Blunt renal artery trauma: A therapeutic dilemma

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ABSTRACT

Blunt abdominal trauma with consequent renal artery dissection is a rare complication. Treatment is chosen on the patient's hemodynamic status, renal function and vascularization. We present two cases of renal dissection after blunt abdominal trauma: first one treated with conservative management, and the other one with urgent endovascular stenting.

Keywords: Angiography; imaging; intervention; renal artery disease, stent.

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Introduction

Renal artery trauma leading to dissection is a rare complication of blunt abdominal trauma.[1,2] The dissection is due to a sudden acceleration-deceleration or direct compression of the renal artery against the vertebral column with consequent arterial wall injury.[1,3] Treatment is chosen on the patient's hemodynamic status, renal function and vascularization. Some patients are candidates for conservative treatment while others need urgent endovascular or surgical intervention.[1-4]

We report two cases of renal dissection after blunt abdominal trauma: the first one treated with conservative management, and the other one with urgent endovascular stenting.

Case presentations

Case 1

A 29-year-old male was admitted to our emergency department because of a motor vehicle accident. On admission the patient was hemodynamically stable and he only complained of left abdominal pain. Contrast-enhanced phase multi-detector computed tomography (MDCT) demonstrated a grade IV spleen laceration and left renal artery filling defect with flow cut-off and no enhancement in the left kidney (Figure 1a, b). The patient signed informed consent and underwent urgent splenectomy. Surgeons noted normal pulsatility of left renal artery with perfusion of the left kidney. The kidney was not surgically manipulated. During his hospitalization the patient underwent renal artery duplex ultrasound, MDCT and digital subtraction angiography (DSA) that demonstrated focal dissection of the left renal artery with normal enhancement of the left kidney (Figure 1c-e). The patient was discharged on day 9 with normal kidney function (creatinine 1.12 mg/dL), and blood pressure, and he received antiplatelet treatment for 30 days. During follow-up procedures performed at 6 months using clinical observation and duplex sonography any complications were not detected with unrestricted free blood flow into the left renal artery and the left kidney.

Case 2

A 23-year-old man was admitted to our emergency department because of a motor vehicle accident. On admission the patient was hemodynamically stable and he complained of abdominal pain. Subsequent contrast-enhanced phase MDCT showed a grade IV-V spleen laceration and left renal arterial irregularity together with reduced heterogenous parenchymal enhancement of the left kidney (Figure 2a, b). After signing informed consent, patient underwent urgent splenectomy and in the same session selective DSA of the left renal artery that confirmed left renal arterial irregularity due to a circular intimal laceration (Figure 2c). Two stents 5x19 mm (Ex-

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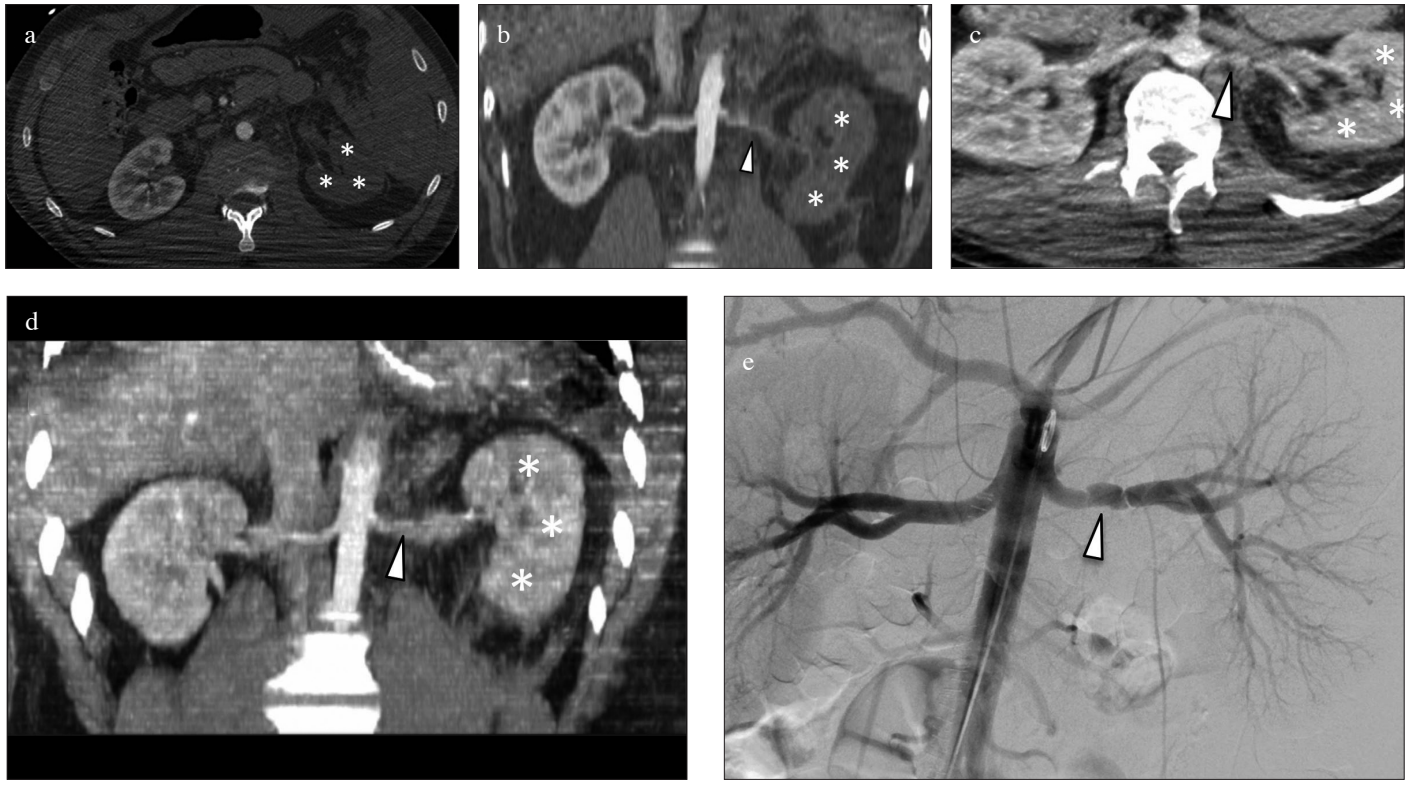

