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CASE REPORTS

Endovascular Treatment of post traumatic Renal Artery Dissection.

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Abstract

Blunt renal artery injuries are rare, and no single trauma center has accumulated sufficient experience to draw meaningful conclusions or recommendations about optimal therapeutic strategies.[1]

The increased use of CT scans to evaluate blunt abdominal trauma identifies more acute renal artery injuries that may have gone undetected.[2]

Patients with renal injury have limited options such as open surgical repair or anticoagulation.[3] The use of endovascular stents to treat trauma is a good option treatment. [4] But not every case is successful.

The purpose of this case report is to describe the importance of accurate diagnosis and successful repair in emergency traumatic conditions by means of interventional radiology in cases of intimal damage to the renal arteries.

We will present a 38-year-old man who shows on the emergency room because of an accident with abdominal and thoracic trauma. The patient complained of pain in the right side of the abdomen…

Through Angiography, an intimal dissection localized in the upper pole of the right kidney was confirmed. We inserted an expandable balloon stent using a transfemoral approach to successfully repair the dissection.

Conclusion: Blunt renal artery injury is rare. Nonoperative management should be considered an acceptable therapeutic option. Management of blunt renal injuries includes timely evaluation to maximize the preservation of renal function. Recent management trends support the consideration of endoluminal intervention for traumatic renal artery dissections.

Keywords: trauma blunt, renal injury, endovascular stent, angiography

Introduction

Renal trauma can result in damage to the renal parenchyma or vasculature, which can cause hemorrhage or damage to the collecting system with possible leakage of urine outside the kidney.

Overall, genitourinary tract injuries are rare (10% of all traumas) with the most commonly affected organ being the kidney. [5]

Renal trauma accounts for about 1% to 5% of all trauma patients, the majority of which are due to blunt abdominal trauma (80% to 90%). [6, 7]

In 1861 *Von Recklinghausen* was the first to describe open renal injury with intimal impaction and thrombosis at autopsy on a boy who suffered a fall from a height. [8]

About 100 years later *Rohl* [9] performed the first successful revascularization in a 25-year-old male with traumatic thrombosis of a renal artery.

The incidence of blunt renal arterial injuries is rarely documented which began in 1981 with 250 patients enrolled and literature review by *Clark et al.* [10] and then continued with 196 walnut patients in the study by *Haas and Sprinak* [11, 12] in 1998.

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The incidence of renal artery injury from blunt trauma ranges between 0.05%, as reported by *Demetriades'group* in the National Trauma Data Bank [1], and 0.08% as reported by *Bruce et al.* [2].

Traditionally, patients with blunt kidney trauma undergo an intravenous urogram, but this diagnostic test has a false negative rate of 30%.[15].

Already during the last 20 years, contrast-enhanced CT has been considered the imaging modality of choice in patients with renal trauma, which has a major role in diagnosing associated injuries in patients with hemodynamic stability. However, the intravenous urogram may still have a role in the diagnosis of renal injuries with hemodynamic instability in the operating room [15].

Selective renal angiography remains the gold standard for diagnosing renal artery injury since it has the highest sensitivity and specificity. [16].

Case Report:

A 38-year-old man shows on the emergency room because of an accident with abdominal and thoracic trauma. Further, sustained blunt trauma and presented with abdominal, chest, and extremity pain. Serum chemistries analysis was within normal limits. The patient complained of pain in the right side of the abdomen. On admission, he was fully conscious, hemodynamically stable, and had no signs of respiratory distress. Physical examination revealed superficial bruises all over the body. Chest and pelvic x-rays as well as FAST were normal.

Macroscopic hematuria was not detected at the time of Foley catheter insertion, but microscopic hematuria was evident in the urine analysis. Computed tomography (CT) scan showed only the upper pole of the right kidney was perfused from a polar ramus and the other part of the kidney does not perfuse. No perinephric hemorrhage or retroperitoneal fluid was noted. No other organ injury. After consultation between the general surgeon, vascular surgeon, urologist, and interventional radiology they decided to send to treat in angiography by an interventional radiologist.

