CASE REPORT

Journal of Indonesia Vascular Access (*INAVA*) 2024, Volume 4, Number 1: 18-20
E-ISSN : 2798-6780 ; P - ISSN : 2807-7032

Published By : IVAA
the Indonesian Vascular Access Association

Renal artery coil embolization for management of bleeding in severe renal trauma: a case report

Haris[1*], I Putu Kokohana[2]

[1]Cardiothoracic and Vascular Surgery Department, Faculty of Medicine, Universitas Indonesia, DKI Jakarta, Indonesia;
[2]Cardiothoracic and Vascular Surgery Department, RSUP Persahabatan, DKI Jakarta, Indonesia.

*Corresponding to:
Haris;
Cardiothoracic and Vascular Surgery Department, Faculty of Medicine, Universitas Indonesia, DKI Jakarta, Indonesia;
harisharis785@gmail.com

Received: 2024-01-26
Accepted: 2024-03-28
Published: 2024-05-22

ABSTRACT

Background: Among genitourinary tract injuries, renal trauma is the most often damaged organ. Renal trauma makes up between 0.3- 3.25 % of all injuries and can cause hemorrhage, damage to the collecting system which could result in urine leakage, or injury to the renal parenchyma or renal vasculature. Clinical stage affects the type of treatment chosen for renal trauma. Grading of renal injury and guiding for treatment and intervention are possible using the AAST grading system. The grades assigned based on renal trauma imaging and clinical features have an impact on the prognosis and treatment plan for the patients. This study aimed to present a renal artery coil embolization in severe renal trauma management.

Case presentation: In this report, we describe a 30-year-old man who had a history of a traffic injury an hour prior, along with extensive hematuria and stomach pain. AAST grade V severe renal damage and a sizable hematoma were shown by an abdominal CT scan.To stop the renal bleeding, the patient received endovascular embolization treatment. Four days following the intervention, the patient was released from the hospital without showing any signs of kidney hemorrhage.

Conclusion: The minimally invasive technique of endovascular angiography and embolization has demonstrated promising clinical outcomes. This technique can be used to stop bleeding in patients with hemodynamically stable renal injuries and can avoid surgery or nephrectomy in some circumstances.

Keywords: renal trauma, renal bleeding, endovascular intervention, embolization.
Cite This Article: Haris., Kokohana, I.P. 2024. Renal artery coil embolization for management of bleeding in severe renal trauma: a case report. *Journal of Indonesia Vascular Access* 4(1): 18-20. DOI : 10.51559/jinava.v4i1.48

INTRODUCTION

Despite being located in a retroperitoneal location, the kidney is the genitourinary system organ that sustains damage the most frequently following trauma. Although renal trauma can occur alone, concurrent injuries occur in 80–95% patients. Renal trauma can result in bleeding, injury to the renal parenchyma or renal vasculature, or harm to the collecting system, potentially causing urine leakage. Kidney injuries account for the majority of genitourinary tract injuries (10% of all traumas), which are generally infrequent.[1] Between 0.3- 3.25 % of trauma patients have renal trauma, and blunt trauma is the most frequent cause of renal damage, with around 71–95% of renal trauma are resulted from blunt trauma. Damage to the renal parenchyma or renal vasculature, as well as injury to the collecting system that may result in urine leakage, can all result from renal trauma. Though they account for 10% of all traumas, genitourinary system injuries are generally rare, with the kidney being the most often injured organ.[2]

For individuals who may have suffered renal damage, contrast-enhanced computed tomography (CT) with both immediate and delayed imaging is the recommended modality. The multiple imaging phases offer a more accurate assessment of the renal cortex, renal arteries, and collecting system because they increase at different periods and differentiate between active bleeding and urine extravasation. While a CT scan reveals damage findings and severity that would be observed following surgery, an imaging blush would corroborate ongoing extravasation. The renal arteries can also be examined thanks to the contrast. For most trauma patients, the first imaging procedure that is administered is often a focused assessment with sonography for trauma (FAST) exam, which is conducted in the trauma bay.[3] The American Association for the Surgery of Trauma (AAST) renal damage grading might assist in managing patients according to their needs. It is possible to detect AAST grade I and II injuries, which often self-limitted without any lasting effects. Patients who have a blood vessel damage on a CT scan run the risk of not receiving effective non-operative treatment because of active contrast extravasation from the injured blood vessel. Even if the AAST grade is moderate, patients with vascular contrast extravasation on imaging should seriously consider endovascular embolization. Patients who are hemodynamically stable and have grade III and IV arterial damage should be treated with selective embolization. Vascular avulsion requires surgery, with the possibility of revascularizing the afflicted area if any viable tissue may still be preserved.[4] This study aimed to present a case of severe renal trauma with renal artery coil embolization as the management for the bleeding.

