Diagnosis of a bleeding Dieulafoy lesion on computed tomography and its subsequent embolization

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Dieulafoy lesions are a potentially serious cause of gastrointestinal bleeding. Because they may bleed intermittently, and only be endoscopically evident during hemorrhage, their diagnosis can be challenging. This is the first case to be reported in the English literature of a patient with a Dieulafoy lesion diagnosed during computed tomography (CT) examination.

Reduced acquisition times required for multislice helical CT allow the application of CT angiography in the diagnosis of gastrointestinal bleeding. CT scans are now widely used in the diagnostic algorithm for acute gastrointestinal hemorrhage, and the present case illustrates that with fortuitous timing, they can provide critical information and an opportunity for selected angiography and coil embolization.

Key Words: Angiography; Arteriovenous malformations; Gastrointestinal hemorrhage; Tomography, x-ray computed

CASE PRESENTATION

An 83-year-old woman with no history of previous gastrointestinal illness or hemorrhage presented to a university hospital with passage of maroon-coloured hematochezia and presyncope. Her past medical history included a history of rheumatoid arthritis requiring chronic treatment with a diclofenac-misoprostol combination. On arrival, her hemoglobin was 48 g/L, her mean corpuscular volume was 84 fL, and she exhibited signs of instability, with a heart rate of 90 beats/min and a blood pressure of 98/40 mmHg. Her laboratory investigations were otherwise unremarkable, and included normal coagulation times. Initial resuscitation consisted of four units of packed red cells followed by an intravenous saline infusion. Gastroscopy revealed an absence of blood in her stomach and no mucosal lesions. A careful inspection that included a retroflexed view of the gastric fundus was entirely normal. Colonoscopy to the terminal ileum was also normal, except that residual preparatory laxative solution was blood-tinged.

A small bowel source of bleeding was suspected, so plans were made for an abdominal computed tomography (CT) scan, to be followed by a small bowel follow-through depending on its results. She remained stable after the initial resuscitation with no further episodes of hemorrhage, so radiological investigations were arranged for the following day. Due to a miscommunication, oral contrast was given, and as a result the CT scan was delayed until the afternoon. A standard protocol for

Un diagnostic de lésion de Dieulafoy hémorragique par tomodensitométrie suivi d'une embolisation

Les lésions de Dieulafoy sont une cause d'hémorragie gastro-intestinale au potentiel grave. Puisqu'elles peuvent saigner de manière intermittente et n'être visibles à l'endoscopie que pendant l'hémorragie, leur diagnostic peut constituer un défi. Est décrit le premier cas de patient atteint d'une lésion de Dieulafoy diagnostiquée par tomodensitométrie (TD) à être signalé dans la documentation scientifique anglophone.

Le temps d'acquisition moins long nécessaire pour la TD en action volumique à multicoups permet d'utiliser une angiographie TD pour diagnostiquer un saignement intestinal. Les TD sont maintenant généralisées dans l'algorithme diagnostique d'une hémorragie gastro-intestinale aiguë, et le présent cas démontre qu'avec une séquence fortuite, elles peuvent fournir de l'information essentielle et une occasion d'angiographie sélective ainsi que d'embolisation.

upper gastrointestinal tract CT examination was used, with oral water contrast given before dual phase post intravenous contrast (Omnipaque, Amersham Health, USA) helical scans. Axial 5 mm images were obtained in arterial phase (40 s post-initiation of intravenous contrast), and demonstrated active bleeding into the gastric fundus from the distal splenic artery. Axial and three-dimensional scans are presented in Figures 1 and 2, respectively.

The patient was hemodynamically stable at this stage and was transferred to the angiography suite for urgent mesenteric angiography. No active bleeding was seen, but a 6 mm × 12 mm pseudoaneurysm arising from the splenic artery was identified on the arterial phase images (Figure 3). The splenic artery was dividing proximal to the splenic hilum, and the pseudoaneurysm was arising from the posterior division. The celiac axis was selectively catheterized with a 5 Fr Simmons 2 catheter, and a rapid transit microcatheter and transend platinum guidewire combination was used to cannulate the splenic artery. Embolization across the neck of the pseudoaneurysm was successfully carried out, using 11 0.018 inch microcoils (4 mm to 5 mm in diameter) (Tornado, Cook Inc, USA). The completion angiogram did not demonstrate any filling of the pseudoaneurysm (Figure 4).

