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LEARNING POINTS

Lower gastrointestinal bleed

M Adan[1], MRad, BJJ Abdullah*[,1], FRCR, S Mohd Amin[2], FRCS

[1] *Department of Biomedical Imaging (Radiology), University of Malaya Medical Centre, Kuala Lumpur, Malaysia*
[2] *Department of Surgery, University of Malaya Medical Centre, Kuala Lumpur, Malaysia*

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CASE REPORT

A 78-year-old woman was admitted with a history of melaenic stool and associated fresh per-rectal bleeding for five days. She also presented with loss of appetite and weight loss. There were symptoms of lethargy, palpitation and shortness of breath. Besides history of melaena, she did not have any epigastric pain or haemetesis. Patient was a known case of chronic renal failure on regular haemodialysis and frequent blood transfusion since 2000. She also suffered from long-term hypertension and atrial fibrillation, which were controlled by medications.

Apart from pallor, the other vital signs were stable with heart rate of 88 beats per min and blood pressure of 160/80 mmHg. Cardiovascular examination showed that patient still had atrial fibrillation but with good pulse volume. An ejection systolic murmur of the heart was noted. Respiratory and abdominal examination was unremarkable. Per rectal examination revealed some fresh blood. No rectal mass or haemorrhoids were detected. Haemoglobin level on admission was only 8 g/L. The renal function was deranged as expected. Coagulation profiles were normal. No other alarming signs were obtained from the rest of the laboratory results.

Colonoscopies were done twice for this patient. The initial colonoscopy done two days before admission showed several diverticulae in the right side of colon. No active bleeder was detected. Three days after admission, a repeat colonoscopy was carried out as the bleeding still persisted. Fresh and clotted blood was seen throughout the whole colon making identification of the source of bleeding not possible.

CT scan of the abdomen and pelvis (Figure 1) was performed using a 16-slice multidetector CT scanner (Siemens Somatom Sensation 16, Erlangen, Germany).

(a)

(b)

Figure 1 Axial CT scan of the a) abdomen, and b) pelvis

* Corresponding author. Present address: Department of Biomedical Imaging (Radiology), Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia. Tel.: +603-79502069; Fax.: +603-79581973; E-mail: basrij@ummc.edu.my (Basri J.J. Abdullah).

QUESTIONS

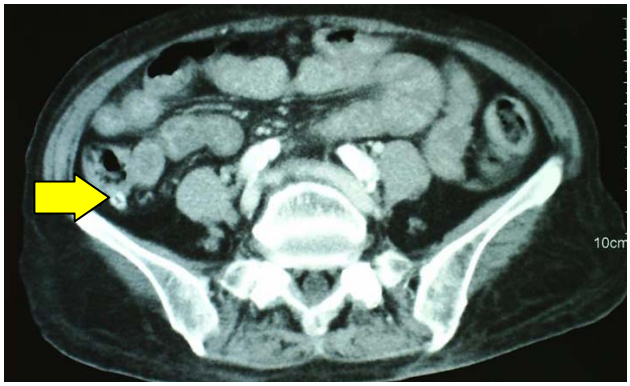
1. What is the abnormality demonstrated and what is the diagnosis?
2. What measures should be taken to optimise the visibility of the pathology?
3. What are the other common causes of this clinical condition and how is it managed?
4. What is the current role of MDCT compared with the other modalities in the diagnosis and management of this condition?

Lower gastrointestinal bleed from a right-sided colonic diverticulum detected by multidetector CT

Answer 1

In Figure 1a, the CT scan shows a small diverticulum in the ascending colon as well as delineated small, rounded pockets of air outpouchings from the bowel wall. In Figure 1b, the diverticulum in the caecum, contains high density material within it (reformatted MDCT in Figure 2). As there was no history of previous barium enema, this represents extravasation of contrast into the diverticulum indicating presence of an active bleeder within it. The diagnosis is that of a bleeding diverticulum. The bleeding diverticulum characteristically shows peri-diverticular stranding, but this is not always present.

(a)



(b)

Figure 1 Axial CT scan of the a) abdomen, and b) pelvis

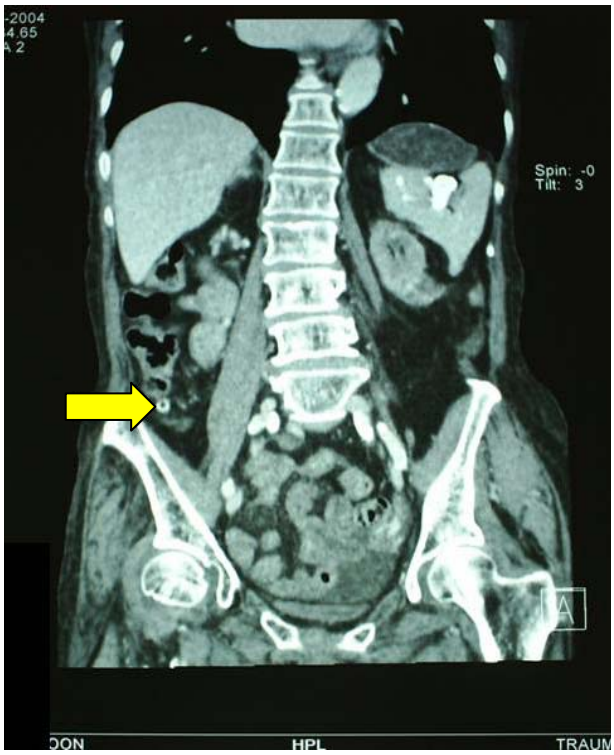


Figure 2 Reformatted coronal CT image of the bleeding from a caecal diverticulum (arrow).

