

## CASE REPORT

# Abrupt occlusion of right gastroepiploic artery as an angiographic evidence of gastrointestinal hemorrhage

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## ABSTRACT

Angiography plays an important role in both diagnosis and treatment of gastrointestinal (GI) bleeding; however, the sensitivity is low for diagnosis. We report a case of a 38-year-old woman who presented with recurrent upper GI bleeding following central pancreatectomy. Multiple selective arteriograms failed to reveal any active bleeding or other common signs of bleeding. There was an abrupt occlusion of the right gastroepiploic artery initially interpreted to be a surgical ligation. Upon direct superselective injection near the occlusion, an area of frank contrast extravasation was demonstrated immediately beyond the occlusion. The underlying vessel was embolized with n-butyl cyanoacrylate without recurrent bleeding up to 3-month follow-up.

**Key words:** Gastrointestinal. Gastroepiploic artery. Hemorrhage. Management.

## INTRODUCTION

Gastrointestinal (GI) bleeding is a common indication for urgent mesenteric angiography. The underlying etiologies are broad and include but are not limited to surgery, trauma, tumor invasion, congenital vascular anomaly, and complication from other disease processes (1,2). Conventional angiography has been widely used for both the diagnosis and treatment of GI bleeding. However, sensitivity can be as low as 42% (3,4).

We report a case of recurrent upper GI bleeding with abrupt occlusion at the right gastroepiploic artery (GEA) near the junction with the gastroduodenal artery (GDA) initially thought to be a surgical ligation but proved to be the bleeding site upon direct injection at the occlusion. The finding was subtle but persistent on a series of angiographic studies.

## CASE REPORT

A 38-year-old woman presented with recurrent massive upper GI bleeding after pancreaticogastrostomy with cho-

lecystectomy for pseudopapillary tumor of the pancreas. Her surgery was complicated by intra-abdominal fluid collection, which was drained percutaneously. On post-operative day 10, a sinogram revealed a fistula between the fluid collection area and the stomach. Two days after the sinogram, the patient developed nausea, vomiting, and hematemesis. Approximately 300 ml of bright red blood was drained via a nasogastric tube and an abdominal drain catheter. An emergency endoscopy was performed, and the results showed a large amount of blood in the stomach but no definitive source of bleeding. A computed tomography scan of the abdomen with intravenous contrast was obtained and demonstrated large amounts of high-density fluid within the stomach, but there was no evidence of focal contrast extravasation. The patient was referred for catheter-directed visceral arteriogram and possible intervention. The angiogram showed an abrupt occlusion at the right GEA, which was thought to be caused by surgical ligation. Therefore, the study was concluded as negative for active bleeding (Fig. 1 A and B).

The patient was stable following angiography until post-operative day 18, when she had another episode of active bleeding and approximately 100 ml of fresh blood was found in the abdominal drain. She was referred for a second arteriogram (Fig. 1C), but again, no apparent evidence of bleeding was identified.

One week after the second arteriogram, the patient presented with another episode of bleeding from the drain (> 150 ml). A third arteriogram was obtained. Neither the superior mesenteric nor celiac arteriograms showed any active contrast extravasations. However, there was interval development of mild luminal irregularities at the common hepatic artery (CHA) and GDA (Fig. 1D). Upon close inspection, there was opacification of the right GEA, which was not on the first arteriogram but can be seen on second and third arteriograms (Fig. 1 C and D). However, this finding was subtle because of a collateral projecting over the course of right GEA.

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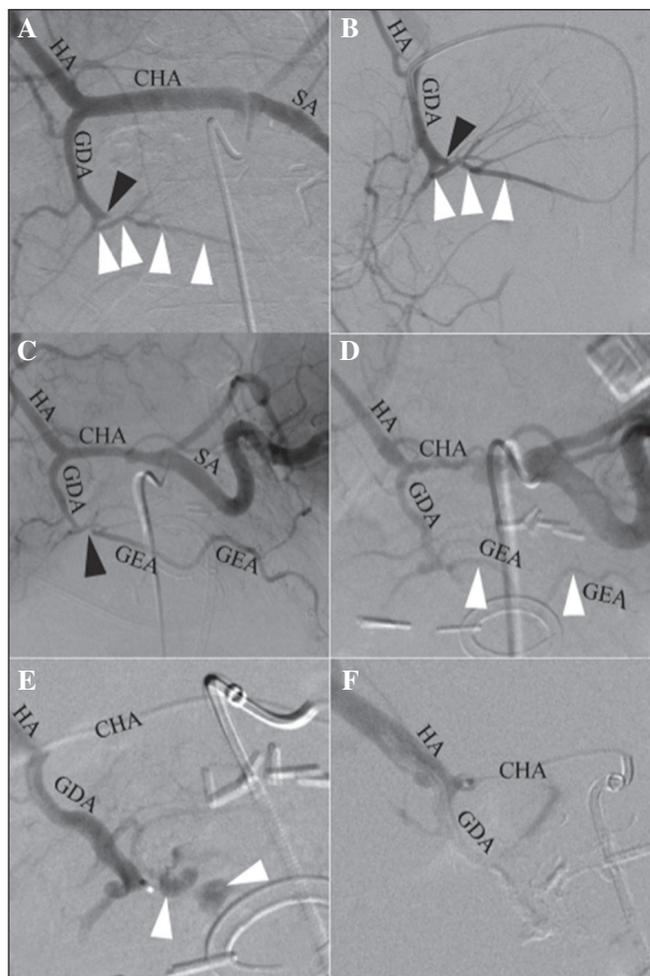