Procedure:

After the patient was informed of the procedure and signed the consent form, he was brought to the angiography room. Initially, diagnostic angiography is conducted to evidence the dissection of the right renal artery after the polar ramus superior (Fig.1). With hydrophilic guidewire in the true lumen, a stent is passed, positioned precisely, and inflated. After the inflation, a second angiography is conducted to evidence full vascularization of the renal artery and all the renal parenchyma (Fig.3 and 4). Due to the patient's age and general condition, after the placement of the stent, anticoagulant or antiplatelet therapy was not applied. On a postoperative day, the patient's serum creatinine is normal.

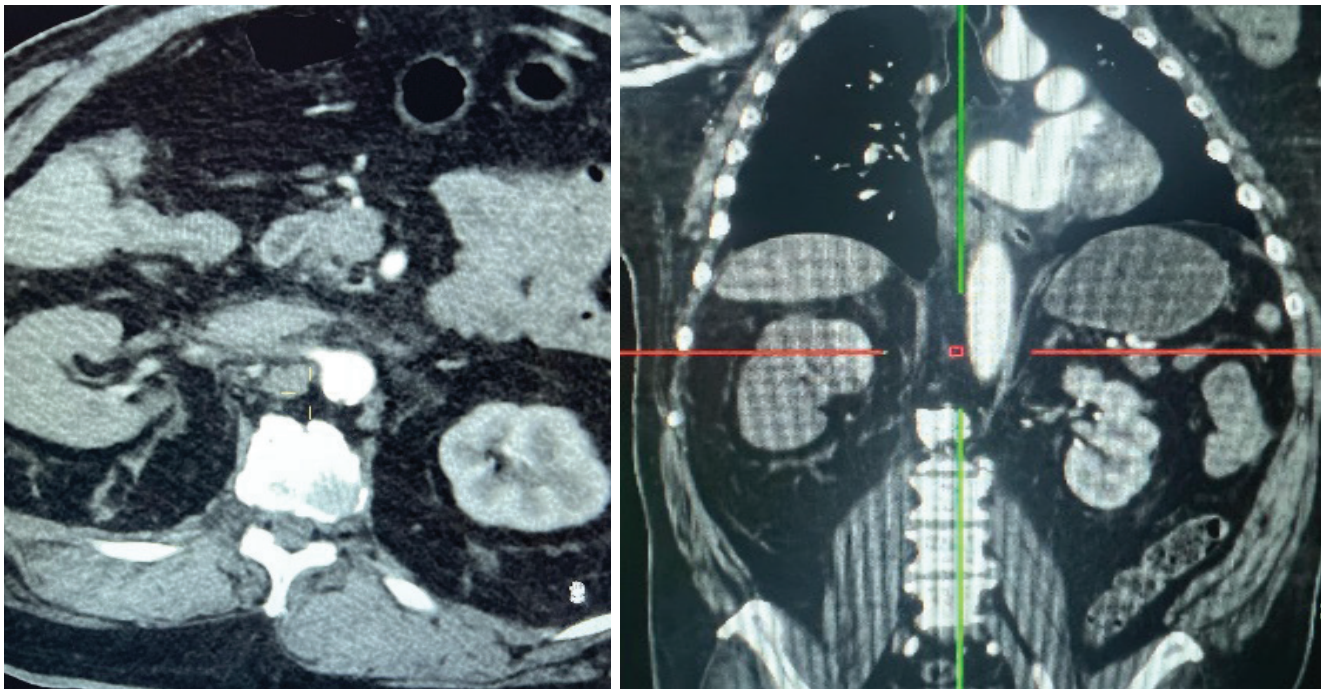


Figure 1, 2 - CT - scanner showing a perfused left kidney and perfused only upper pole of right kidney.

