Case 534

Eurorad

Renal artery stenting for PTA-induced dissection

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Section: Interventional radiology
Imaging Technique: Digital radiography
Case Type: Clinical Cases
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Patient: 75 years, male

Clinical History:

Angioplasty-induced renal artery dissection of left renal artery
Imaging Findings:

The patient was admitted for renal artery angioplasty. He was suffering from reduced renal function and elevated blood pressure. Angiography revealed a high-grade stenosis of his left renal artery. Selective angiography was performed by use of a Sidewinder 1 catheter which appeared advantageous because entrance into the stenosis was at the lower aspect of the artery (Fig. 1 a). To enter into the stenosis, a 0.035 in hydrophilic guidewire was carefully passed over the stenosis. Once the guidewire was gently advanced into the poststenotic segment of the renal artery the catheter was advanced by pulling it. Then the guidewire was removed and after angiographic control of the safe location of the catheter in the renal artery, a conventional 200 cm guidewire was introduced. Again, control angiography via a 6 F guiding catheter in a renal configuration was performed proving a safe position of the guidewire within the renal artery with no signs of dissection at the level of the stenosis. Balloon angioplasty was performed by use of 6 mm x 2 cm large balloon catheter inserted over a conventional 200 cm long guidewire that was exchanged over the Sidewinder catheter after the stenosis was overcome by a hydrophilic guidewire. During angioplasty the patient reported a sharp pain in his left flank but balloon inflation was kept for 60 seconds. After the balloon was deflated, a 6 F guiding catheter was introduced over the guidewire and selective angiography was performed while keeping the guidewire in place. Angiography revealed a deep dissection of the proximal left renal artery and flow into the renal artery was slowed (Fig. 1 b).
Discussion:

It was decided to treat this dissection by percutaneous stent implantation to prevent renal artery thrombosis. The 7 F vascular sheath was exchanged for a 7 F long kink-resistant renal artery sheath (Arrow Inc.) whose end was placed into the left renal artery across the stenosis (Fig. 2 a). Then, a 16 mm long balloon-expandable stent crimped onto a 6 mm balloon (AVE-Medtronic Inc.) was inserted through the sheath until the desired position of the stent was reached. After that, the distal end of the sheath was retrieved over the stent (Fig. 2 b) and an angiographic control of the stent position was performed (Fig. 2 c). Then the balloon was inflated until the stent was completely open (Fig. 2 d). Control angiography showed a widely patent renal artery; the proximal stent portion was additionally dilated by use of a 7 mm balloon (Fig. 2 e). The most risky step in renal angioplasty is passage of the stenosis. If the tip of the guidewire enters into a subintimal channel, this may create a worst case scenario because this may cause complete occlusion of the renal artery with no protecting wire over the stenosis. Surgery may become mandatory. The same could happen, if a forceful injection is used during selective angiography which can also create antegrade dissection of the renal artery. Many authors recommend use of 0.014 or 0.18 in floppy tip guidewires to cross a stenosis to minimize the risk of traumatization. We regularly pass a stenosis by use of 0.035 in guidewires. It is true, that with hydrophilic guidewires, risk of dissection may be increased. However, we therefore slightly retrieve the catheter tip when the guidewire is advanced to avoid a wedge position of the wire tip. In addition, the guidewire is constantly twisted while being advanced. Free movement of the wire end proves intraluminal position of the wire. With that technique, passage is usually safe. Renal artery stenting is recommended for severe complications of renal angioplasty and ostial lesions. While stenting in severe dissection is a necessary tool to prevent an otherwise major failure, definition when a dissection requires stenting is somewhat difficult. We prefer stenting only if flow is visibly deteriorated. In ostial lesions caused by an aortic plaque, stenting dramatically improves the technical outcome which is otherwise bad for PTA alone. Some authors, however, define ostial lesions as all lesions within the first cm distal to the ostium which means that many lesions would be primary candidate for stenting. This question is still under discussion. For renal stenting, short balloon-expandable stents are preferred because exact placement is facilitated. Safe passage of a stent to the renal artery or across the lesion can be, however, difficult and angiography to determine exact placement of the device is mandatory. There are three techniques of stent placement. The first technique includes a bilateral arterial access with one flush catheter in the aorta allowing angiography during placement. The second access serves for introduction of the stent mounted on the balloon with no protection all the way up into the renal artery. There is some risk of loosing the stent. The second technique is a single access technique where the stent mounted on a balloon catheter is inserted into an 8 or 9 F guiding catheter. Both together are introduced through an appropriate sheath and advanced to the renal artery. Once the stent is in place, the guiding catheter is slightly retrieved and the stent is deployed. Angiography can be performed via the guiding catheter. Disadvantage is a relatively large introductory diameter. The third technique is the technique described for that case. Maximum access diameter is 7 F.

