



# Intra-abdominal Bleeding due to Segmental Arterial Mediolytic and Coexisting Pulmonary Thromboembolism: a Case Report

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## Abstract

Segmental arterial mediolysis (SAM) is a rare but important cause of abdominal haemorrhage and is usually treated with endovascular management. Surgical or conservative management can be performed depending on the patient's situation. Since the course of conservative treatment is not well described in the existing literature, it must be used with caution. We describe the case of a 52-year-old man who was transferred to the emergency department because of abdominal pain, diarrhoea, and haematemesis. On arrival, he was haemodynamically unstable, with a blood pressure of 70/40 mmHg. After he was transfused and stabilised in the emergency department, contrast-enhanced computed tomography (CECT) revealed a haematoma around the transverse colon and ascites, without any evident extravasation. The peripheral branch of the middle colic artery (MCA) showed irregular calibre, suggesting SAM. Since the patient remained stable, we initially chose conservative management. However, a CECT scan performed on the third day of hospitalisation showed coexisting pulmonary thromboembolism (PTE). Because of the need for anticoagulation therapy, we performed open surgery. The pathological examination was consistent with SAM. Anticoagulation therapy was initiated the next day. A CECT scan performed on a postoperative day (POD) 13 showed no PTE. Although the patient defecated haemorrhagic stool and experienced haematemesis on PODs 19 and 23, respectively, colonoscopy, esophagogastroduodenoscopy, and repeated CECT scans revealed no evidence of rebleeding, and no recurrence was observed. Open surgery produced a relatively good postoperative course for the patient. Endovascular management, however, remains a reasonable first approach, considering its reportedly excellent outcomes.

**Keywords** Haemorrhage · Segmental arterial mediolysis · Conservative treatment · Surgical treatment

## Case Report

A 52-year-old man was transferred to the emergency department because of abdominal pain, diarrhoea, and haematemesis. He was haemodynamically unstable, with a blood pressure of 70/40 mmHg. The patient received fluid resuscitation and two units of red blood cells (RBCs), to stabilise him. Contrast-enhanced computed tomography (CECT) revealed a haematoma around the transverse colon and ascites without any evident extravasation (Fig. 1a). The peripheral branch of the MCA showed an irregular calibre (Fig. 1b), suggesting

SAM. Since the patient remained stable, we chose conservative management.

Three days later, he complained of chest pain. CECT showed a PTE in the peripheral branch of the right lower pulmonary artery (Fig. 1c). No exacerbation of the haematoma and ascites were observed. There was no deep vein thrombosis. Echocardiography showed no evidence of a cardiac cause of PTE; thus, we assumed transient hypercoagulation induced by haemorrhage could be responsible. Anticoagulation therapy was recommended; however, this could have led to an exacerbation of the intra-abdominal haemorrhage. Therefore, we decided to surgically remove the affected arteries.

