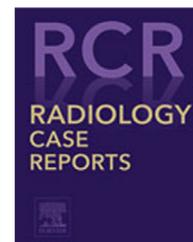


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Case Report

Triaxial system in stent-graft placement for traumatic renal artery dissection: A case report [☆]

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ABSTRACT

Stent-graft placement is an important treatment for traumatic renal artery dissection, but it may occasionally be technically difficult to advance a catheter through the lesion of the dissection due to severe stenosis of the true lumen. A triple-coaxial (triaxial) system, which consists of a small microcatheter, a large microcatheter, and a 4-Fr. catheter, has recently become available, and it contributes to super-selective catheterization. We thought this system may be useful for passing catheters through the dissection. We herein report a 30-year-old male patient with traumatic renal artery dissection, who was successfully treated by stent-graft placement using the triaxial system.

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Introduction

Renal artery dissection can occur due to blunt abdominal trauma [1,2], and may be a crucial condition because it can induce acute renal failure. Therefore, emergent treatment should be necessary. Endovascular management including stent or stent-graft placement has been considered an important treatment option for visceral artery dissection [3,4]. However, in stent or stent-graft placement, it may occasionally be technically difficult to advance a catheter through the lesion

of the dissection due to severe stenosis of the true lumen. On the other hand, a triple-coaxial (triaxial) system, which consists of a small microcatheter, a large microcatheter, and a 4-Fr. catheter, has recently become available [5–7]. It is useful for super-selective catheterization because it has been shown to prevent the kick-back of small microcatheters by providing good support from the large microcatheter (Fig. 1). We herein report a patient with traumatic renal artery dissection, who was successfully treated by stent-graft placement using the triaxial system.

[☆] Competing interest: The authors declare that they have no conflict of interest.

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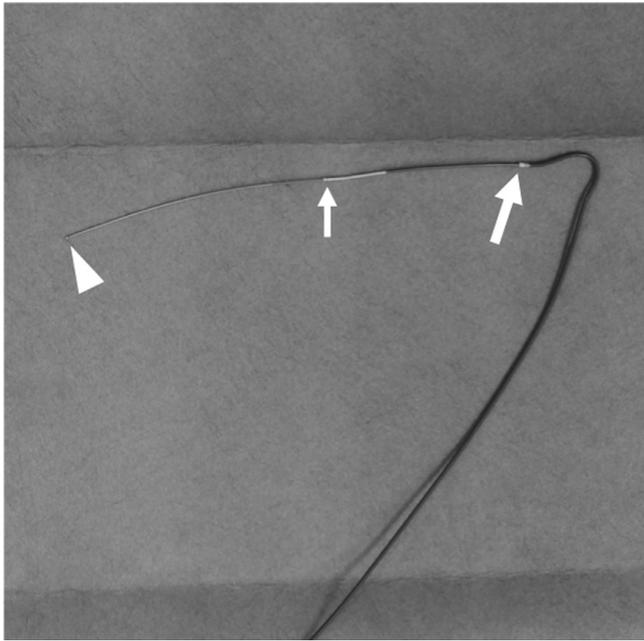


Fig. 1 – Triaxial system: a small microcatheter (arrow head), a large microcatheter (small arrow), and a 4-Fr. catheter (large arrow).