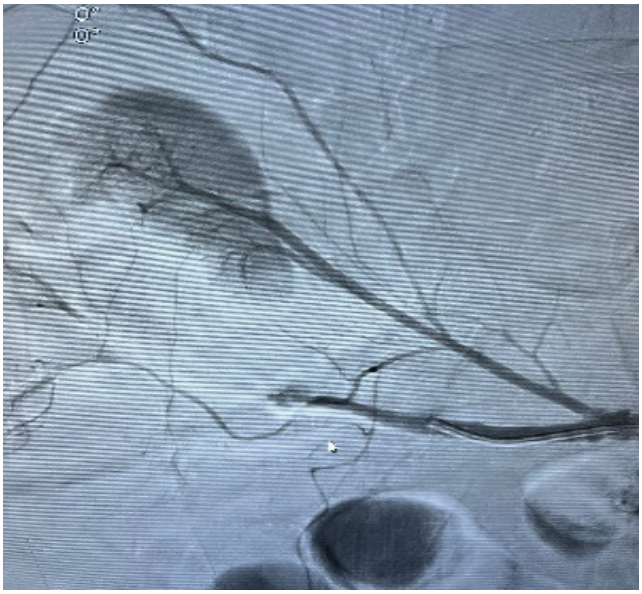


Figure 4 - Angiography of right renal artery after stent deployment showing flow.

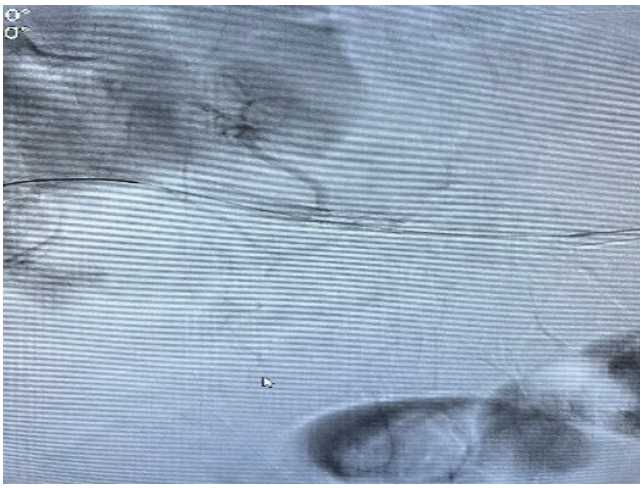


Figure 3 - Angiography of the renal arteries verifying occlusion of flow through the right renal artery.

Delayed angiography of the right renal artery after stent deployment showing normal vascular perfusion and normal parenchymal perfusion also.

During his hospital stay, the patient was normotensive and had a satisfactory urinary output with stable hemoglobin level and renal function tests.

Discussion

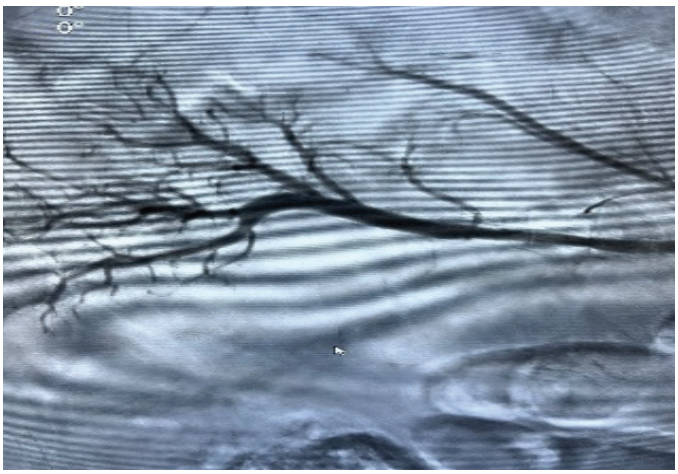
Mechanisms for blunt renal arterial injuries involve sudden acceleration-deceleration forces that cause a stretch injury to the vessel wall or direct impact with compression of the renal vessel against the vertebral column. The kidneys are fixed in place only by means of the vascular pedicle and the ureter, thus injuries usually occur at these points. [17]

Hematuria is present in the majority of cases with renal trauma; however, her presence and the amount are not related to the severity of the injury. Hematuria may be absent in up to one-third of patients who persist in renal vessel damage [17].

