

Case Report

Delayed Presentation of a Bleeding Renal Artery Pseudo-aneurysm in Pediatric Blunt Trauma

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Keywords

Angio-embolization
Blunt abdominal injury
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Pediatric trauma
Pseudoaneurysm
Renal injury
Vascular pathology

Abbreviations

CECT - Contrast enhanced
computed tomography

Abstract

Renal artery pseudo-aneurysm following trauma is rare in children. Bleeding pseudo-aneurysm requires high index of suspicion for early diagnosis and proper management. This report describes a 10-year-old boy who presented with delayed bleeding from a renal artery pseudo-aneurysm following a motor vehicle accident. Contrast enhanced computed tomography scan showed a bleeding pseudo-aneurysm in the upper pole lobar artery of the left kidney. Angio-embolization of the pseudo-aneurysm was successfully done using pushable coil. Post-embolization recovery was marked by temporary minimal abdominal pain and hematuria that resolved without any residual renal dysfunction. Awareness of this rare condition is crucial for early detection and successful management.

INTRODUCTION

Renal artery pseudo-aneurysm is a known complication of penetrating or blunt injury and renal interventions.⁽¹⁾ It is less common following blunt abdominal trauma and is even rarer among the pediatric population. Clinical diagnosis of a bleeding pseudo-aneurysm requires high index of suspicion because of its rarity and unpredictable clinical presentation. Prompt recognition and intervention of this potentially fatal sequel of abdominal trauma is essential to prevent mortality and morbidity.

CASE REPORT

A 10-year-old boy was brought to the emergency department following a high-impact road traffic accident. He presented with vomiting, abdominal pain and hematuria; but he was hemodynamically stable. Contrast enhanced computed tomography scan (CECT) showed Grade-III renal and Grade-III splenic injuries as defined by the Organ Injury Scaling Committee of the American Association for Surgery of Trauma (AAST). He was managed non-operatively. He had few episodes of fever that was assumed to be due to nosocomial infection and empirically treated with antibiotics. However, a septic work-up was negative. He was observed for

a week as an in-patient and was discharged after the resolution of symptoms.

One month later, he presented again with gross hematuria, suprapubic pain and difficulty in micturition. On examination, he was pale with notable gross hematuria, passing out blood clots. (Fig. 1) Digital rectal examination was unremarkable. His hemoglobin was 7.1 g/dl, requiring transfusion of packed cells. An ultrasonography of the abdomen showed blood clots in the urinary bladder with no other significant abnormality.



Fig 1. Clinical presentation of renal artery pseudo-aneurysm with gross hematuria with passing out of blood clots

He continued to have gross hematuria. Though he was hemodynamically stable his dropping hemoglobin level necessitated further transfusion. A repeat CECT showed a lobulated lesion within the lacerated left kidney that enhanced with contrast during the arterial phase. The lesion was measuring 1.3 x 1.5 cm. A bleeding pseudo-aneurysm of the upper pole lobar artery was diagnosed.(Fig. 2)

Trans-femoral angiography showed a contrast filled sac arising from the left renal artery.(Fig. 3) Angio-embolization of the pseudo-aneurysm was successfully done using a pushable coil. Post-embo-

lization imaging confirmed complete resolution of the pseudo-aneurysm.(Fig. 4)

During the post-embolization period he had transient abdominal pain (managed with analgesics) and self-limiting mild hematuria. There were no evidences of residual renal dysfunction and he was discharged after 48 hr of observation. At one month follow-up he was well and a Doppler ultrasonography was normal.

