dose of intra-arterial vasopressin and monitor potential side effects.

Discussion

There are three steps to the treatment of small bowel bleeding: endoscopic therapy, such as haemoclip or heater probe coagulation, angiography with embolisation and then surgical intervention. This article reports an alternative to the second step, ie intra-arterial vasopressin infusion, for patients in whom embolisation is unfeasible. Intra-arterial vasopressin infusion was first described by Nusbaum et al (1968) for treating gastrointestinal bleeding. Vasopressin causes vasoconstriction via direct action upon the vascular bed, especially the capillaries, small arterioles and venules (DailyMed, 2022). Intra-arterial low dose vasopressin is given as an initial 20–30-minute infusion at 0.2 units/min, followed by repeated angiography to determine that bleeding has stopped

Case report

A 76-year-old woman with liver cirrhosis and hepatocellular carcinoma, for which she had received local treatment with radiofrequency ablation, presented with bloody stools. She was taking medication to treat hypertension and type 2 diabetes mellitus. The patient denied taking any antiplatelet, anticoagulant or non-steroidal anti-inflammatory drugs. Endoscopic studies including oesophagogastroduodenoscopy, colonosocopy and enteroscopy revealed angiodysplasia bleeding in the terminal ileum. Endoscopic haemostasis with haemoclipping was performed, but bleeding persisted. Follow-up capsule enteroscopy revealed suspicious angiodysplasia bleeding of the terminal ileum. During hospitalisation, intravenous ceftriaxone was prescribed to decrease the rate of bacterial infection but also because it increases survival in patients with cirrhosis and gastrointestinal haemorrhage. After a 6-day course of ceftriaxone, her platelet count dropped from $66\times10^3/mm^3$ at baseline to $4\times10^3/mm^3$. Thus, ceftriaxone was changed to ceftotaxime because severe thrombocytopenia had developed.

Since she had severe comorbidity, angiography with transarterial embolisation was arranged on the 10th day, which showed active contrast extravasation at a small branch of the ileal artery (Figure 1). This branch of the ileal artery was too narrow to fit an embolisation catheter, so intra-arterial vasopressin infusion at 0.2 units/min was given for 8 hours. She received routine blood transfusion because of her low haemoglobin level on admission, but did not require further blood transfusion, and her haemoglobin level was stable. Severe thrombocytopenia was resolved by platelet transfusion and discontinuing ceftriaxone. Active bleeding from the puncture site of the femoral artery was noted after removal of the catheter sheath, and the platelet count was $30\times10^3/mm^3$. The wound was successfully repaired by a cardiovascular surgeon. The patient was discharged in a stable condition on the 22nd day after admission. She had two follow-up visits 4 days and 4 months after discharge, without any recurrence of bleeding.

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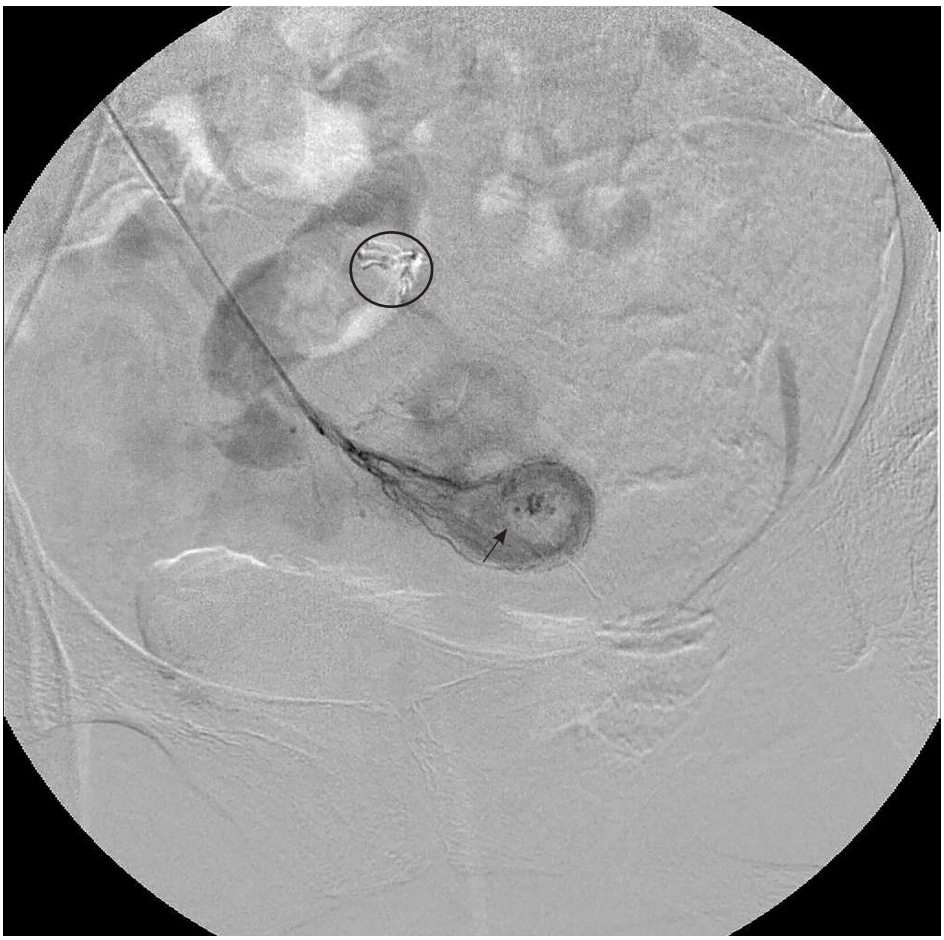

