Case Report

ANNALS OF MEDICINE & SURGERY

OPEN

Post-traumatic jejunal branch of superior mesenteric artery pseudoaneurysm in paediatrics: a compelling case report highlighting early diagnosis and successful endovascular embolization

Shailendra katwal, MD[a,*], Dinesh Chataut, MBBS[b], Sundar Suwal, MBBS[b], Ajit Thapa, MBBS[b], Pratiksha Paudel, MBBS[c], Sushmita Bhandari, MBBS[d]

Introduction and importance: This manuscript underscores the critical significance of prompt diagnosis and intervention in cases of post-traumatic gastroduodenal artery pseudoaneurysms. Such occurrences, particularly in the paediatric population, are rare but potentially life-threatening complications following abdominal trauma, necessitating heightened clinical awareness. Despite their rarity, the devastating consequences of delayed recognition and management emphasize the necessity for advanced imaging modalities and individualized treatment strategies.

Case presentation: A 17-year-old male presented with severe epigastric pain following a football fall. Despite initial stability, persistent symptoms prompted further investigation. Conventional screening methods proved inconclusive, leading to a contrast-enhanced computed tomography (CT) scan that revealed a jejunal branch of superior mesenteric artery (SMA) pseudoaneurysm. The subsequent fluoroscopy-guided angiography and successful embolization using glue exemplify the importance of timely intervention in such cases.

Conclusion: This case highlights the importance of early recognition and appropriate intervention in post-traumatic jejunal branch of SMA pseudoaneurysms. The successful outcome achieved through endovascular embolization underscores the necessity for vigilant monitoring and tailored management strategies in similar clinical scenarios.

Keywords: case report, endovascular embolization, superior mesenteric artery, post-traumatic, pseudoaneurysm

Introduction

Pseudoaneurysm develops when blood collects between the two outermost layers of an artery, tunica media, and tunica adventitia, leading to the formation of a cavity outside the artery. Research shows that among children who sustained traumatic injuries, almost 21% suffer from abdominal trauma[1]. Although rare, visceral artery pseudoaneurysm is a potential complication of blunt trauma to the abdomen. Pseudoaneurysm of the jejunal branch of SMA is a much rarer phenomenon and accounts only for 1.5% of all visceral artery aneurysms[2].

Patients are typically asymptomatic but can present with symptoms such as abdominal pain and discomfort, upper gastrointestinal bleeding, jaundice, and rarely hypovolemic shock. These pseudoaneurysms are difficult to diagnose and can be lethal if they rupture. So, prompt diagnosis and treatment can be life-saving. An abdominal ultrasound, computed tomography (CT) scan, MRI, and fluoroscopy are some of the widely used imaging modalities. Likewise, visceral angiogram is the gold standard diagnostic and therapeutic imaging modality as it has 100% sensitivity for diagnosing SMA branch pseudoaneurysm[3,4]. Because it tended to remain clinically silent and the high mortality

HIGHLIGHTS

- This study highlights the successful management of a rare post-traumatic jejunal branch of superior mesenteric artery pseudoaneurysm in a paediatric patient through endovascular embolization using glue.
- Timely intervention by endovascular embolization is proved effective in averting potential life-threatening complications.
- This study highlights the critical significance of personalized treatment strategies in addressing unique clinical scenarios, emphasizing the necessity for vigilant monitoring and tailored management approaches.

[a]Department of Radiology, Dadeldhura Subregional Hospital, Dadeldhura, [b]Department of Radiology, Maharajgunj Medical Campus, [c]Department of Radiology, All Nepal Hospital, Kathmandu and [d]Shankar Nagar Health Post, Butwol, Nepal

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Department of Radiology, Dadeldhura Subregional Hospital, Dadeldhura, 10300 Tufandada. Tel.: +977 984 9149 630.
E-mail: shailendrakatwal@gmail.com (S. Katwal).

