

Renal Artery Occlusion Due to Aortic Dissection Caused by Blunt Trauma

Hakan Parlar, MD, Orhan Findik, MD, Cagri Duzyol, MD, Ozgur Baris, Atike Tekeli Kunt, Ass. PhD., MD

Department of Cardiovascular Surgery, Derince Training and Research Hospital, Kocaeli, Turkey

ABSTRACT

In this report, our aim is to present a case of renal artery occlusion due to type-3 acute aortic dissection following blunt trauma. A twenty-four-year-old male patient was admitted to the emergency department of our hospital with pain in his abdomen and on his back 3 hours after a blunt abdominal trauma due to an industrial injury. After consultation with the urology department, the patient was taken to operation to be evaluated for an intervention for aortic dissection and nephrectomy.

INTRODUCTION

Trauma, in the form of blunt or penetrating, is the most common cause of death in young adults. It should always be kept in mind and eliminated that the aorta and its branches might have been affected by blunt trauma. Aortic dissections are defined in much of the literature as injuries after blunt trauma. However, reported renal artery injuries are extremely rare among these types of trauma. Aortic dissections due to blunt trauma and their clinical consequences are clinical aspects that require emergent surgery. There is not yet a common consensus on a final algorithm for the therapy to be applied for renal artery injuries following trauma.

In this report, our aim is to present a case of renal artery occlusion due to type-3 acute aortic dissection following blunt trauma.

CASE REPORT

A twenty-four-year-old male patient was admitted to the emergency department of our hospital with pain in his abdomen and on his back 3 hours after a blunt abdominal trauma due to an industrial injury. His physical examination showed abdominal hypersensitivity, loss of lower extremity pulses, and intestinal sounds. With the suspicion of an aortic dissection, thoracoabdominal computerized tomography (CT) with intravenous contrast was taken. The dissection flap was detected in the abdominal aorta including left renal artery distal to the superior mesenteric artery branching, in which the left renal artery remained in the false lumen (Figure 1). There was collection in the retroperitoneal cavity suggesting

hematoma. For the patient, whose urinary output was sufficient, the right renal artery was found intact and the right kidney was functional, however the left kidney was ischemic and edematous (Figure 2). Following common consultation with the urology department, the patient was taken to operation to be evaluated for an intervention for aortic dissection and nephrectomy.

Surgical Method

Median laparotomy was made. There was neither any intraperitoneal injury nor intestinal ischemia. The retroperitoneal cavity was opened and the abdominal aorta was



Figure 1. Aortic dissection and left renal artery occlusion. The arrow shows the dissection flap and the star shows the non-functioning kidney.

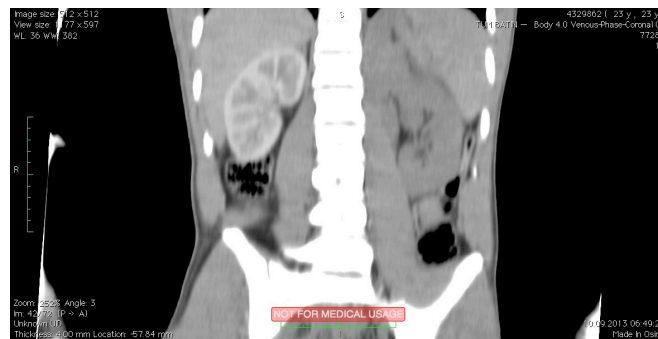


Figure 2. Functional right kidney and non-functional and edematous left kidney.

Received September 18, 2015; accepted November 8, 2015.

Correspondence: Hakan Parlar, MD, Derince Training and Research Hospital, Department of Cardiovascular Surgery, 41900, Kocaeli, Turkey; +90-533-718-3693 (parlar.hakan@yahoo.com).

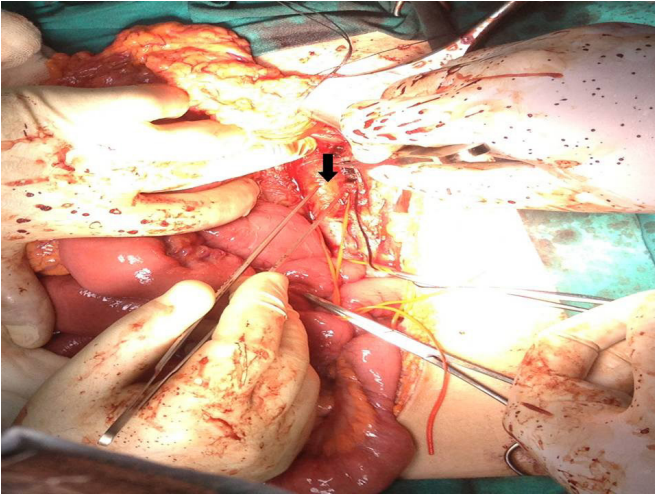


Figure 3. The arrow shows the reentry site of the aortic dissection flap.

