CASE REPORT

Therapeutic angiography and embolisation for bleeding aberrant duodenal artery arising from replaced hepatic artery

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SUMMARY

We present a rare case of a 70-year-old man with a known case of hypertension and carcinoma larynx, he was admitted under ENT (ear, nose and throat) services for a laryngectomy. On admission, he started having severe per rectal bleeding. The patient underwent a number of radiological investigations to determine the origin of the bleed, including Tc 99 m labelled red blood cells tagged scan, a CT scan and two angiographies. The final angiogram showed an aberrant artery supplying the duodenum showing active extravasation. It was arising from the replaced right hepatic artery which itself arose from the superior mesenteric artery. Successful embolisation was performed using polyvinyl alcohol particles and microcoil. We present this rare case of an aberrant artery supplying the duodenum.

BACKGROUND

In this case of gastrointestinal (GI) bleed, the initial angiography was negative and a rare variant of duodenal branch arising from the replaced hepatic artery was not identified; this was embolised in subsequent angiography. It is important to understand and remember anatomical variants, as failure to recognise may result in delay or failure in patient's proper management.

CASE PRESENTATION

A 70-year-old man, with a known case of hypertension, was diagnosed with carcinoma larynx. He was admitted under ENT (ear, nose and throat) service for laryngectomy. On his admission to the hospital, he started having severe per rectal bleeding. The patient's pulse was 156/min, blood pressure 80/50 mm Hg, respiratory rate 24/min and he was afebrile. His digital rectal examination and proctoscopy were unremarkable. He was transferred to our radiology department due to his rectal bleeding and unstable condition.

INVESTIGATIONS

The patient's initial haemoglobin (Hb) was 6.1 mg/dL. Red blood cell (RBC) tag scan was performed. A radionuclide angiogram was performed with 200 MBq Tc 99 m labelled RBCs injected intravenously and 60 min dynamic study was acquired in anterior projection. A radionuclide angiogram with tagged RBCs was positive for an active GI bleed in the jejunal loop. A colonoscopy or upper GI endoscopy was not possible due to the vitally unstable condition of patient.

The patient was taken to the Vascular and Interventional suite for an angiography and therapeutic embolisation. An extensive search failed to locate the bleeder. The right hepatic artery was seen arising from superior mesenteric artery but selective injection into this vessel was not carried out at that point of time. It was assumed that the bleeding must have been intermittent and most likely had stopped. The patient was shifted to the ward and remained stable overnight with no further episodes of rebleeding.

Next morning the patient started bleeding again. It was decided to perform a CT scan in the arterial and venous phase prior to taking him for the angiography.

His CT scan showed multiple enhancing vascular areas with layering effects on delayed images in the first and second part of the duodenum, representing active extravasation of intravenous contrast into the gut lumen (figure 1).

The patient was then taken to interventional radiology for mesenteric angiography. Again extensive search was made to locate the bleeder but was negative. Based on the CT angiography findings gastroduodenal artery was cannulated but showed no extravasation (figure 2). However, the duodenal supply was empirically embolised. However this did not result in any sign of haemodynamic stability.

Finally the replaced right hepatic artery arising from the superior mesenteric artery was selectively cannulated with visceral C1 catheter. An angiographic run showed an aberrant artery supplying the duodenum showing massive active extravasation (figure 3).

TREATMENT

This aberrant artery was then selectively catheterised with a microcatheter (Progreat, Terumo) and embolisation was performed using 355–500 µ polyvinyl alcohol particles and a microcoil. Postembolisation showed no evidence of extravasation of contrast (figure 4).

OUTCOME AND FOLLOW-UP

The patient became haemodynamically stable and his Hb was 9.7 mg/dL which remained static postprocedure.

DISCUSSION

Endoscopic management remains as the first-line option in the management of GI bleed whenever possible. However, in cases with massive GI bleed,

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Figure 1 CT scan axial images of abdomen at the level of duodenum. (A) Plain study, (B) arterial, (C) venous phase and (D) delayed phase. Active extravasation was identified from duodenum which progressively increased in different phases. Arrow pointing to duodenum with active extravasation of contrast in (B), and increase in contrast in (C) and (D).

unstable condition and poor bowel preparation as in lower GI bleed may not be possible to diagnose or perform therapeutic procedure. For patients in whom endoscopy failed due to reasons described or was inconclusive therapeutic transcatheter embolisation is considered useful option. Surgery is rarely used for treatment of upper GI bleeds. RBC tag scan may be useful in cases where the bleeding rate is slower although the anatomical localisation may not be as good as CT scan. CT scans are becoming more popular however they still require active bleeding at the time of imaging.

Arterial anatomical variations are commonly encountered with multiple variations in coeliac or superior mesenteric artery anatomy.¹ The most common anomaly seen is aberrant right-hepatic arterial anatomy which may be a replaced or accessory right hepatic artery according to Hiatt *et al*² classification. Evaluation of variations in visceral arterial anatomy include a high quality, contrast-enhanced CT or MRI examination.³ Routine visceral angiography has been advocated by some.⁴ The hepatic arterial supply normally is by a common hepatic artery that arises from coeliac trunk. This then

Figure 2 Digital subtraction angiography of coeliac trunk (thin black arrow) showing left hepatic artery (thick white arrow) and gastroduodenal artery (thick black arrow). No active extravasation identified from gastroduodenal artery.

Figure 3 Digital subtraction angiography showing replaced right hepatic artery (thick white arrow) arising from the superior mesenteric artery. Active extravasation (thick black arrow) identified from aberrant duodenal artery. Coils (thin black arrow) seen in gastroduodenal artery which was empirically embolised.

Figure 4 Digital subtraction angiography showing embolised aberrant duodenal artery with no further extravasation (thin black arrow). Replaced right hepatic artery (thick white arrow) is seen.

branches into gastroduodenal and right gastric arteries. The subsequent arterial segment is called hepatic artery proper, which divides into right and left hepatic arteries. Michels and Hiatt's classifications of hepatic arterial variations is widely accepted.⁵ In both series, the most commonly reported vascular anomaly is an aberrant right hepatic artery. Michels has described differentiation between a replaced and accessory aberrant right hepatic artery. A replaced right hepatic artery (Michel type III) arising from the superior mesenteric artery has reported incidence from 8% to 11%.² The accessory right hepatic artery arising from the superior mesenteric artery (Michel type VI) is reported to occur in upto 7% of patients.⁶ According to Hiatt classification, both replaced the right hepatic artery and accessory right hepatic artery has reported incidences from 7% to 21%.^{7 8}

Learning points

- ▶ An aberrant duodenal branch of replaced right hepatic artery is one of the least common anomalies.
- ▶ The search for aberrant vessels should be extensively performed if the patient is bleeding and the bleeder cannot be located on angiography.
- ▶ All relevant imaging should be extensively reviewed.

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Competing interests None.

Patient consent Obtained.

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