CASE PRESENTATION

A 30 year old male, was admitted to the emergency department with chief complain of severe abdominal pain. The

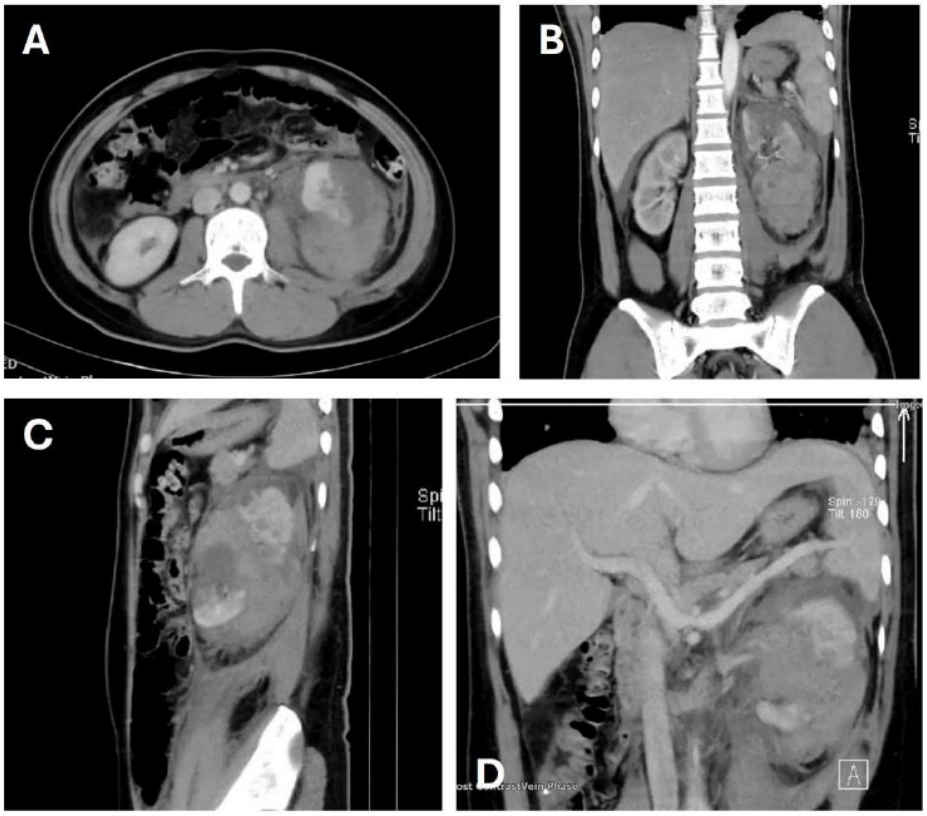

Figure 1. Post Contrast Abdominal CT scan showing shattered kidney and hematome (A-D).

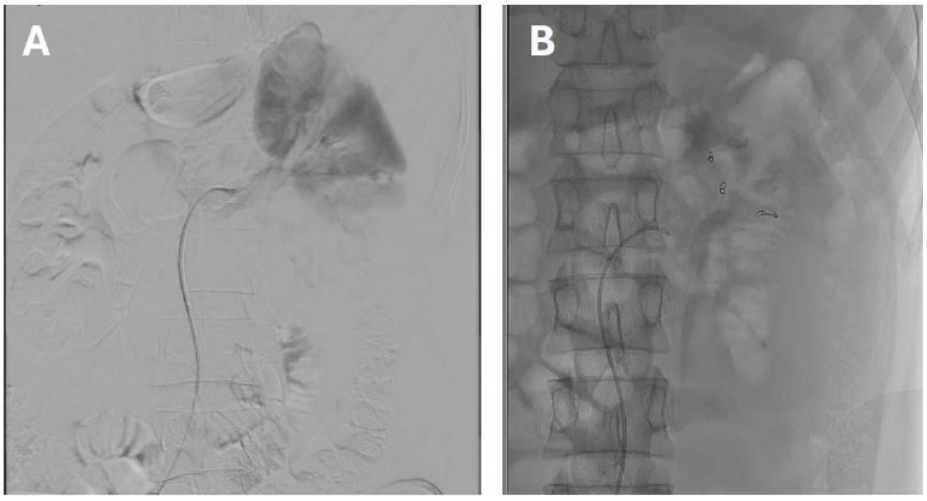

Figure 2. Angiography of pre (A) and post (B) coil embolization of left renal arteries.

