

EMBOIALIZATION FOR THE TREATMENT OF DELAYED HEMATURIA RENAL ARTERY PSEUDOANEURYSM FOLLOWING BLUNT TRAUMA

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ABSTRACT:

Background: The occurrence of a renal artery pseudoaneurysm after blunt renal trauma is an infrequent complication. The occurrence of delayed bleeding is typically observed within 2 to 3 weeks following an injury. It is commonly attributed to the presence of an arteriovenous malformation (AVM) or pseudoaneurysm. They are frequently observed in cases of severe injuries or trauma that penetrates the body. The application of angiographic catheterization is efficacious in detecting pseudoaneurysms in the renal artery. The management of renal pseudoaneurysms necessitates the consideration of distinct clinical associations, including the location and size of the lesion as well as the presence of symptoms.

Objective: This study aims to describe in detail how angiographic catheterization and embolization were used to treat a patient with a post-traumatic pseudoaneurysm of the renal artery.

Materials and Methods: Conducting a literature review and medical records.

Results: A case of renal artery pseudoaneurysm is presented. A male individual aged 33 sought medical attention at the emergency department following a motorcycle collision and exhibited symptoms of pain in the right flank region. The individual underwent a medical intervention involving the placement of a double J stent. After nearly fourteen days, the individual reported experiencing hematuria. The abdominal CT scan revealed a renal injury on the right side with an AAST grade of 4, while the renal CTA demonstrated the presence of a pseudoaneurysm. With the help of an angiographic catheterization, a false aneurysm was found at the right renal pole. The procedure of selective embolization utilizing coils was performed on the renal arteries located at the lower and middle poles of the right kidney.

Conclusion: The occurrence of renal artery pseudoaneurysms is infrequent; however, it is a grave complication that may arise from renal trauma. The accurate diagnosis and effective management of pseudoaneurysms are of paramount importance due to their potential to cause severe and potentially fatal complications if left untreated. The diagnostic process for pseudoaneurysms heavily relies on the involvement of the general radiologist. Interventional radiology procedures have less morbidity and mortality compared to surgical procedures.

Keywords: angiographic catheterization, embolization, and pseudoaneurysm.

INTRODUCTION

Trauma to the kidneys can lead to harm caused upon either the renal parenchyma or the renal vasculature, which may result in rupture or damage to the collecting system¹. Renal trauma is observed with a higher frequency in the male population, accounting for approximately 72-93% of cases. Moreover, it is more commonly reported in individuals aged between 31-38 years². Delayed bleeding, which typically manifests 2-3 weeks post-injury, is commonly attributed to the presence of an arteriovenous malformation or a pseudoaneurysm³.

OBJECTIVES

This paper aims to describe a case of angiographic catheterization and embolization in a patient with renal artery pseudoaneurysm.

METHODS

This paper is conducting a literature review and medical records.

CASE REPORT

A male patient, aged 33, presented to the emergency department following blunt trauma resulting from a motorcycle accident. The patient was diagnosed with blunt abdominal trauma. The urologist did the insertion of a stent for urine drainage. Almost two weeks after the injury, the patient complained of hematuria, and the patient underwent abdominal CT, and the result was renal injury scale AAST 4. Two days later, the patient

underwent renal CTA, and the result was a pseudoaneurysm in the middle and lower pole right kidney. Then patients were referred to our hospital; the patient underwent an angiographic catheterization. It showed a pseudoaneurysm at the right middle and lower pole renal artery. Embolization of the right middle and lower pole aneurysm was performed using coil sizes 3mm x 5cm and 2mm x 3cm. Post embolization run showed total occlusion of the pseudoaneurysm.

DISCUSSION

A true aneurysm is an expansion of the vascular wall in the shape of a ball, while a pseudoaneurysm is caused by the tissues that surround the arteries⁵. Pseudoaneurysms are a type of aneurysm that are not true aneurysms but rather occur at the location of arterial injury. This leads to the formation of a hematoma that is confined to the local area and is characterized by turbulent blood flow. Unlike aneurysms, pseudoaneurysms are not able to penetrate the vessel wall. Pseudoaneurysms are unlike true aneurysms in that they do not penetrate any layer of the vessel wall. A wall forms from fibrin that are ultimately weaker than a true aneurysm⁶.