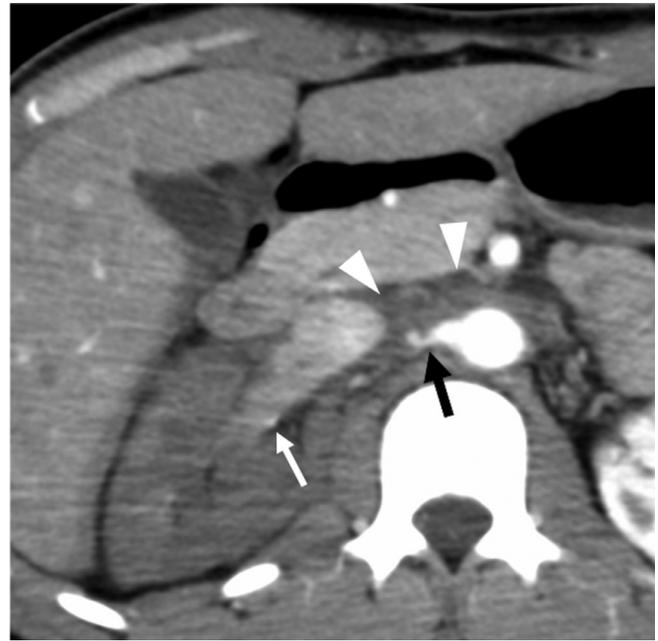


Fig. 2 – Contrast-enhanced CT shows disruption of the right renal artery (large arrow), slight enhancement of the distal branch (small arrow), and hematoma around the right renal artery (arrow heads).

Case report

A 30-year-old man was transported to our emergency room 20 minutes after a fall injury from a height of 5 m. On admission, the patient was hemodynamically stable. Contrast-enhanced computed tomography showed liver injury with active bleeding. In addition, the right kidney was not well enhanced and the right renal artery was disrupted at the main artery with slight enhancement of the distal branch, and thus it was diagnosed as renal artery dissection. Besides, hematoma was found around the right renal artery, although there was no active bleeding (Fig. 2). There were no other comorbidities. Therefore, transcatheter arterial embolization for liver injury and stent-graft placement for the right renal artery dissection were planned.

A 4-Fr. sheath (Terumo, Tokyo, Japan) was introduced to the right femoral artery, and embolization using a gelatin sponge was successfully performed for the liver injury. Then, stent-graft placement was attempted for the right renal artery dissection. Heparin had not been administered due to the risk of bleeding. A 4-Fr. catheter (Terumo) was placed in the right renal artery, and angiography only depicted the proximal side of the right renal artery (Fig. 3A). To advance catheters through the lesion of the dissection, a large microcatheter (2.85-Fr. Carry Leon High-flow, UTM, Toyohashi, Japan) was introduced to the 4-Fr. catheter, and then a small microcatheter (2.0-Fr. Carry Leon Selective, UTM) was advanced through the large microcatheter with the 0.014-inch microguidewire (CHIKAI V; ASAHI INTEC, Nagoya, Japan). The microguidewire and the small microcatheter were successfully advanced through the dissection, and the large microcatheter was

then advanced along the small microcatheter. Angiography from the large microcatheter revealed the distal side of the renal artery although slight dissection was found in the lower branch (Fig. 3B). A 0.018-inch guidewire (V18, Boston Scientific, Watertown, MA) was advanced through the large microcatheter. Thereafter, the 4-Fr. sheath, 4-Fr. catheter, and large microcatheter were removed and a 6-Fr. guiding sheath (Destination, Terumo) was introduced to the distal side of the right renal artery along the 0.018-inch guidewire. Then, an 8-mm-diameter, 50-mm-long stent-graft (Viabahn, WL Gore & Associates, Inc., Flagstaff, AZ) was advanced through the 6-Fr. guiding sheath and successfully deployed at the right renal artery. Angiography showed revascularization of the right renal artery (Fig. 3C). The procedure time of the stent-graft placement was 45 minutes.

Antithrombotic therapy was not performed due to the possibility of bleeding. Contrast-enhanced computed tomography 1 month after the procedure showed patency of the stent-graft (Fig. 4), although slight infarction and mild atrophy of the right kidney were observed. Preservation of renal function was confirmed by blood examination. This patient did well without any other complications during 6 months of follow-up.

