Case Study

Spontaneous Thrombosis in a Post-traumatic Splenic Pseudo-aneurysm

[1]**MS Suraini &** [2]**SI Bux**
[1]*Department of Imaging, Faculty of Medicine and Health Sciences*
Universiti Putra Malaysia, Serdang, Selangor, Malaysia
[2]*Department of Biomedical Imaging, University of Malaya Medical Centre*
Kuala Lumpur, Malaysia

ABSTRACT

Introduction: Splenic pseudo-aneurysm is an uncommon complication following splenic injury caused by blunt abdominal trauma. Pseudo-aneurysm is usually treated with splenic arterial embolisation. Spontaneous thrombosis of a splenic pseudo-aneurysm can occur but it is rare. **Method:** We report a case of spontaneous thrombosis in a post-traumatic splenic pseudo-aneurysm. The patient was managed conservatively as he was haemodynamically stable with a repeat CT scan on the 7th day showing a tubular enhancing structure in the upper pole of the spleen demonstrating the same attenuation value . **Conclusion:** This case illustrates a spontaneous resolution of splenic pseudo-aneurysm, which is a rare outcome of the condition.

Keywords: Post-traumatic, splenic pseudo-aneurysm, spontaneous thrombosis

INTRODUCTION

The spleen is the most frequently injured organ in blunt abdominal trauma and accounts for about 50% of abdominal organ damage, followed by liver and kidney.[1] Patients with splenic injury can be treated either surgically or conservatively.

Post-traumatic pseudo-aneurysm is an uncommon complication following splenic injury. Other causes of splenic artery pseudo-aneurysm include pancreatitis, iatrogenic and post-operative causes, and rarely peptic ulcer disease. Splenic artery pseudo-aneurysm is rare and fewer than 200 cases have been reported in the English-language literature.[2] Post-traumatic splenic pseudo-aneurysm is even more rare, with only 45 reported cases. [3] A pseudo-aneurysm forms when the vessel wall ruptures, with extravasated blood contained within the adventitia or surrounding parenchyma.[4]

The preferred treatment for post traumatic splenic pseudo-aneurysm is angiography and splenic arterial embolisation. We report a case of spontaneous thrombosis in a splenic pseud-aneurysm after blunt abdominal trauma.

*Corresponding author: Dr Suraini Mohamad Saini; Email: *suraini@medic.upm.edu.my*

THE CASE

An 18-year-old man was admitted to University of Malaya Medical Centre following a motorcycle accident. He sustained blunt abdominal injury. On admission, he was alert with a Glasgow coma scale of 15/15. His vital signs were stable but he complained of tenderness at the left lumbar region.

Contrast enhanced CT scan of abdomen showed extensive splenic laceration at the upper and mid-pole with subcapsular haematoma (Figure 1) in keeping with a grade IV splenic injury (American Association for the Surgery of Trauma Splenic Injury Scale: 1994 Revision) (Table1). No sign of active bleeding was found.

The patient was managed conservatively as he was haemodynamically stable. On the 7th day of injury, a repeat CT scan showed a tubular enhancing structure in the upper pole of the spleen demonstrating the same attenuation value as the splenic artery in keeping with a splenic pseudo-aneurysm measuring 1.9cm (Figure 2). The previously noted splenic laceration and perisplenic haematoma remained unchanged.

The patient was reluctant to undergo angiography and arterial embolisation, despite explanation with regard to risk of rupture. Conservative management was continued, as he was haemodynamically stable. He was discharged one week later. A repeat CT scan at eight weeks after the injury, showed the pseudoaneurysm replaced by a well defined low attenuation defect representing a thrombus (Figure 3). The patient has since remained well until his last follow up at six months after injury.