Differential Diagnosis List: Stent placement into a dissected renal artery

Final Diagnosis: Stent placement into a dissected renal artery

References:

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Figure 1

a

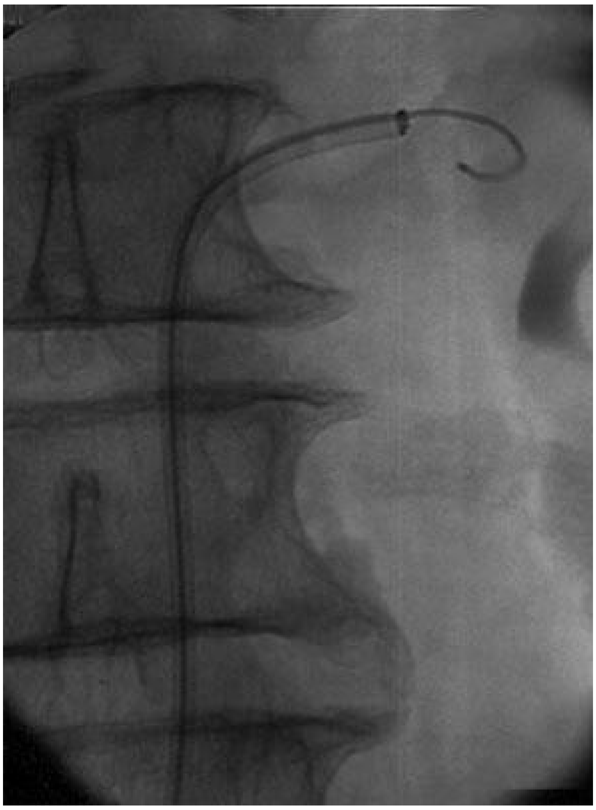
Description: Selective angiography of left renal artery reveals high-grade stenosis **Origin:**

b

Description: After PTA, severe dissection of the renal artery at the level of dilation is detected **Origin:**