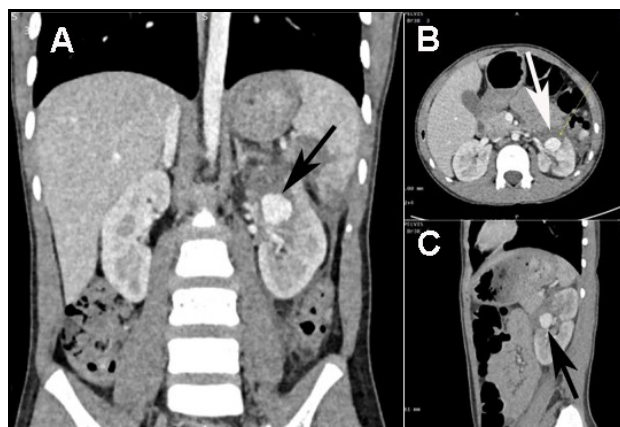


Fig 2. Arterial phase contrast enhanced computed tomography demonstrating the contrast enhancing lobulated lesion in the upper pole of the lacerated left kidney suggestive of a bleeding pseudo-aneurysm (arrows). (A) Coronal view; (B) Axial view; (C) Sagittal view.



Fig 3. Pre-embolization angiography demonstrating the pseudo-aneurysm arising from the left lobar renal artery (arrow)



Fig 4. Post-embolization angiography demonstrating the disappearance of pseudo-aneurysm

DISCUSSION

Non-surgical management of blunt renal injury in hemodynamic stable children is a widely accepted method with good outcomes. Nonetheless, renal artery pseudo-aneurysm may complicate blunt abdominal injuries.⁽¹⁾ There are only six cases of pseudo-aneurysm reported in children after blunt injury,⁽¹⁻⁵⁾ with the age ranging between 6-17 yr. The commonest presentation is gross hematuria following trauma or a renal procedure. The time interval between trauma and hematuria can be highly variable, ranging from 1 day to 38 years.^(4,6) While flank pain is commonly reported in the literature, our patient had suprapubic pain due to acute urinary retention secondary to blood clots in the bladder. Given the variability of clinical presentations, high index of suspicion is essential to diagnose this uncommon cause of hematuria.

Doppler ultrasonography is the choice of first-line investigation of post-traumatic hematuria as it is non-invasive, radiation-free, easily available and cost effective. But, lesion location and operator expertise may limit its diagnostic value.⁽⁷⁾ Pseudo-

aneurysms may be missed if they are not clinically suspected. Bi-directional flow at the neck of the aneurysm showing a 'ying-yang' color pattern is characteristic of pseudo-aneurysm in the Doppler scan. CECT provides more useful information, such as the location of the lesion and its relation with the parent vessel. However, high radiation dosage limits its liberal use in children. Angiography, though invasive, is the gold standard of diagnosis with therapeutic extension.⁽⁸⁾ Radiation dosage of renal artery embolization as measured by Dose Conversion Coefficient is approximately 0.26 (mSv/Gy·cm²) which is higher than all other diagnostic methods. Radiation dose of fluoroscopy guided interventions are of special concern, as children are more radiosensitive than adults.⁽⁹⁾

Out of the 6 reported cases of renal artery pseudo-aneurysm in children, only 1 was managed surgically with excision of the pseudo-aneurysm and primary anastomosis of the renal artery.⁽²⁾ The remaining five were managed successfully with angio-embolization.^(1,3-5) Among the 5 cases, only one patient had low grade fever, nausea, vomiting and left flank pain suggestive of post-infarction syndrome.⁽⁵⁾ Post-embolization syndrome, though a serious complication, is fortunately rare, occurring in only 2.6% of patients.⁽¹⁰⁾ Advancements in imaging modality enable super selective embolization with improved outcome.

More recently, covered stents have been described for post-traumatic renal artery pseudo-aneurysm with improved success rates.⁽¹¹⁾ Deployment of the covered stent excludes the pseudo-aneurysm from circulation, theoretically offering a nephron-preserving endovascular approach with minimal risk of post-infarction syndrome. However, this technique has only been described in adults and its pediatric application is yet to be studied.

Renal artery pseudo-aneurysm may result in significant morbidity and mortality if it is not promptly diagnosed and treated. The increasing popularity

of non-operative approach in blunt abdominal injury has led to an increase in the reporting of this previously rare complication. Therefore, it is imperative that pediatric surgeons be aware of this rare post-traumatic complication, which may present after several months or years. Despite newer endovascular methods, angio-embolization remains the recommended therapeutic approach with good outcome in the pediatric population, averting the need of surgery.

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