Figure 1. a-e. (a) Contrast-enhanced phase multi-detector computed tomograms of axial (*) and (b) coronal reconstructions demonstrating left renal artery filling defect (arrowhead) without any contrast enhancement of the left kidney (*). (c) Contrast-enhanced phase multi-detector computed tomogram of axial and (d) coronal reconstruction obtained at postprocedural 24-hours demonstrating a focal lesion of the left renal artery (arrowhead) with normal enhancement of the left kidney (*). (e) Digital subtraction angiography confirms focal dissection of the left renal artery (arrowhead) with normal vascularization of the left kidney, and a minimum delay in arterial blood flow compared to the contralateral kidney

press, Boston Scientific, Natik, MA, USA) were deployed into the damaged segment of the left renal artery with resolution of the left renal artery dissection (Figure 2d). Life-long mono-antiplatelet treatment (aspirin 100 mg/d) was started. During his hospitalization (11 days) the patient was normotensive with increased creatinine level from 0.89 mg/dL to 1.37 mg/dL. Follow-up procedures performed at 28 months, including clinical observation, assessment and duplex sonography demonstrated normal blood pressure, regular unrestricted blood flow into the left renal artery stents, partial vascularization of the diminished left kidney (Figure 2e, f).

Discussion

Blunt renal artery trauma is a very rare entity with incidence rates varying between 0.05% and 0.08%.[5] Left renal artery is shorter and has a more acute angle than the right one. This anatomical characteristic leads left renal artery to be more subjected to stretch injuries.[6] Young patients are more vulnerable than older ones to blunt renal artery trauma due to relative lack of surrounding fat tissue and larger kidney.[6] Management of renal artery dissection remains controversial and no guidelines are yet available.[1-4] Primary objectives of treatment in renal artery dissection are to preserve or re-establish blood flow as early as possible[1,3,4], to limit the extension of the dissection and to prevent possible renal artery rupture. Based on data retrieved from literature, revascularization is possible at most 24 hours after traumatic renal artery injuries.[7]

Before deciding the best treatment modality for each case, an accurate preoperative clinical and imaging examination is mandatory to evaluate the anatomical and pathologic status of the renal artery and affected the kidney.[8]

When renal function is normal and integrity of kidney vascularization is ensured, then only medical treatment can be generally sufficient. When renal function is not normal and there is an alteration in renal perfusion, endovascular or surgical revascularization is required to achieve preservation of renal function. Based on the last recommendations, endovascular approach has become the first-line therapeutic approach in the management of renal artery injuries.[9]
In conclusion, blunt abdominal trauma with consequent renal