Annals of Medicine & Surgery (2024) 86:2326–2329

Received 8 January 2024; Accepted 12 February 2024

Published online 28 February 2024

http://dx.doi.org/10.1097/MS9.0000000000001856

rate associated with rupture, radiographic imaging techniques are of great importance in establishing the diagnosis of pseudoaneurysm[5]. Once diagnosed, endovascular embolization is the treatment modality of choice. In addition, it can also be managed with endovascular stenting, percutaneous, or endoscopic ultrasound-guide thrombin injection[6,7]. For hemodynamically unstable patients and those who are refractory to angioembolization, surgical revascularization, vessel ligation, and aneurysmal sac exclusion can be performed[8,9].

We report a case of 17-year-old male with post-traumatic pseudoaneurysm of jejunal branch of SMA managed with angioembolization. This case has been reported in line with Surgical Case Reports (SCARE) guidelines[10].

Case presentation

A 17-year-old, non-smoking, and non-alcoholic male presented to the emergency department (ED) with a 2-h history of severe pain in the epigastric region. The patient was playing football and fell suddenly on the ground, front down, when the pain started. The pain was a sudden, severe, aching sensation but non-radiating. It was not aggravated by any factors and not relieved by painkillers; however, it was associated with one episode of vomiting and intermittent pain episodes in the past. The vomitus was non-bloody, non-projectile, and semisolid in consistency with a normal colour. The patient denied any history of prior trauma or any regular medications. There is no history of acid reflux or prolonged NSAID use. The family history is not significant.

The patient was hemodynamically stable with a pulse of 92/min, blood pressure of 125/80 mm Hg, temperature of 98°F, and respiratory rate of 18/min. On examination of the abdomen, there was tenderness and rigidity, and a small abrasion was noted on the anterior abdominal wall. Laboratory investigations revealed an haemoglobin (Hb) of 13.8 g/dl, haematocrit of 45%, amylase of 85 U/l and lipase of 60 U/l. Renal and liver function tests turned out to be normal.

The patient was admitted and managed symptomatically with IV analgesics and IV fluids, providing only mild relief. An acute series of abdominal X-rays was done, which did not show any gas under the diaphragm or any other abnormalities. The extended focused assessment with sonography for trauma (e-FAST) scan was not significant. The patient was then sent for a contrast-enhanced CT (CECT) scan of the abdomen. Surprisingly, the arterial phase of the CECT showed a contrast-filled focal outpouching from the jejunal branch of SMA with no obvious contrast extravasation (Fig. 1A and B). Suspecting the case to be a post-traumatic SMA branch pseudoaneurysm, the patient was shifted to the radio interventional unit.

In the radio interventional unit, the patient underwent fluoroscopy-guided angiography by placing the catheter on the opening of the SMA which revealed contrast-filled outpouching arising from the jejunal branch of SMA without extravasation (Fig. 2A). Glue was used as an embolizing agent for the pseudoaneurysm. Procedure was performed by specialized interventional radiology operators with significant experience, demonstrating proficiency and familiarity with the technique. The procedure was successful, and the post-embolization angiogram showed no obvious outpouching or any contrast blush (Fig. 2B). After procedure, patients were advised to avoid heavy lifting, care for wounds, and schedule follow-up appointments to monitor recovery progress and potential complications On follow-up of the patient after 2 weeks in the interventional radiology department, the patient was improving symptomatically, and the CT scan at 2 weeks showed no obvious signs of an aneurysm.

Discussion

Post-traumatic pseudoaneurysm of the SMA branch is a rare but potentially life-threatening complication of blunt abdominal injuries. Unlike true aneurysm which is the dilation to more than 1.5 times the actual size of an artery with all its three layers, pseudoaneurysm occurs due to fluid leakage into the surrounding tissues from an injured artery that is contained by a single-layered fibrous capsule. Although rare, jejunal branch of SMA pseudoaneurysm has a 75% incidence of rupture and an extremely high morbidity and mortality[6]. The most common etiologies of a pseudoaneurysm include inflammation such as pancreatitis, trauma, infections, alcohol abuse, peptic ulcer disease, or iatrogenic causes such as intra-abdominal surgeries, vascular interventions, etc[2,7]. In our case, the patient developed a jejunal