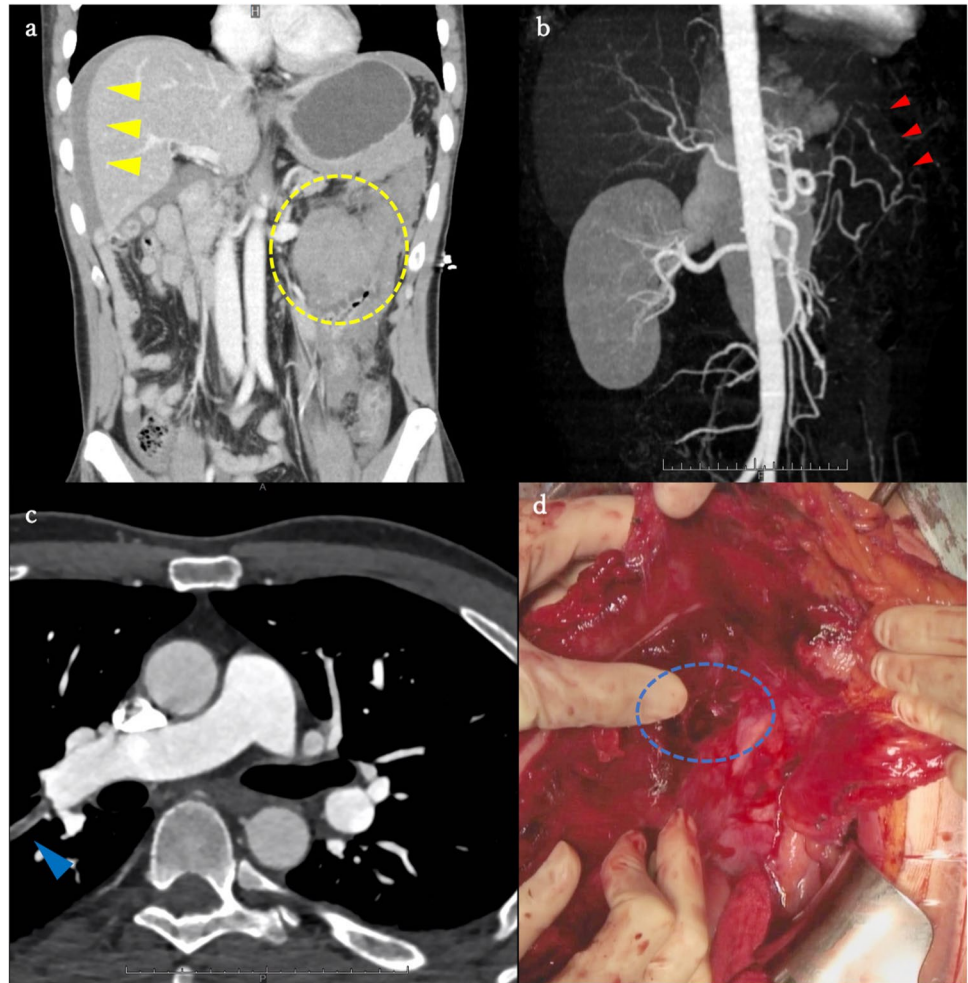
When the abdominal cavity was opened, fresh blood was found throughout the upper abdomen. There was a haematoma inside the transverse mesocolon with the serosa ruptured because of increased internal pressure (Fig. 1d). We confirmed that the bleeding artery was completely torn. We resected the affected transverse colon and

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**Fig. 1** CECT findings reveal **a** a haematoma inside the transverse mesocolon (yellow circle), ascites (yellow arrowheads), and **b** an irregular calibre of the peripheral branch of the middle colic artery with stenoses and dilations (red arrowheads). Another CECT reveals the PTE in the peripheral branch of the right lower pulmonary artery (**c**, blue arrowhead). The transverse mesocolon ruptured due to increased internal pressure (**d**, blue circle)

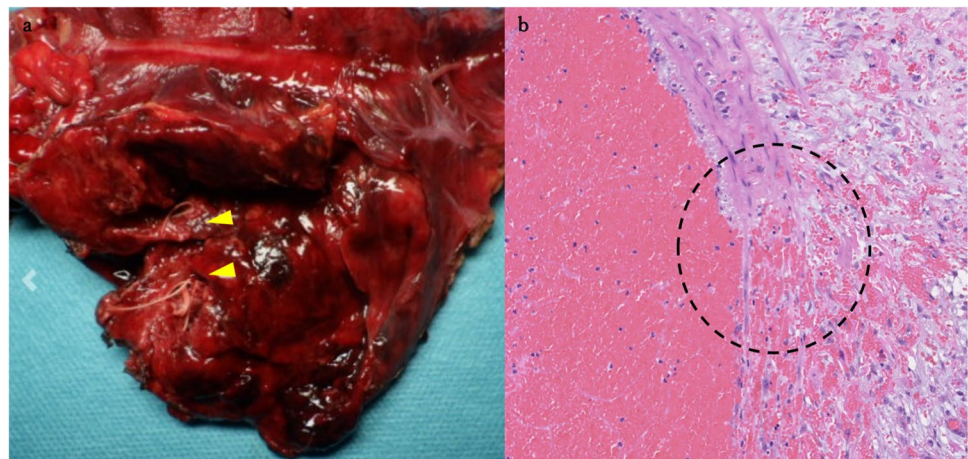


mesocolon to avoid rebleeding and end-organ ischaemia (Fig. 2a). The amount of bleeding was 1350 ml. Four units of RBCs were transfused during surgery. Pathological examination revealed dissection of the tunica media and

intima, inside which a haematoma was present (Fig. 2b), establishing the final diagnosis of SAM.

