CASE REPORT

Acute appendicitis: a potential complication of video capsule endoscopy

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SUMMARY

A 69-year-old man presented to our emergency room with malena and symptoms suggestive of anaemia. He was on chronic anticoagulation with warfarin for a mechanical aortic valve. He was haemodynamically stable. Laboratory investigations revealed a low haemoglobin level of 7.1 g/dL and a low-ferritin level of 6 ng/dL suggesting chronic gastrointestinal bleeding. Oesophagogastroduodenoscopy and colonoscopy were performed to identify the source of bleeding but were unfruitful. Video capsule endoscopy was performed. Fifteen hours after ingesting the capsule endoscope, the patient started having severe abdominal pain, nausea and vomiting. Abdominal X-ray did not show any bowel perforation. CT of the abdomen revealed impaction of the capsule endoscope at the appendiceal orifice and an inflamed appendix. The patient underwent laparoscopic appendectomy and made a good recovery.

case of this potential complication of capsule endoscopy.

CASE PRESENTATION

A 69-year-old man presented to the emergency room with dyspnoea, fatigue and malena for a month. He had a history of coronary artery disease and aortic valve replacement. He was on anticoagulation with warfarin. He had a 50-pack-year history of tobacco use. Blood pressure at admission was 135/88 mm Hg, heart rate 75/min, respiratory rate 15/min and temperature was 96.9°F. Chest auscultation revealed clear lungs. Cardiac examination revealed a grade 3 systolic murmur over the aortic area. The abdomen was soft with good bowel sounds.

INVESTIGATIONS

Investigations revealed a low haemoglobin level of 7.1 g/dL. The rest of the laboratory data is summarised in table 1. Peripheral blood smear revealed microcytic hypochromic anaemia.

DIFFERENTIAL DIAGNOSIS

Serum ferritin level was low suggesting a chronic loss of iron. Warfarin was discontinued. The anaemia was suspected to be from chronic gastrointestinal blood loss.

TREATMENT

Oesophagogastroduodenoscopy and colonoscopy were performed but they failed to reveal the source of the bleeding. A capsule endoscopy was performed. Approximately 15 h after the ingestion of

BACKGROUND

Video capsule endoscopy (VCE) is a non-invasive technology that can provide diagnostic imaging of the small intestine. It is considered a relatively safe procedure. Known complications of capsule endoscopy include capsule retention and impaction at sites of undiagnosed structural abnormalities within the small intestine including strictures, ulcers or masses. This can potentially lead to acute bowel obstruction and perforation.¹ Literature review in PubMed revealed that acute appendicitis due to impaction of capsule endoscope at the appendiceal orifice has never been reported. We report the first

Table 1 Laboratory data

Laboratory parameter	Value	Reference range
Haemoglobin	7.1	13–15 g/dL
Haematocrit	21.5	40–50%
Red blood cells	2.91	4.6–6.8×10 ⁶ /μL
Leucocytes	9.4	3.6–10.3×10 ³ /μL
Mean corpuscular volume	72	80–98 fL
Mean corpuscular haemoglobin	31.6	25–34 pg
Mean corpuscular haemoglobin concentration	32	31–36 g/dL
Red cell distribution width	18	11–16.3
Platelets	204	140–420×10 ³ /μL
INR	2.9	2–3
Serum iron	22	65–176 μg/dL
Serum ferritin	6	12–300 ng/dL
Total iron binding capacity	427	250–370 μg/dL

INR, International normalised ratio.

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Figure 1 Abdominal X-ray showing capsule endoscope in right lower quadrant.

the capsule, the patient started having right lower quadrant abdominal pain. Palpation of the abdomen revealed tenderness at McBurney's point. Bowel sounds were audible on auscultation. Capsule impaction and bowel perforation were suspected. Abdominal X-ray localised the capsule endoscope to the right lower quadrant of the abdomen ([figure 1](#)). No subdiaphragmatic air was noted. CT abdomen localised the capsule endoscope to the caecum near the appendiceal orifice and the appendix was distended with fluid and gas ([figures 2–6](#)). The patient underwent an emergency laproscopic appendectomy. The patient passed the capsule endoscope 56 h after the procedure. Capsule endoscopy did not reveal any source of bleeding within the small intestine. The patient made a good recovery from the surgery.

OUTCOME AND FOLLOW-UP

The patient reported no complications from the surgery at 1 month and 6 month follow up.