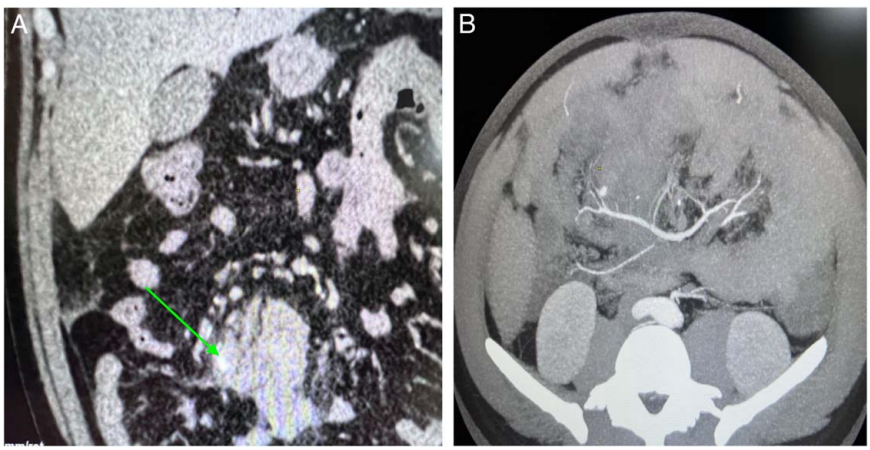

Figure 1. (A) Contrast-enhanced coronal computed tomography of the abdomen showing the contrast-filled focal outpouching (Green arrow). (B) Contrast-enhanced axial reformatted image showing the focal contrast-filled outpouching arising from the jejunal branch of SMA.

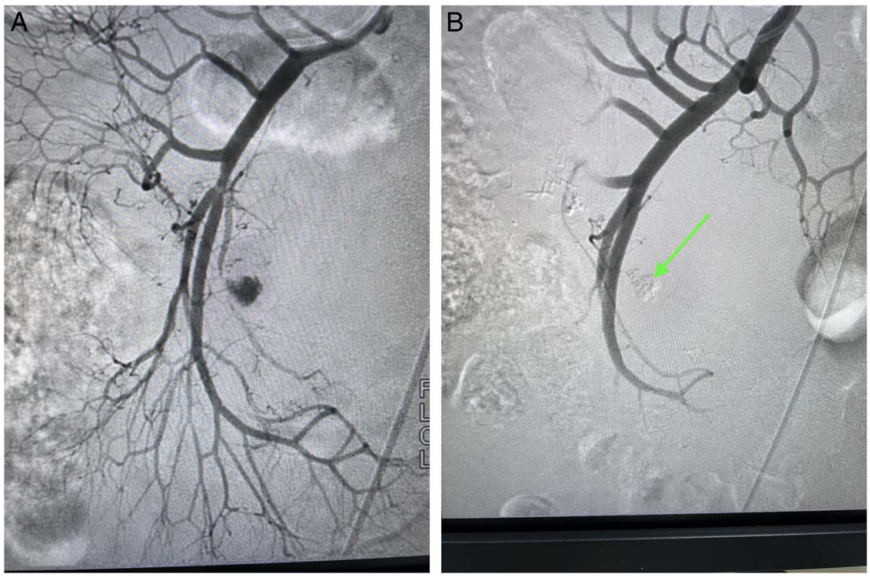

Figure 2. (A) Fluoroscopy-guided angiography image with contrast passed via the coeliac artery showing the focal contrast-filled outpouching arising from the jejunal branch of SMA. (B) Angiographic image after embolization with the glue showed focal radio-opacity at the site of outpouching (Green arrow).

branch of SMA pseudoaneurysm because of blunt trauma to the abdomen after a fall on the football ground.