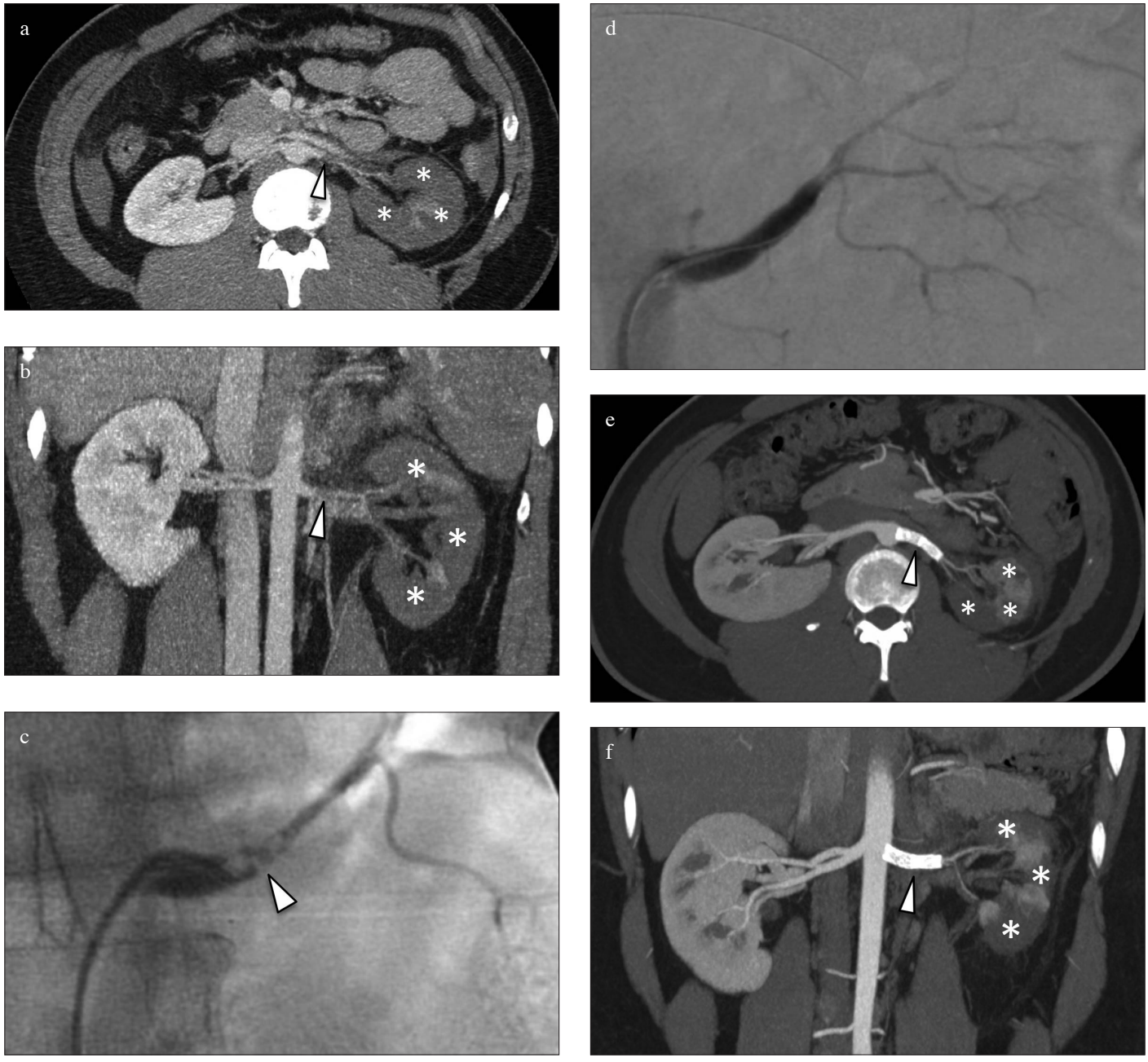

Figure 2. a-f. (a) Contrast-enhanced phase multi-detector computed tomograms of axial and (b) coronal reconstructions demonstrating left renal artery filling defect (arrowhead) and heterogenous parenchymal enhancement into the left kidney (*). (c) Selective digital subtraction angiogram of the left renal artery demonstrating left renal arterial circular dissection (arrowhead) with reduced flow into the left kidney. (d) Selective digital subtraction angiogram of the left renal artery after deployment of the stents that demonstrates absence of intraluminal defects, normal flow into the stents, and substantially unchanged arterial blood flow into the left kidney. (e) Contrast-enhanced phase multi-detector computed tomograms of axial and (f) coronal reconstructions obtained at postprocedural 12 months demonstrating regular, unrestricted blood flow into the left renal artery stents (arrowhead) and partial vascularization of the diminished left kidney (*)

artery dissection is a rare event. An appropriate preoperative clinical and imaging examination is mandatory, before multidisciplinary decision concerning the best treatment modality can be established for each case.

Informed Consent: Written informed consent was obtained from patients who participated in this case.

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