DISCUSSION

Incidence

Appendicitis is one of the most common causes of acute abdominal pain and one of the most frequent indications for an emergent abdominal surgical procedure worldwide. Approximately 250 000 cases occur annually in the USA.² The incidence is highest in men compared with women.²

Figure 2 CT abdomen, transverse section. White arrow showing inflamed appendix. Black arrow showing capsule endoscope impacted at its orifice.

Figure 3 CT abdomen, coronal section: white arrow showing inflamed appendix. Black arrow showing capsule endoscope impacted at its orifice.

Aetiopathogenesis

The primary pathogenesis of appendicitis involves obstruction of the appendiceal orifice.³ Appendiceal obstruction may be caused by fecaliths, calculi, lymphoid hyperplasia, parasites and benign or malignant tumours.³ We are reporting the first case of acute appendicitis due to appendiceal orifice obstruction by a capsule endoscope. Once obstructed, the lumen becomes filled with mucus and distends, increasing luminal and intramural pressure. Increasing intraluminal pressures eventually exceeds capillary perfusion pressure leading to venous engorgement, arterial compromise and tissue ischaemia. Ischaemia gradually progresses into tissue infarction and necrosis.

Clinical presentation

Sudden onset of abdominal pain during VCE should be considered a surgical emergency. Differential diagnosis should include acute bowel obstruction due to capsule impaction at an unknown stricture or mass, acute bowel perforation and acute appendicitis. The combination of right lower quadrant abdominal pain, nausea, vomiting, fever and McBurney's point tenderness on palpation should arouse the suspicion of appendicitis.

Diagnostic workup

An abdominal X-ray should be obtained immediately to identify the position of the capsule endoscope and any subdiaphragmatic air which would suggest a bowel perforation. The presence of capsule endoscope in the right lower quadrant of the abdomen

Figure 4 CT abdomen, coronal section: white arrow showing inflamed appendix. Black arrow showing capsule endoscope impacted at its orifice.

Figure 5 CT abdomen, sagittal section: white arrow showing inflamed appendix. Black arrow showing capsule endoscope impacted at its orifice.

should arouse the suspicion of acute appendicitis. CT of the abdomen should be obtained as soon as possible as it typically will reveal the typical signs of appendicitis including an enlarged appendiceal diameter, circumferential wall thickening, mural enhancement and the capsule endoscope impacted at the appendiceal orifice. Periappendiceal fat stranding, fluid and clouding of adjacent mesentery may also be seen in some cases.⁴

Figure 6 CT abdomen, sagittal section: white arrow showing inflamed appendix. Black arrow showing capsule endoscope impacted at its orifice.

Management

Appendectomy, either open or laparoscopic, should be performed for the appendicitis. The capsule endoscope can be dislodged from its impacted position and allowed to pass out through the normal bowel movement.

Patients should be informed about the risk of having appendicitis and possible surgery before obtaining consent for VCE. The newer biodegradable M2A patency capsule theoretically carries a lesser risk of impaction and appendicitis compared with standard capsule endoscopes. Small studies have shown that patency capsule has a lesser chance of impaction even in patients with known or suspected intestinal strictures.⁵ Large studies are necessary to establish its efficacy and safety beyond doubt.

Learning points

- ▶ Acute appendicitis is a potential complication of video capsule endoscopy.
- ▶ Sudden onset of abdominal pain during video capsule endoscopy should arouse the suspicion.
- ▶ Abdominal X-ray should be performed to rule out potential bowel perforation.
- ▶ CT abdomen is very useful in localising the pillcam and diagnosing appendicitis.
- ▶ Patients should be informed about this potential complication before the procedure.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 De Palma G D, Masone S, Persico M, *et al*. Capsule impaction presenting as acute small bowel perforation: a case series. *J Med Case Rep* 2012;6:121.
- 2 Addiss DG, Shaffer N, Fowler BS, *et al*. The epidemiology of appendicitis and appendectomy in the United States. *Am J Epidemiol* 1990;132:910–25.
- 3 Birnbaum BA, Wilson SR. Appendicitis at the millennium. *Radiology* 2000;215:337–48.
- 4 Parks NA, Schroepel T. Update on imaging for acute appendicitis. *J Surg Clin North Am* 2011;91:141–54.
- 5 Banerjee R, Bhargav P, Reddy P, *et al*. Safety and efficacy of the M2A patency capsule for diagnosis of critical intestinal patency: results of a prospective clinical trial. *J Gastroenterol Hepatol* 2007;22:2060–3.

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