explored to the level of the renal artery branches. Reentry of the dissection flap was detected approximately 3 cm proximal to the inferior mesenteric artery branching (Figure 3). The left renal artery was also dissected with laceration in its proximal portion 2 cm long, which showed active bleeding. It was decided that the left renal artery was impossible to repair; it was suture ligated at the injury site. Distal run-off of the abdominal aorta was found well with pulse on both common iliac arteries (CIA), therefore no further surgical repair was needed. Following left nephrectomy, control for bleeding was established. Laparotomy was closed and the patient was transferred to the intensive care unit in stable condition.

DISCUSSION

In young adult patients, trauma is the single most common cause of death, and injury to the kidney from blunt or penetrating trauma is the most common urinary tract injury. Various large studies report the overall incidence of renal artery injuries as 0.05% [Sangthong 2006], 0.08% [Bruce 2001], and 0.1% [Jawas 2008]. Although the cases defined in the scanned literature were consistent with isolated renal artery injuries due to blunt trauma, renal artery injury occurred secondary to type-3 acute aortic dissection in our patient. Contrast-enhanced CT scanning is the modality of choice for diagnosis and follow-up after treatment of blunt traumatic renal artery occlusion [Jawas 2008; Kawashima 2000]. Findings of the CT scan suggestive of renal arterial thrombosis include an absence of both renal parenchymal enhancement and contrast

excretion in the affected kidney. Also, a thin rim of contrast enhancement, often described as the rim sign, may be noted [Kawashima 2000]. In our case, the CT scan showed a dissection flap including the left renal artery with complete malperfusion of the left kidney, which was extremely edematous.

Anecdotal case reports suggest that severe time constraints influence successful revascularization of the occluded renal artery. Classically, it is thought that the kidney tolerates warm ischemia for only 1 hour [Bruce 2001; Jawas 2008]. Successful revascularization has been reported within 24 hours and even 7 days post-injury, suggesting that, under rare and poorly understood circumstances, the kidney withstands longer periods of ischemia than generally believed. This occasional survival might be a result of incomplete occlusion of the renal artery or flow from collateral circulation [Vidal 2011]. The optimal treatment for this entity is not well established and has been controversial. The rarity of the condition, delayed diagnosis, presence of other associated life-threatening injuries or condition, and the disappointing long-term results of revascularization procedures are usually responsible for the lack of optimal treatment [Garge 2013]. Management options include observation only, thrombolytic therapy, nephrectomy, surgical intervention, and more recently, percutaneous transluminal angioplasty with or without stenting [Chabrot 2010]. In our case, existence of a type-3 aortic dissection together with renal artery injury and inability to salvage the left kidney made surgical intervention suitable.

REFERENCES

- Bruce LM, Croce MA, Santaniello JM, et al. 2001. Blunt renal artery injury: incidence, diagnosis, and management. *Am Surg* 67:550-6.
- Chabrot P, Cassagnes L, Alfidja A, et al. 2010. Revascularization of traumatic renal artery dissection by endoluminal stenting: three cases. *Acta Radiol* 51:21-6.
- Garge S, Kanojia R, Rao K. 2013. Traumatic renal occlusion in the pediatric age group: a case and review of the literature. *TJTES* 19:366-70.
- Jawas A, Abu-Zidan FM. 2008. Management algorithm for complete blunt renal artery occlusion in multiple trauma patients: case series. *Int J Surg* 6:317-22.
- Kawashima A, Sandler CM, Ernst RD, et al. 2000. CT evaluation of renovascular disease. *Radiographics* 20:1321-40.
- Sangthong B, Demetriades D, Martin M, et al. 2006. Management and hospital outcomes of blunt renal artery injuries: analysis of 517 patients from the National Trauma Data Bank. *J Am Coll Surg* 203:612-7.
- Vidal E, Marrone G, Gasparini D, et al. 2011. Radiological treatment of renal artery occlusion after blunt trauma in a pediatric patient: is it never too late? *Urology* 77:1220-2.