patient has a history of traffic injury one hour prior to admission. The patient was riding a motorcycle with a helmet, grazed by a car from the left. The patient bounced, his left stomach hit the street post. The patient complained of pain in the left abdomen, with nausea. The patient feels abdominal pain when moving, with VAS score 2-3 especially when the patient coughs. The patient had no fever. The patients had no history of renal disease or bleeding disorder before. The patient was hospitalized and had serial hemoglobin (Hb) check, and from urine bag showed gross hematuria. During the hospilatization period before the intervention, the patient is hemodinamically stable. From abdominal CT, a shattered left kidney is seen (Figure 1). There is a prominent hematoma and fats stranding involving the retroperitoneum, part of the peritoneum, and the periureter as well as edema of the left psoas major muscle. A filling defect is seen in the left proximal ureter. Then the patient is admitted for further observation, and given antibiotics and analgetic. From serial examination of complete blood count, the patient's Hb was drop to 9.6 g/dL from 14.5 in two days since hospitalization.

It was decided to do the embolization to stop the bleeding. The patient was put in a supine position on the operating table with sedation anesthesia. Local anesthetic lidocaine was applied to the right femoral area, then we proceed with femoral puncture using introducer sheath 6 Fr. Then we proceed with a Bern 5 Fr catheter with 260 cm hydrophilic wire, then replace the Cobra 5 Fr catheter. After that we perform arteriography with DSA on a. left renalis. Renegade STC 18 microcatheter inserted 130x20 cm with V-19 wire 0.018 x 300 cm. Then, three coils of Vortx 18.3 mm x 3.3 mm, were inserted with coil pusher to two anterior segments and one posterior segement arteries. An arteriography of left renal arteries after embolisazation was performed to evaluate, from evaluation it was shown that the active bleeding appears reduced (Figure 2). Post procedure serial Hb examination shows a constant Hb value, ranging from 12.2 at the post intervention day one and 12.3 at the post intervention day three. This results, along with clear urine at post intervention day three in urine bag, indicating that the kidney bleeding has been stopped. Then, the patient was discharged four days after the embolization.

DISCUSSION

Absolute indications for renal intervention include grade V vascular injury, an increasing or pulsatile perirenal hematoma identified after a laparotomy performed for related injuries, hemodialysmic instability and an inability to react to rigorous resuscitation due to renal hemorrhage.[5] Widespread renal pelvic lacerations, ureteropelvic junction (UPJ) avulsion, concurrent pancreatic or intestinal injuries, chronic urine leakage, post-injury urinoma, or perinephric abscess with unsatisfactory percutaneous or endoscopic therapy are among the relative requirements for renal intervention. Other indications include renal vascular damage

after unsuccessful angiographic treatment, devitalized parenchymal segment with concurrent urine leak, and complete renal artery thrombosis of both kidneys or one kidney.[6] One prominent effect of severe renal injury is active bleeding, which guides the early treatment for the damage. Although it can sometimes occur with lower-grade injuries (II and III), active bleeding is more commonly seen with high-grade (IV and V) injuries. A pseudoaneurysm or arteriovenous malformation (AVM) is often the source of delayed bleeding, which manifests two to three weeks following the initial injury.[7] Higher grade injuries and penetrating trauma are more likely to result in AVMs and pseudoaneurysms, which are sequelae. Urine extravasation can be found in roughly 7% of patients with renal injury, but active bleeding is a considerably more serious consequence that requires prompt care.[8]