Discussion

Stent-graft placement for traumatic renal artery dissection may be technically challenging, because it is sometimes difficult to advance the microguidewire and microcatheter to the distal side of the dissection due to severe stenosis of the

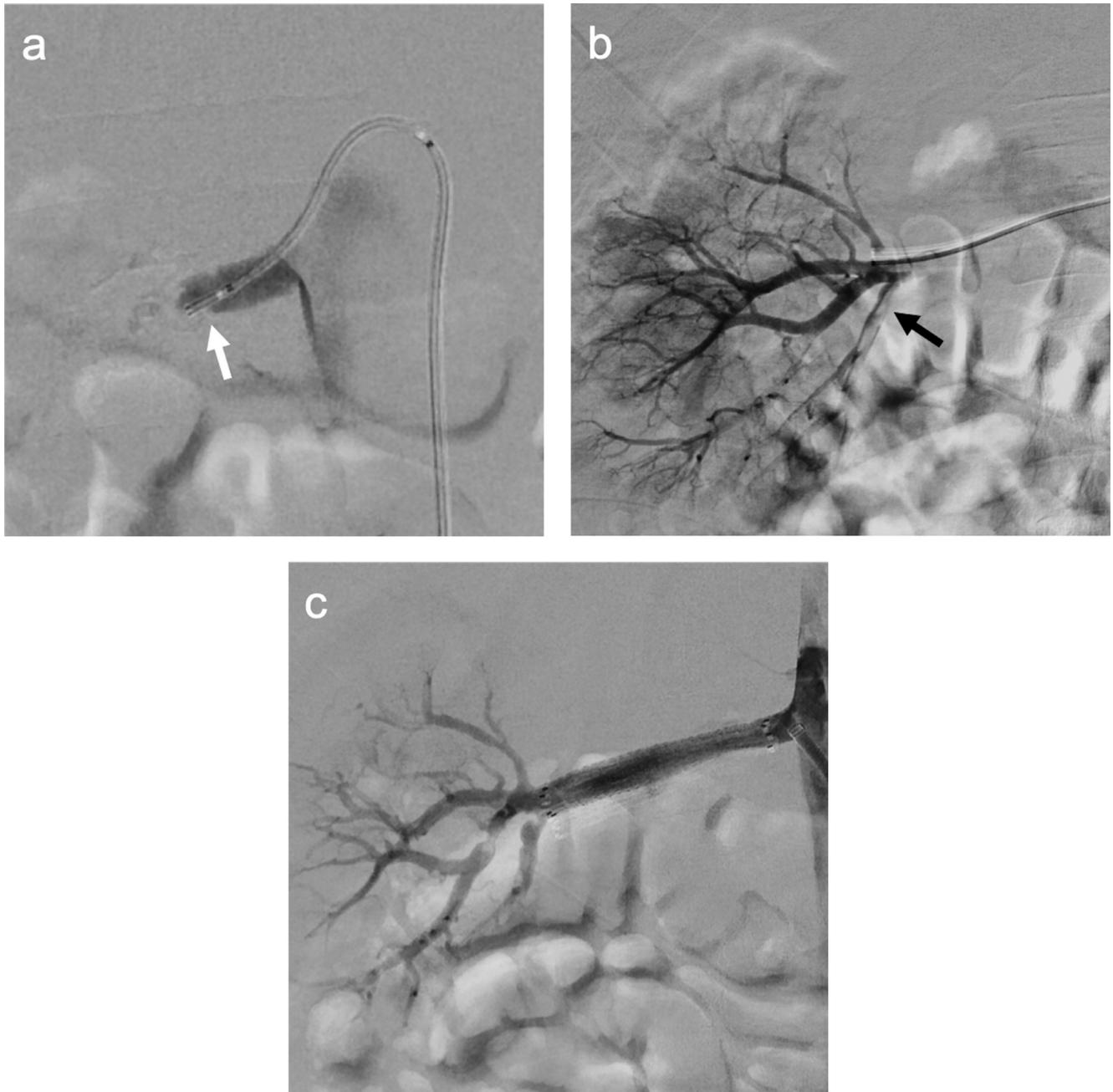


Fig. 3 - (A) Angiography only depicted the proximal side of the right renal artery (arrow). (B) The triaxial system successfully crossed the dissection. Angiography from the large microcatheter revealed the distal side of the renal artery, although slight dissection was found in the lower branch (arrow). (C) Then, an 8-mm-diameter, 50-mm-long stent-graft was deployed and angiography showed successful revascularization of the right renal artery.

true rumen. There is a risk of arterial injury and manipulation of the microguidewire and microcatheter must be performed gently.