The CT-scanner data suggest renal artery damage can be summarized as follows: Evidence of an abnormal increase in contrast in relation to the contralateral kidney, which can be presented with an irregular hypodense linear form until the delayed expansion of the renal contour, or with reduction of the affected kidney. [18]; Lack of darkening of the pelvic-calyceal system, which refers to an ischemic area with non-excretory renal parenchyma.; "Cortical rim sign", indicating non-enhanced renal parenchyma except for the outer peripheral portion of the cortex [17]; Direct visualization of the irregularity of the renal artery, through the filling defect, extravasation of the contrast medium until the complete closure of the blood vessels.

Many patients with renal injury go on renal loss and death.[11] In traumatic renal vasculature injury, patients usually have damage to other organs as well. [13, 14,] Surgery is successful between 0% to 25% [19]

First described by Whigham and co-authors in 1995 angiographic revascularization has emerged as a promising



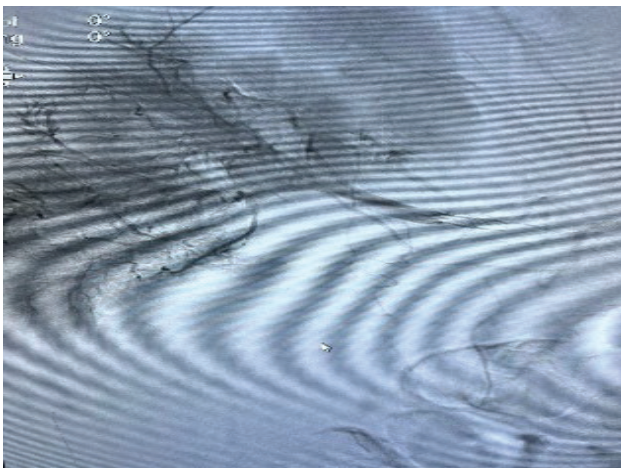


Figure 5, 6 Delayed angiographies of right renal artery after stent deployment showing normal vascular perfusion and normal parenchymal perfusion also.

additional therapeutic approach. In the last few years, growing experience and improved techniques with elective renal artery angioplasty and stenting for atherosclerotic disease and fibromuscular dysplasia have widened the application of this technique in the acute setting of trauma. [20].

The diagnosis was made in most cases using a CT scan. In three cases the diagnosis was made via angiography. In most cases, the injury caused significant renal artery flow restriction.

In a trauma center, the early angiographic approach has become the preferred treatment approach in hemodynamically stable patients with dissection of the renal artery due to blunt trauma [21].

Endovascular stenting in the setting of renal artery injury has shown promise as the result shows, this method is successful in treating this pathology.

Stent patency may be achieved without anticoagulation or antiplatelet therapy. The utilization of anticoagulation therapy in critically injured patients is currently the subject of active debate in the literature. [22, 23]

In patients with hemorrhage, the use of anticoagulation or antiplatelet therapy is counter-indicated, in patients without hemorrhaging, a dissection of renal arteria with a stent is still open to discussion.

Long-term post-procedure antiplatelet prophylaxis of late stent occlusion seems to be reasonable, but no guidelines are yet available.

In our patient, no late complications occurred and no renovascular hypertension was detected.

Conclusion:

Blunt renal artery injury is rare. Nonoperative management should be considered an acceptable therapeutic option. Management of blunt renal injuries includes timely evaluation to maximize the preservation of renal function. Recent management trends support the consideration of endoluminal intervention for traumatic renal artery dissections. Already, endovascular management for renal artery injuries in blunt trauma patients appears to be safe and feasible.

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