SHORT REPORT

Customised Stent Graft for Complex Thoraco-abdominal Aneurysm Associated with Congenital Pelvic Kidney

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Abstract
Introduction: The association of aortic aneurysm with congenital pelvic kidney is an uncommon condition and has been described in association with abdominal aortic aneurysm (AAA) open repairs.

Report: We present a case of a patient with a type IV thoraco-abdominal aortic aneurysm (TAAA) extending into the left common and internal iliac arteries associated with a congenital pelvic kidney who was treated with a customised endovascular prosthesis involving proximal fenestrations, bifurcation fenestration and a left internal deep iliac branch device.

Discussion: Although branch technology continues to evolve, cases such as this are encouraging for future widespread use. This approach allowed us to offer TAAA repair without compromising renal function in a patient with multiple co-morbidities who probably would not have withstood conventional open treatment.

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The use of branch stent graft to treat thoraco-abdominal aortic aneurysm (TAAA) has been proved feasible and effective when compared to conventional open surgical repair.1 The association of aortic aneurysm with pelvic ectopia renis is uncommon and has been described in association with abdominal aortic aneurysm (AAA) open repairs.2–4 We present a case of a patient with a type IV TAAA extending into the left common and internal iliac arteries associated with a congenital pelvic kidney who was treated with a customised endovascular prosthesis involving proximal fenestrations, bifurcation fenestration and left internal iliac branch device.

Report
A 71-year-old man with hypertension, diabetes and pulmonary disease was referred for treatment of an asymptomatic type IV TAAA, left common iliac (CIA) and
left internal iliac (IIA) aneurysms in the setting of a congenital left pelvic kidney (Fig. 1). Previous approval from our institution ethical board and informed consent was taken, and a branched aortic graft was customised and implanted using femoral and brachial access sites. Aneurysm exclusion was accomplished by embolising both the lower pole right renal artery (RRA) and the right internal iliac artery to avoid type II endoleaks. Balloon expandable stent grafts were mated with customised fenestration in the proximal fenestrated device to incorporate the superior mesenteric artery (SMA) and RRA. The congenital pelvic kidney supplied by a left pelvic artery (LPA) maintained via a fenestration in the distal bifurcated portion of the device. Self-expanding stent grafts were used to branch into the distal left internal iliac (LII) artery to exclude the CIA and IIA. There was an initial endoleak on the check angiogram, prompting a repeat angioplasty of the right renal stent graft, which resolved the endoleak. The endovascular procedure was completed uneventfully. This approach allowed us to offer TAAA repair without compromising renal function as there was no increase in serum creatinine and the urine output remained stable. A computed tomography (CT) reconstruction post-procedure (Fig. 2) demonstrates the completed repair with all branches patent and with no endoleaks.

Discussion

The occurrence of a pelvic ectopia renis (pelvic kidney) is an uncommon condition with an incidence of 1 in 2100-3000 births. Congenital pelvic is the most uncommon of the six types of renal ectopia (pelvic, lumbar, abdominal, cephalad, thoracic and crossed). It results from failure of embryological kidney to ascend during the fourth to eighth week of gestation.²,⁴ Open surgical repair of AAA with associated congenital pelvic kidney has been reported previously.⁴ However, in patients unfit for open surgical repair, endovascular exclusion of the aneurysm with re-vascularisation of branches plays an important role, particularly if renal mass can be maintained.

The use of customised TAAA stent graft had been compared favourably to open surgical repair.¹ With new endovascular techniques and the availability of customised stent graft, patients who were untreatable earlier now have an alternative. Customised, endovascular branched and fenestrated grafts have expanded the capability of endovascular repair to regions beyond the infrarenal aorta. Different configurations of branches have been reported and used, but the basic principle of bridging the aneurysmal segment of the aorta to maintain perfusion of critical end organs while excluding the aneurysm from circulatory flow is the same. In this case, the concept was extrapolated to a patient who had a congenital left pelvic kidney in association with a type IV TAAA, left CIA and left IIA. We preferred the use of helical limbs because of the ability to conform to complex anatomical morphology without bending or kinking the involved stents, offering improved flow dynamics that have been tested with computational fluid dynamics models.⁵

Although branch technology continues to evolve, cases such as this are encouraging for future widespread use. This approach allowed us to offer TAAA repair without compromising renal function in a patient with multiple co-morbidities who may not have withstood conventional open treatment. To the best of our knowledge, this is the first report of this nature in the literature.
**Conflict of Interest**

None declared.

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**References**