The triaxial system is currently used in various clinical settings. The large microcatheter can stabilize the position and prevent sagging or jumping of the small microcatheter. So, it has been shown to contribute to super-selective catheterization [5-7]. In the present case, we introduced the triaxial system to cross the dissection. The 0.014-inch microguidewire

was very soft and there was only a small gap between the 0.014-inch microguidewire and small microcatheter. Thus, these devices were gentle for the vessel and the large microcatheter could give good support to the small microcatheter. As a result, it was easy to pass through the dissection without any arterial injury. We believe this system may be appropriate for not only super-selective catheterization but also crossing the dissection. To deliver the 6-Fr. guiding sheath, it was necessary to advance the rigid 0.018-inch microguidewire,

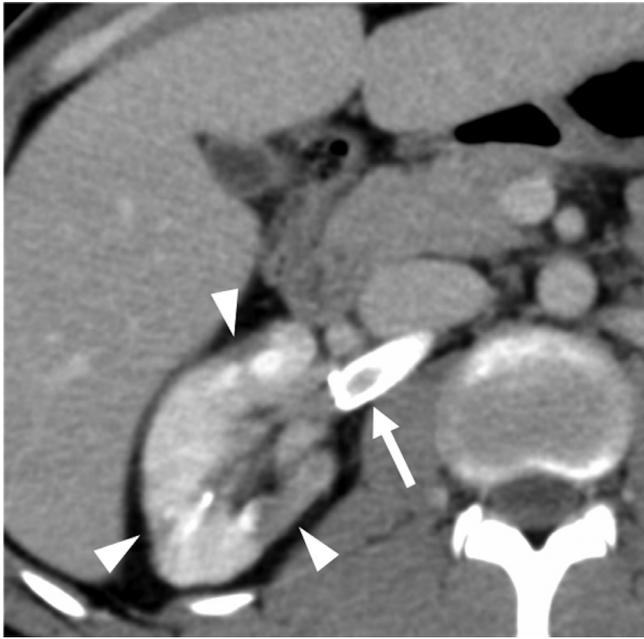


Fig. 4 – Contrast-enhanced CT 1 month after the procedure showed patency of the stent-graft (arrow), although slight infarction (arrow heads) and mild atrophy of the right kidney were observed.

and it could not be inserted to the small microcatheter since the inner diameter of the small microcatheter was so small. However, the large microcatheter could be easily advanced along the small microcatheter due to the very small gap between the large and small microcatheter. Then, the rigid 0.018-inch microguidewire could be inserted to the small microcatheter, and thereafter the stent-graft placement was performed successfully.

The time window for revascularization is an important issue in stent-graft placement for renal artery dissection. The optimal time was reported less than 12 hours from injury [8], but a shorter time limit (3–4 hours) is recommended as ischemic changes begin to appear 60–120 minutes after injury [9]. In our case, the procedure time of the stent-graft placement was only 45 minutes, because we could easily advance the catheters through the dissection using the triaxial system. Therefore, we believe this system can contribute to shortening the procedure time and it should be useful to preserve renal function.

Postoperative antithrombotic therapy has to be considered after the stent-graft placement [10]. However, the indication of antithrombotic therapy after stent-graft placement for blunt trauma is controversial due to a risk of bleeding. In our case, slight infarction and mild atrophy of the right kidney were observed and they may be due to absence of antithrombotic therapy. In our case, however, renal function and patency of the stent-graft were preserved without any bleeding. Antithrombotic therapy should be carefully decided in each case.

In conclusion, the stent-graft placement using the triaxial system appears to be useful for traumatic renal artery dissection.

Ethical approval

Our institution policy does not require institutional review board approval for a case report.

Statement of informed consent

It also does not require patient consent for cases with no identifiable personal information.

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