Fig. 1. A-B. An abrupt occlusion of the right GEA (black arrowhead) was very subtle on initial celiac (A) and gastroduodenal (B) arteriograms. This finding was overlooked as it was thought to be related to the surgical procedure. Furthermore, a branch artery from distal GDA projects over the course of the right GEA (white arrowheads) and mimics a right GEA. C. The second celiac arteriogram showed reconstitution of flow to the right GEA. There is a discontinuity between the distal GDA and proximal right GEA (black arrowhead), which is difficult to appreciate because a branch artery crosses the occlusion area and partially obscures the gap. D. The third celiac arteriogram showed luminal irregularities at the CHA and GDA, which were new findings and not seen on the second angiography. The right GEA remained occluded but very subtle. E. Superselective right GEA arteriogram with hand injection of the microcatheter showed an area of contrast extravasation immediately beyond the occlusion (arrow), which proved to be the bleeding site. F. The CHA arteriogram with a microcatheter showed that right GEA and GDA were embolized by n-butyl cyanoacrylate glue.

The distal GDA was cannulated with a microcatheter technique in which the tip of the catheter was paced just above the occlusion. A subselective arteriogram was obtained by hand-injection. This revealed an area of frank contrast extravasation at the proximal right GEA, immediately beyond the occlusion (Fig. 1E). The right GEA and GDA were subsequently embolized by n-butyl cyanoacrylate glue (Cordis Neurovascular, Inc., FL, U.S.) (Fig. 1F).

The patient had no recurrent bleeding after the embolization procedure at 3-months follow-up.

## DISCUSSION

Conventional angiography and transcatheter arterial embolization play important roles in the diagnosis and management of GI bleeding in select patients (2). However, the sensitivity of angiography is low for detecting active bleeding, and many factors may be attributed to this low sensitivity, including intermittent bleeding, vascular spasm, administration of vasoconstrictor drugs, and slow arterial (< 0.5-1.5 mL/min), venous, or small vessel bleeding (3-5).

The positive angiographic findings of active bleeding include direct and indirect angiographic signs (4,6). Contrast extravasation is direct evidence of active bleeding; however, it only occurs in a minority of patients who have GI bleeding and requires a bleeding rate of at least 0.5 mL/min for visualization (3,7,8). Commonly encountered indirect angiographic signs of bleeding include delayed focal contrast stasis, intramural pooling, aneurysm, pseudoaneurysm, arteriovenous shunt, submucosal vessel and early venous drainage of angiodysplasia, neovascularity, mucosal or extramucosal hyperemia, or arterial wall abnormalities (9). Vessel caliber changes and sudden truncations are also important signs of active bleeding.

Our case demonstrates an uncommon clue for GI bleeding, the abrupt occlusion preceding to the bleeding site, which can easily be confused with a surgical ligation. Further, the occlusion occurred at a small artery, which can also be easily overlooked. In this case, the patient had a pancreatectomy complicated by a pancreatic leak, resulting in a fistula between the fluid collection area and the stomach. The irregular luminal changes in the CHA and GDA are believed to be related to the effect of pancreatic enzymes because the underlying vessels were very smooth on prior arteriograms. The cause of right GEA rupture was thought to be due to erosion caused by pancreatic enzymes. The abrupt occlusion may represent a thrombosis proximal to the bleeding site, which can explain the intermittent nature of the bleeding.

In conclusion, abrupt occlusion of the arteries can be an indirect angiographic sign of GI bleeding and should prompt further investigation. Superselective angiography via probing the occlusion with the tip of a catheter may be attempted to discover an occult-bleeding source.

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