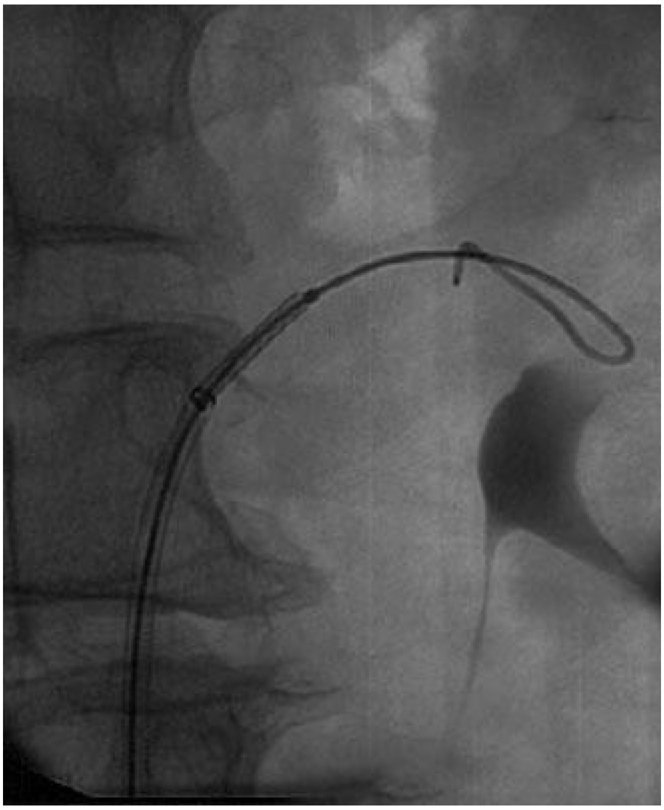
Figure 2

a



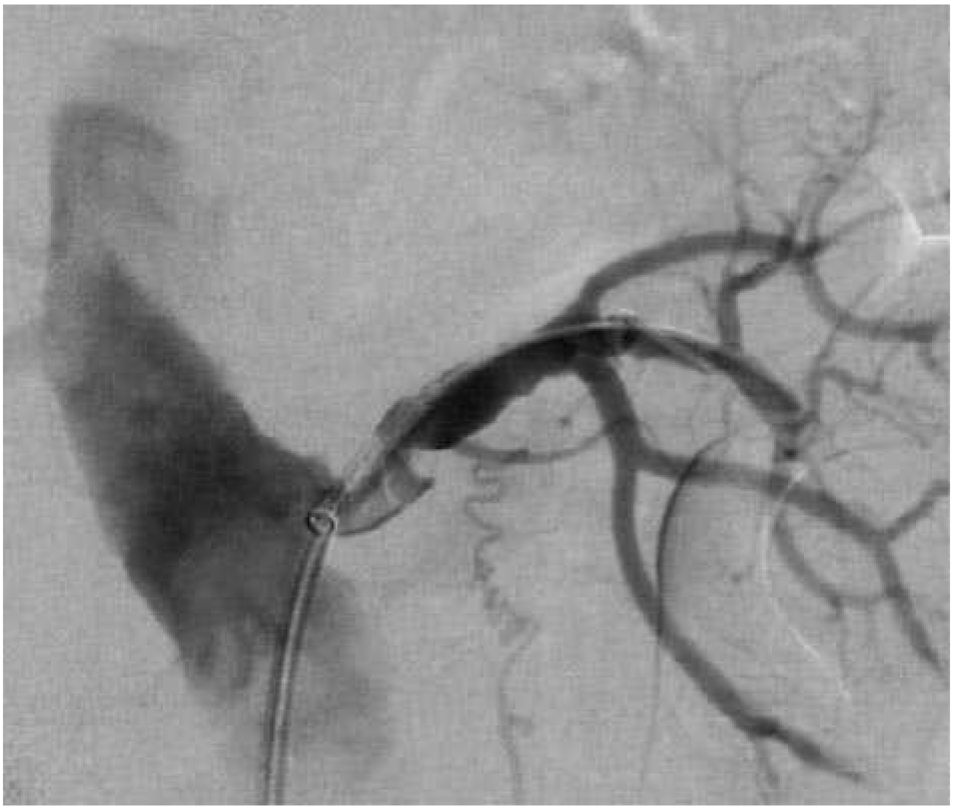
Description: A 7 F long kink-resistant renal sheath has been introduced into the left renal artery across the lesion. **Origin:**

b



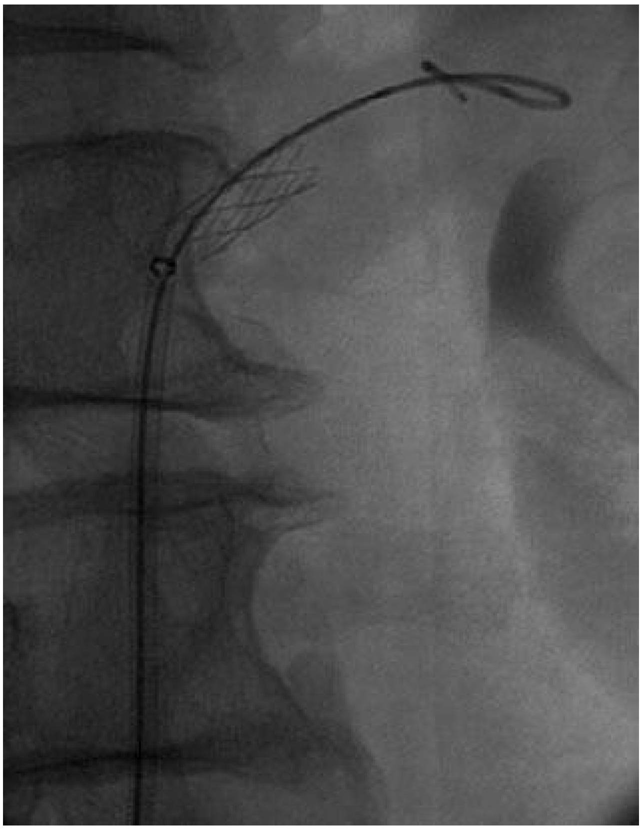
Description: A renal stent has been advanced through the sheath into the lesion. The sheath has been slightly retrieved in order to check the stent position **Origin:**

c



Description: Angiography through the sheath indicates correct position of the nondeployed stent in the lesion **Origin:**

d



Description: After inflation of the underlying balloon, the stent is opened by balloon dilation **Origin:**

e

Description: Control angiography reveals full opening of the stent and sealing of the dissection **Origin:**