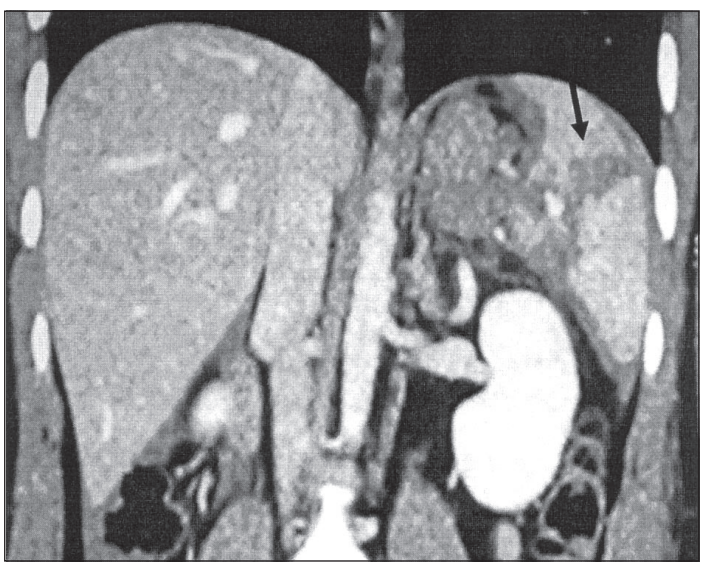
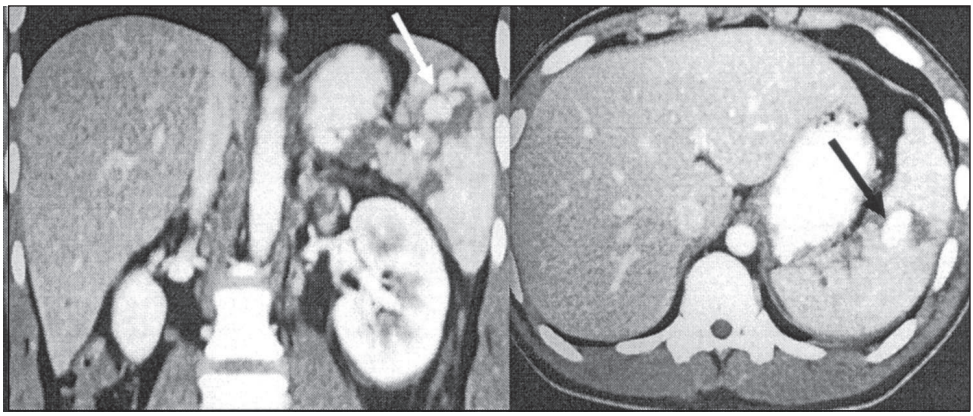


Figure 1. Coronal image of contrast enhanced CT of the abdomen showing extensive splenic laceration at the upper and mid-splenic pole with subcapsular haematoma consistent with Grade IV splenic injury (black arrow).



(a) (b)

Figure 2. Coronal (a) and axial (b) images of the repeat contrast enhanced CT scan 7 days post-injury showing tubular enhancing area within the laceration in the upper pole of the spleen consistent with a pseudoaneurysm (white and black arrows).

Table 1. American Association for the Surgery of Trauma Splenic Injury Scale (1994 Revision)

Grade	Type of Injury	Description of Injury
I	Hematoma	Subcapsular, <10% surface area
	Laceration	Capsular tear, <1 cm parenchymal depth
II	Hematoma	Subcapsular, 10-50% surface area; Intraparencymal <5 cm in diameter
	Laceration	1-3 cm parencymal depth that does not involve a trabecular vessel
III	Hematoma	Subcapsular >50% surface area or expanding; ruptured subcapsular or parenchymal hematoma
	Laceration	>3 cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration involving segmental or hilar vessels producing major devascularisation (>25% of spleen)
V	Laceration	Completely shattered spleen: vascular hilar vascular injury that devascularises spleen.

DISCUSSION

Traumatic pseudo-aneurysms are rare, with only 45 reported cases since 2006. [3] The majority (74%) of traumatic splenic pseudo-aneurysms are not present on admission abdominal CT but appear in a follow-up study performed hours to several months later. The incidence of these pseudo-aneursyms correlates with the severity of splenic injury. Twenty-six percent

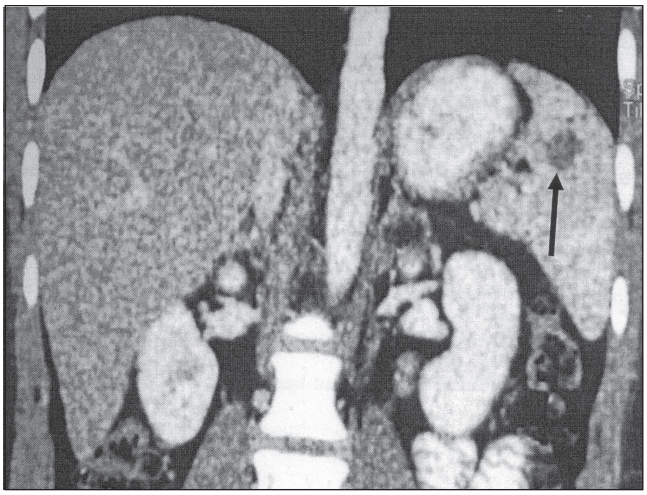


Figure 3. Coronal image of contrast enhanced CT scan of the abdomen at 8 weeks after injury showing resolution of splenic haematoma with thrombosed pseudo-aneurysm (black arrow).