A repeat gastroscopy performed on the day after her angiogram revealed ulceration at the site of arterial occlusion in the gastric fundus, but no other abnormal mucosa in the

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Figure 1) Axial computed tomography scanning reveals an actively bleeding gastric lesion

Figure 2) Three-dimensional reconstruction of the computed tomography images demonstrates that bleeding is from a tributary of the splenic artery

Figure 3) Angiography demonstrates a pseudoaneurysm of the posterior branch of the splenic artery

Figure 4) Post-treatment angiogram, showing no filling of the pseudoaneurysm

Figure 5) Post-treatment gastroscopy shows ulceration at the site of arterial occlusion

esophagus, stomach or duodenum (Figure 5). The patient was treated with an intravenous proton pump inhibitor for 48 h and subsequently observed in hospital on oral proton pump inhibitor therapy. Because of an infected ulcer on her leg, she remained in hospital for over a month. During that time her hemoglobin was followed carefully, and there was no evidence of recurrent bleeding.

DISCUSSION

Since the published description in 1898 that resulted in their eponym (1), Dieulafoy lesions have been a vexing problem. Alternately known as exulceratio simplex (the name given by Dieulafoy), cirroid aneurysm or caliber-persistent vessels, the lesions consist of inappropriately large arteries lying close to the gastrointestinal mucosal surface (2). More than one-half of the lesions occur in the gastric fundus, and one-third are extra-gastric (3). Estimated to occur in as few as 0.3% to as many as 5% of patients with gastrointestinal hemorrhage (4-6), they result in a disproportionate level of diagnostic challenge, because they produce no endoscopic change except for small erosions, 1 mm to 3 mm in diameter, overlying the culprit arteries (7). In fact, data from experienced endoscopists at the Mayo Clinic in Rochester, Minnesota (3), revealed that an initial endoscopy was diagnostic in only 63% of patients eventually diagnosed with endoscopic Dieulafoy lesions, even though 77% were actively bleeding at the time of their first endoscopy. Because established endoscopic criteria for the diagnosis of Dieulafoy lesions require the presence of a minute mucosal defect with or without active bleeding or adherent

clot (8), it is not surprising that a lesion that has stopped actively bleeding can be difficult, or even impossible, to detect.

Although the diagnosis of Dieulafoy lesions remains challenging, it is crucial now that effective therapy can be offered. Mortality rates preceding the advent of therapeutic endoscopy have been traditionally described as 80% (9), with a high proportion of diagnoses made on autopsy (10), but a more recent 30 day mortality was reported to be 13% (3). Improved survival seems largely attributable to success with therapies that include endoscopic hemostasis by electrocautery, injection or clip application, and arteriographic therapy by selective embolization (3,11).

In the present case, the mucosal defect responsible for the patient's massive bleeding was not detected on initial endoscopy, when the bleeding was quiescent. Through fortuitous timing, however, active bleeding took place during her CT scan. Following her second hemorrhage, and the application of therapeutic angiography, a more obvious mucosal defect was evident.

Traditional CT scans have had a minor role in the localization of gastrointestinal bleeding (12), but the increased speed of image acquisition and improved resolution have increased their capability to define small lesions, and the advent of new technologies may widen their applicability. CT angiography has not been generally advocated for the workup of acute gastrointestinal hemorrhage (13), but it can accurately delineate the mesenteric vascular anatomy and identify bleeding sites in the setting of chronic occult bleeding. In a preliminary study (14) they compared favourably with traditional arteriography.

While a successful diagnosis in the present case was reached, in part, due to fortuitous timing, the use of conventional CT scanning did offer a compelling three-dimensional view of our patient's pathology that could be used to therapeutic effect on arteriography and later confirmed on endoscopy. We hope this will represent a harbinger of further harmonies between diverse technologies.

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