Answer 2

Plain water should be used instead of oral and rectal contrast to have a clear visualisation of the possible site of bleeding since dense contrast will obscure presence of blood within the bowel lumen. In addition current MDCT allows accurate visualisation of the enhancing mucosal wall and thus mucosal and submucosal disease can be better visualised.

In addition a dual or triphasic CT should be performed i.e. unenhanced, 30-40 second followed by a delayed scan at 1-2 minutes [1].

Answer 3

Acute gastrointestinal bleeding is a common disorder (hospitalisation for severe or continuous bleeding occurs in 20.5 per 100 000 adults per year) with lower gastrointestinal bleeding being one of the common medical emergencies in elderly patients [2]. It is a potentially dangerous and life-threatening situation. Initial haemodynamic assessment and resuscitation are

critical, followed by localisation of the bleeding site in order to plan for a definitive treatment.

Approximately 70% of lower GI bleeding is due to diverticular diseases, neoplasms, angiodysplasia and haemorrhoids [1] with diverticular disease being responsible for approximately 40% of cases because diverticula are intimately related to small arteries. Most of such diverticular haemorrhages have a benign outcome, which nearly always stops spontaneously. A vast majority of these patients can be treated conservatively with overall mortality of 2.8%. If an active bleeder is detected during colonoscopy, endoscopic treatment can be carried out either by thermal contact probes, laser, monopolar electrocauthery or injection sclerotherapy. Angiography also offers interventional treatment. A selective infusion of vasoactive drugs (e.g. vasopressin) or embolisation through an angiogram catheter was reported to be effective in 36-90% of cases [2]. The most widely accepted surgical indications are based on haemodynamic stability, transfusion requirements and the presence of persistent bleeding. Segmental colectomy is best performed when the site is accurately identified. In this case patient was transfused two pints of blood and recovered well with no signs of early recurrent haemorrhage.

However the increased presence of cerebrovascular and cardiovascular diseases, malignancy, polypharmacy and the use of non-steroidal anti-inflammatory drugs in elderly patients affect the outcome of lower GI bleed.

Answer 4

There are various imaging techniques to demonstrate gastrointestinal bleed. With the emergence of MDCT, CT angiography can be used as an imaging technique to detect an active bleeder. An experimental study demonstrated that MDCT could detect arterial bleed of 0.07 ml/min [2], suggesting that MDCT could be more sensitive than angiography. The positive rate for detecting active GI haemorrhage may reach 80% [1]. The high sensitivity of MDCT is not only due to its ability to show contrast extravasation and vascular abnormalities but it is also able to demonstrate contrast enhancement of the bowel wall and other anatomic lesion (polyps, tumours, diverticulae) that can cause gastrointestinal bleeding. It is also fast, safer, less expensive, minimally invasive and less demanding than angiography. MDCT scan has evolved into an important tool in diagnosing GI haemorrhage.

Upper tract endoscopy is helpful in ruling out bleeding source from upper GI tract. An unprepared colonoscopy can be performed; however, bowel cleansing improves visualisation and allows a more accurate diagnosis of the bleeding source. Colonoscopy is adequate for many cases; but fails in 32% of the cases [2], mainly because of technical difficulties due to blood clots and stools, and the time required for a prepared colonoscopy. Furthermore, colonoscopy is unable to depict small intestine bleeding.

Traditionally, angiography is used for the localisation of a bleeding source for surgical resection, but it is an invasive technique. For an angiogram to be positive, it is estimated that arterial bleeding is at least 0.5 mls per minute. The limitations of angiography are its variable sensitivity of 13.6-86%, a complication rate of about 8.5-10% (stroke, renal failure, femoral artery thrombosis, lower extremity immobilisation, haematoma) and higher costs [3] especially in view of the elderly population. Advances in transcatheter technique have allowed for haemorrhage control through embolisation of bleeding points, without the need for emergent laparotomy. Embolisation is a relatively safe and effective procedure with a success rate ranging between 70% and 100% [4].

If bleeding rate is less than 0.5 ml per minute, technetium-labelled red blood cell scans may be useful in demonstrating the lesion, which can detect rates as low as 0.1 ml per minute. The source of the active bleeding can be identified in up to 85% of cases. However, in cases of inactive bleeding, the study is accurate in only 40-60% of patients [5]. The procedure is however time consuming and not widely available.

Magnetic resonance angiography (MRA) had been reported to be able to diagnose an active lower GI bleeding [6]. Contrast enhanced MRA is a non-invasive, three-dimensional imaging technique that delivers high spatial resolution and high contrast between exogenous contrast and native tissue. MRI can identify an extravasated blood pool with 100% sensitivity and specificity, compared with 78% specificity for nuclear scintigraphy [6]. The excellent results for MRI could be achieved only in an idealised and controlled environment; therefore this investigation is not applicable in our situation. In addition, the procedure is time consuming and requires patient's cooperation.

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