Figure 1. Angiography on the 10th day in hospital showed active contrast extravasation at a small branch of the ileal artery. Circle denotes endoscopic failure haemostasis with two haemoclips. Arrow denotes active contrast extravasation in the ileal region.

(Rosen and Sanchez, 1994; Darcy, 2003; Loffroy et al, 2011). If bleeding continues, the infusion rate is increased to 0.3 and then 0.4 units/min, but it is important to wait after each change in infusion rate for the increased dose to take effect, and to perform another arteriogram to assess the effect (Rosen and Sanchez, 1994; Darcy, 2003; Loffroy et al, 2011). If bleeding is controlled, the infusion is continued in an intensive care setting for 6–12 hours and then tapered over 12–24 hours (Rosen and Sanchez, 1994; Darcy, 2003; Loffroy et al, 2011). Patients not responding to an infusion rate of 0.4 units/min are unlikely to respond to higher doses and require alternative therapies, such as embolisation or surgery. However, in this case, this protocol was modified to an intra-arterial vasopressin infusion at 0.2 units/min for 8 hours, after which haemostasis was confirmed. This shorter duration of infusion was chosen since extravasation from the terminal ileum with one small arteriole supply was considered easier to control than diffuse or multifocal lesions (Figure 1). Recurrent bleeding is believed to occur because the vasospasm-induced thrombus resolves before the underlying vascular lesion heals (Navuluri et al, 2012). In this patient, the bleed was identified and haemostasis was established without recurrent bleeding after 4 months' follow up.

Vasopressin is useful in situations including lesions that are inaccessible to a microcatheter, for diffuse mucosal oozing, and for controlling multiple sites of haemorrhage in high-risk surgical patients. However, contraindications to its use include bleeding that originates from a large diameter artery or bleeding from a dual blood supply. Patients who have cardiovascular disease cannot be given vasopressin (Walker et al, 2012). Patients should be monitored for other side effects of vasopressin therapy, such as angina, myocardial infarction, hypertension, volume overload, abdominal cramps or mesenteric ischaemia.

Learning points

- Intra-arterial vasopressin infusion could be a rescue therapy for gastrointestinal bleeding in patients in whom embolisation cannot be performed.
- Recurrent bleeding should be monitor because the vasospasm-induced thrombus may resolve before the underlying vascular lesion heals.
- Patients should be monitored for side effects of intra-arterial vasopressin infusion, such as angina, myocardial infarction, hypertension, volume overload, abdominal cramps or mesenteric ischaemia.
- The aetiology of thrombocytopenia should be studied and corrected in patients with gastrointestinal bleeding to lower the recurrent bleeding rate.

Intra-arterial short-term vasopressin infusion could be a rescue therapy for gastrointestinal bleeding in patients in whom embolisation cannot be performed because of either diffusely oozing lesions or difficult-to-approach lesions and patients who have high risks of complication from surgery because of thrombocytopenia and a bleeding tendency.

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