of pseudo-aneurysms develop in Grades 1 and 2 and 71% in Grades 3 and 4 splenic injuries. About 3% of pseudo-aneurysms are seen in Grade 5 splenic injury and this is because most of these patients would have had surgical intervention.[3]

Traumatic splenic artery pseudo-aneurysm is due to intimal trauma and disruption of elastic fibres associated with deceleration injury, leading to intimal fragmentation and weakening of the arterial wall. Rapidly enlarging intrasplenic post-traumatic pseudo-aneurysm may develop from pulpar laceration and the haematoma continuously supplied with blood from injured intrasplenic arteries.[1]

A splenic pseudo-aneurysm appears well defined with homogenous area of hyperdensity similar to enhanced blood vessels on contrast enhanced CT. Better demonstration of the lesion in three dimension (3D) can be achieved with multislice CT angiography (CTA). Delayed presentation or diagnosis for splenic pseudo-aneurym can be due to progressive clot lysis at the site of arterial wall injury or improper timing of contrast bolus injections and scanning. Scanning during the arterial and venous phase would reduce the risk of a false negative CT outcome. Other non-invasive methods for detection of pseudo-aneurysm include Doppler ultrasonography and magnetic resonance angiography (MRA). Identification of a splenic pseudo-aneurysm by these non-invasive methods may warrant catheter angiography, which offers both diagnostic and therapeutic options in a haemodynamically stable patients, thus avoiding the necessity for laparotomy. Pseudo-aneurysms manifest angiographically as contained collections of extravasated contrast material.[4]

When left untreated, the risk of rupture of a splenic artery pseudo-aneurysm can be as high as 37% with the mortality rate of these cases approaching 90%.[2] The risk of rupture depends on the age at presentation, the size and location of the pseudo-aneurysm, and other clinical risk factors. Once the initial diagnosis of splenic artery pseudo-aneurysm is

made, therapeutic decisions would guided by symptoms related to the pseudoaneurysm and the clinical status of the patient.

There are two categories of patients who may benefit from elective surgery; namely patients with an asymptomatic pseudo-aneurysm that is 2 cm or greater in diameter or documented to be increasing in diameter and those pseudo-aneurysms discovered in pregnant women or women of childbearing age. They should undergo elective repair before pregnancy or during the first trimester. There is, however, no current proposed standard therapy for asymptomatic pseudo-aneurysms less than 2 cm in diameter.[5] For symptomatic splenic artery pseudo-aneurysm, splenectomy with or without partial pancreatectomy has been the treatment of choice. [2]

Arterial embolisations of pseudo-aneurysms are generally done using a variety of embolic agents which include coils, detachable ballons and inert particles or Gelform (gelatin sponge). Reported success rates of these procedures vary from 75-85%. [2] Percutenous thrombin injection under CT guidance to treat splenic artery pseudo-aneurysms in patients who were not suitable for endovascular therapy has been reported.[2] Because of the unknown natural course of post-traumatic splenic pseudo-aneurysm and the fact that some may thrombose spontaneously, the necessity for laparotomy in cases where angiographic embolisation failed is debatable. Splenic pseudo-aneurysm in children and young people is more likely to resolve spontaneously and less likely to bleed than in older patients. The thicker capsule and more elastic parenchyma of the paediatric spleen potentially result in a self-tamponade and may contribute to spontaneous thrombosis. It would be appropiate to follow up stable pediatric patients with splenic pseudo-aneurysm with Doppler ultrasound examinations with the expectation of spontaneous resolution of the lesion. [1]

Imaging plays an important role not only in the follow-up evaluation of splenic pseudo-aneurysm managed conservatively but also as an alternative to surgery in the form of angiographic embolisation and providing a vascular roadmap in the event of open surgery. This case shows that spontaneous occlusion can be one of the possible outcomes in post traumatic splenic pseudo-aneurysm. In conclusion, this case illustrates a spontaneous resolution of splenic pseudo-aneurysm, which is a rare outcome of the condition.

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