Patients with visceral aneurysms arising from branch of SMA can be asymptomatic and diagnosis can be incidental while performing imaging for another reason. The most common presentations of patients with such pseudoaneurysms include gastrointestinal or intraperitoneal haemorrhage due to aneurysmal rupture (hematemesis, melena), abdominal pain, gastric outlet obstruction, nausea, vomiting, hemobilia, pulsatile abdominal mass, anaemia, and rarely shock[7,11]. However, ~7.5% of cases with SMA branch aneurysms can remain clinically silent[7]. Our patient presented with acute onset severe epigastric pain associated with vomiting secondary to the fall.

Radio-imaging modalities such as X-ray and abdominal ultrasound can be used to screen the presence of a pseudoaneurysm; however, these tests are less sensitive and the pseudoaneurysm was missed in our case. The contrast-enhanced CT scan of the abdomen and pelvis has a sensitivity of 67% for diagnosing pseudoaneurysm[12]. CT visceral angiography is the gold standard diagnostic and therapeutic modality as it has 100% sensitivity for diagnosing SMA branch aneurysms and pseudoaneurysms[3,4]. Along with angiography, MRI, and fluoroscopy can also be used to aid in the diagnosis. In our case, contrast-enhanced CT abdomen showed a focal outpouching from the SMA branch that was further confirmed to be pseudoaneurysm with the help of a fluoroscopy-guided angiogram.

Due to the high mortality and morbidity associated with pseudoaneurysmal rupture[11,13], all pseudoaneurysms once diagnosed should be treated regardless of their size, nature, or presenting symptoms. Treatment aims to occlude or excise aneurysm while maintaining the arterial supply for end-organ perfusion. In the case of hemodynamically stable patients, interventional radiographic techniques such as endovascular embolization have become the treatment modality of choice[6]. Endovascular deployment of covered stent, coil embolization, and percutaneous or endoscopic ultrasound-guided thrombin injection have proven to be superior due to their advantage over conventional surgical procedures in terms of lower morbidity and mortality rate, less postoperative pain, decreased hospitalization, and faster recovery[4]. In a case reported by Zhou and colleagues, N-butyl-2-cyanoacrylate (NBCA) was employed as the embolizing agent, yielding successful outcomes. Conversely, in our case, glue was utilized as the embolizing agent, resulting in superior outcomes without recurrence. The efficacy of glue embolization may be attributed to the small size of the pseudoaneurysm[14].

For hemodynamically unstable patients or the ones that are refractory to endovascular embolization, surgical procedures are indicated[6,8]. Surgical treatments can be open, laparoscopic, or robotic and often include surgical revascularization, vessel ligation, or resection of aneurysmal sac[8,9]. Despite the advantages, re-bleeding after embolization can still occur in 20–40% of patients[15,16] and observation with close follow-up is important[17]. Our patient did not experience any re-bleeding or other complications after embolization and was discharged in a clinically stable condition.

Conclusion

This case report highlights the critical importance of early diagnosis and tailored intervention in post-traumatic SMA jejunal branch pseudoaneurysms. Successful endovascular embolization demonstrates the efficacy of individualized management strategies, offering favourable outcomes and reduced morbidity.

Ethical approval

None.

Consent

Written informed consent was obtained from the patient's legal guardian for publication of this case report and the accompanying images. A copy of the written consent is available for review by the Editor-in-chief of this journal on request.

Source of funding

None.

Author contribution

S.K.: conceptualization, as mentor and reviewer for this case report and for data interpretation. D.C.: contributed in conceptualization and reviewer. S.S.: contributed in performing literature review and editing. A.T.: contributed in performing literature review and editing. P.P.: contributed in writing the paper and reviewer for this case. S.B.: contributed in writing the paper. All authors have read and approved the manuscript.

Conflicts of interest disclosure

All the authors declare that they have no competing interest.

Research registration unique identifying number (UIN)

None.

Guarantor

Shailendra Katwal.

Provinence and peer review

Not commissioned, externally peer-reviewed.

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