Our patient, was present with high grade renal injury AAST stage V and active bleeding. We proceed with renal artery embolization using coil inserted to proximal renal artery branches. Four days following the admission, the patient was released from the hospital with no evidence of ongoing bleeding, indicating the success of our surgery. When a kidney is broken without a renal hilum avulsion, proximal embolization of the primary renal artery can be used as a non-surgical substitute for nephrectomy therapy. When a patient has a full vascular pedicle avulsion, surgery should be the preferred course of treatment rather than embolization. The most common tools utilized in embolization operations are gelfoam and/or coils.[9,10] When arterial injury is identified by angiography and technically successful embolization is performed, the reported success rates of non-operative therapy range from 63 to 100%; the majority of clinical failure that occurs after embolization is associated with AAST grade V renal injury.[11] Re-embolization increased the clinical success rate in one trial from a low initial rate of success (63%), to a high rate of 95%.[12] The results of that study were significantly different from those of other trials, which showed first clinical success rates of non-operative therapy of 94.4 to 100% for stable patients with AAST grade IV and V renal impairment when triaged to embolization.[13]

CONCLUSION

A blunt abdominal trauma can cause severe renal injury (AAST grade IV-V), which will likely results in active renal bleeding. Selective embolization is a safe and very effective treatment for hemodynamically stable patients with severe renal damage when no other surgical options are available. However, it's crucial to remember that life-threatening renal hemorrhage still calls for surgical investigation in hemodynamically unstable patients.

PATIENT'S INFORMED CONSENT

The patient has signed a written informed consent and agreed to this study publication.

FUNDING

None.

AUTHOR CONTRIBUTION

All author contributes equally to every step of manuscript preparation until publication.

CONFLICT OF INTEREST

All author declares that there is no conflict of interest regarding this study publication.

REFERENCE

1. Baghdanian AH, Baghdanian AA, Armetta A, Babayan RK, LeBedis CA, Soto JA, Anderson SW. Utility of MDCT findings in predicting patient management outcomes in renal trauma. Emerg Radiol. 2017.(3):263-272.
2. Ząbkowski T, Skiba R, Saracyn M, Zieliński H. Analysis of Renal Trauma in Adult Patients: A 6-Year Own Experiences of Trauma Center. Urol J. 2015.(4):2276-9.
3. McPhee M, Arumainayagam N, Clark M, Burfitt N, DasGupta R. Renal injury management in an urban trauma centre and implications for urological training. Ann R Coll Surg Engl. 2015. (3):194-7.
4. Heller MT, Schnor N. MDCT of renal trauma: correlation to AAST organ injury scale. Clin Imaging. 2014. (4):410-417
5. Morey AF, Brandes S, Dugi DD, 3rd, et al. Urotrauma: AUA guideline. J Urol 2014; 192: 327–335.
6. Santucci RA, Wessells H, Bartsch G, et al. Evaluation and management of renal injuries: consensus statement of the renal trauma subcommittee. BJU Int 2004; 93: 937–954
7. Starnes M, Demetriades D, Hadjizacharia P, Inaba K, Best C, Chan L. Complications following renal trauma. Arch Surg. 2010 Apr;145(4):377-81; discussion 381-2
8. Morey AF, Brandes S, Dugi DD, Armstrong JH, Breyer BN, Broghammer JA, Erickson BA, Holzbeierlein J, Hudak SJ, Pruitt JH, Reston JT, Santucci RA, Smith TG, Wessells H., American Urological Assocation. Urotrauma: AUA guideline. J Urol. 2014 Aug;192(2):327-35.
9. Lanchon C, Fiard G, Arnoux V, et al. High Grade Blunt Renal Trauma: Predictors of Surgery and Long-Term Outcomes of Conservative Management. A Prospective Single Center Study. J Urol 2016;195:106-11
10. Hotaling JM, Sorensen MD, Smith TG, et al. Analysis of Diagnostic Angiography and Angioembolization in the Acute Management of Renal Trauma Using a National Data Set. J Urol 2011;185:1316-20.
11. Huber J, Pahernik S, Hallscheidt P, et al. Selective Transarterial Embolization for Posttraumatic Renal Hemorrhage: A Second Try is Worthwhile. J Urol 2011;185:1751-5.
12. 34. Sugihara T, Yasunaga H, Horiguchi H, et al. Management trends, angioembolization performance and multiorgan injury indicators of renal trauma from Japanese administrative claims database. Int J Urol 2012;19:559-63.
13. Aragona F, Pepe P, Patanè D, et al. Management of severe blunt renal trauma in adult patients: a 10-year retrospective review from an emergency hospital. BJU Int 2012;110:744-8.

This work is licensed under a Creative Commons Attribution