Renal artery pseudoaneurysms are predominantly related to medical management. The most common causes are open and endoscopic surgery, percutaneous renal surgery, and a kidney biopsy. The occurrence of a renal artery pseudoaneurysm due to traumatic events is infrequent. Pseudoaneurysms arising from renal

trauma are attributed to the impact of deceleration forces on the arterial system⁷.

The conventional angiography technique is widely accepted as the benchmark method for diagnosing pseudoaneurysms. But non-invasive imaging methods like ultrasound, magnetic resonance angiography (MRA), and computed tomography angiography (CTA) are good ways to find pseudoaneurysms. In contemporary times, there has been a greater utilization of percutaneous endovascular and surgical methods in managing arterial ailments. In recent times, interventional radiology has undergone significant advancements and has superseded surgical interventions⁸.

The use of embolization has been proven to be effective in the treatment of pseudoaneurysm therapy. Two primary techniques are commonly utilized in clinical practice, namely embolization and stent deployment. The optimal course of treatment is contingent upon the dimensions of the neck region and the supplementary provisions of the terminal organ⁸.

The choice of embolization material depends on several things, such as the presence of pseudoaneurysms and/or active bleeding, the presence of collateral vessels, the location of the feeding artery, and the clinical status of the patient⁹. Sarmuk *et al.* (2021) chose endovascular embolization with Boston Scientific's "Guglielmi Detachable Coil" (GDC) in their case report. These coils were carefully inserted at the terminal artery, targeting the area of leakage. A short section of uncoated stainless steel connects the coil to the Teflon-coated delivery wire. The objective of this intervention was to induce thrombosis, thereby effectively occluding the pseudoaneurysm. The other researchers used a Boston Scientific 6F double-curve guiding catheter, an Excelsior-14 microcatheter, and a platinum-tip steerable guidewire (specifically, the Transcend model from Boston Scientific). The renal aneurysm was treated by inserting a microcatheter tip and subsequently filling the cavity with multiple Guglielmi Detachable Coils¹⁰.

After the embolization procedure, embolize the right middle pole and right lower pole using coil sizes of 3mm x 5cm and 2mm x 3cm. The post-embolization run showed total occlusion of the pseudoaneurysm. After the embolization procedure, the patient was observed; within 24 hours of observation, there were no more complaints of hematuria, and the right-side pain was reduced.

The literature reports that percutaneous embolization is a safe and cost-effective alternative to surgical exploration for the treatment of traumatic renal pseudoaneurysms¹¹. Additionally, it is considered a less complex procedure. The potential adverse effects of renal artery embolization encompass postembolization syndromes such as nausea, vomiting, fever, leukocytosis, and abdominal pain resulting from the damage to the renal parenchyma. Additionally, there is a risk of hematoma at the catheter insertion site, renal failure, and temporary arterial hypertension¹².

CONCLUSION

The occurrence of a renal artery pseudoaneurysm is infrequent, yet it represents a significant and consequential complication arising from renal trauma as in this case. Renal artery embolization is a minimally invasive procedure utilized for the diagnosis and treatment of renal artery pseudoaneurysms. Pseudoaneurysm examination via CT is only diagnostic, but if using catheter angiography, it can also be directly treated with an embolization procedure guided by an angiographic catheterization. By using an angiographic catheter, an interventional radiologist can quickly make a diagnosis and start treatment to avoid potential problems like haematuria, anemia or haemodynamically unstable, and renal failure.

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FIGURE LEGENDS:



Figure 1: Soft tissue window of abdominal CT scan showed right renal injury AAST grade 4



Figure 2: Angio window of renal CTA showed middle pole pseudoaneurysm



Figure 3: Angio window of renal CTA showed lower pole pseudoaneurysm.



Figure 4: Angiography pre-embolization.



Figure 5: Angiography post-embolization.