Anticoagulation therapy was initiated the next day. CECT on POD 13 showed no recurrence. The postoperative course was uneventful until he defecated haemorrhagic stool and

**Fig. 2** Resected specimen with a haematoma inside the mesocolon (**a**). The affected artery was torn apart, and arterial stumps were ligated (**b**, yellow arrows). Pathological examination of the affected artery by haematoxylin and eosin staining reveals granulated tissue and thrombosis disrupting the tunica media (**b**)



experienced haematemesis on PODs 19 and 23, respectively. Colonoscopy and esophagogastroduodenoscopy revealed no evidence of active bleeding, and no recurrence was observed. Repeated CECT showed no recurrence of abdominal haemorrhage and PTE until the patient was transferred for rehabilitation on POD 40.

## Discussion

SAM was first reported in 1976 by Slavin and Gonzales [1], but the definitive aetiology is still unknown. Vessel injury caused by a vasospastic event—such as hypoxia, hypertension, vasopressor administration, or recent anaesthesia—may be a cause, resulting in the lysis and degeneration of the media of the arterial wall [2]. Pathological features in previous studies have shown that granulated tissue disrupts the tunica media without inflammatory cell infiltration and results in stenosis, occlusion, dissection, or aneurysm. Multiple small aneurysms alternating with intact arterial segments produce a “string of beads” sign on CECT or angiography [3]. Aneurysm rupture can be life-threatening, with an estimated mortality rate approaching 50% [4].

SAM usually involves the splanchnic arteries, such as the superior mesenteric artery, celiac axis, inferior mesenteric artery, and renal arteries. Sudden abdominal pain and haemodynamic shock are clues [5].

Fibromuscular dysplasia, connective tissue disorders, and infections are the differential diagnoses. Although some of these are challenging mimics, establishing the correct clinical diagnosis of SAM is not difficult with appropriate scrutiny of medical history, physical examinations, and investigation modalities [3, 5, 6].

Endovascular management usually provides better outcomes than surgery [3, 7], and conservative management is acceptable for haemodynamically stable patients [5, 6, 8]. However, short-interval follow-ups are essential when choosing conservative management.

We initially chose conservative management since the patient remained stable following resuscitation. However, the coexistence of SAM and PTE was challenging since it required simultaneous haemostasis and anticoagulation. There is currently no evidence for continuing conservative management when the risk of bleeding increases. Endovascular management was considered because of its excellent outcomes and minimal invasiveness. However, repeated CECT scans did not show any extravasation, and we anticipated difficulties in confirming the affected artery with angiography. Moreover, post-procedural anticoagulation therapy was immediately needed. Open surgery, while more invasive, provided the prompt and certain elimination of the affected area. While endovascular management is

appropriate to consider, it should only be attempted with trained surgeons available for the surgery.

Retrospectively, the strategy for treating haemorrhage caused by SAM is simple: the first choice is endovascular management; should endovascular management be unavailable or fail, open surgery may be chosen, and conservative management may be a viable choice if the patient is haemodynamically stable and presents limited symptoms [7]. The first two approaches should be tried with surgical backup available in case of failure or rapid exacerbation.

**Abbreviations** SAM: Segmental arterial mediolysis; MCA: Middle colic artery; PTE: Pulmonary thromboembolism; CECT: Contrast-enhanced computed tomography; RBC: Red blood cells; POD: Post-operative days

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**Author Contribution** YT drafted the manuscript. YT, AM, and NT were involved in performing the surgery. YT, SM, and NT contributed to patient management. KT, SM, and NT supervised the writing of the manuscript. All authors read and approved the final manuscript.

**Data Availability** All data generated or analysed during this study are included in this published article.

## Declarations

**Ethics Approval and Consent to Participate** This study was approved by the Ethics committee of Kurashiki Central Hospital.

**Consent for Publication** Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

**Conflict of Interests** The authors declare no competing interests.

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