Practical uroradiology

Ureteropelvic junction obstruction by aberrant lower pole artery

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1. Introduction

Obstruction of the ureteropelvic junction (UPJ) is one of the causes of obstruction uropathy and it may be either congenital or acquired. Aberrant lower pole crossing vessels is one of the congenital causes. In order to determine the exact cause of UPJ obstruction, imaging examinations are performed. Computed tomography (CT) with reformatted three-dimensional images is the best imaging examination for demonstrating the aberrant crossing vessels in the case of UPJ obstruction. Because the aberrant crossing vessels may aggravate, but is not the primary cause of UPJ obstruction, dismembered pyeloplasty with anterior transposition of the collecting system and preservation of the aberrant crossing vessels are usually performed to treat UPJ obstruction.

2. Case report

A 42-year-old man presented to our urological outpatient department with left hydronephrosis, which was incidentally identified during a sonographic examination of the abdomen while he was undergoing a regular physical check-up in a local clinic. However, the patient did not report any clinical symptoms associated with the condition. An intravenous urography (IVU) was performed, the results of which showed delayed opacification of the collecting system of the left kidney, left hydronephrosis, poor opacification of the left ureter, and retention of contrast material in the dilated collecting system of the left kidney, indicating UPJ obstruction on the left side (Fig. 1). CT with reformatted three-dimensional images was performed, which showed an aberrant lower pole artery and vein crossing the left UPJ causing stenosis of the left UPJ and left hydronephrosis (Fig. 2). He was then admitted for surgical management. Upon admission, a physical examination and various laboratory examinations were performed, the results of which were all normal. Robotic-assisted laparoscopic dismembered pyeloplasty with anterior transposition of the collecting system of left side and preservation of the aberrant crossing vessels were performed. Left double-J ureteral stent placement was also performed. The pathological report of the segmental left ureteric resection revealed fibrosis. The postoperative course was uneventful and the patient was discharged in stable condition. Urological outpatient department follow-up was recommended. Follow-up diuresis urography was performed, which revealed no obstruction of urinary drainage on either side.

3. Discussion

Obstruction of the UPJ is one of the causes of obstructive uropathy in all ages and is the most common cause of neonatal hydronephrosis. It may be either congenital or acquired. Aberrant lower pole crossing vessels is one of the congenital causes. Aberrant crossing vessels at an obstructed UPJ are less common in neonates and children than in adults. However, in a study that examined 120 children with UPJ obstruction, aberrant crossing vessels were reported to be the major cause of obstruction in 11% of the investigated children. Another study had reported that aberrant crossing vessels may be present in up to 40% of cases with primary UPJ obstruction in adults. UPJ obstruction is twice as common in males as in females. The left kidney is affected about twice as often as the right. Chronic or intermittent back pain for many years often exacerbated by high fluid intake is the most common clinical symptom in adults. However, no symptoms and signs are noticed in some cases. Infection and stones may be developing in cases of UPJ obstruction.
IVU still remains as the important imaging examination to confirm suspected UPJ obstruction in adults. Classical findings are delayed opacification of the collecting system, pyelocaliectasis, narrowing at UPJ, a normal-caliber ureter or poorly opacified ureter, and retention of contrast material in the collecting system on delayed films. IVU and retrograde pyelography may show a balloon-on-a-string sign. An aberrant vessel may produce linear oblique crossing defect in the proximal end of the ureter. CT with reformatted three-dimensional images is the best imaging examination for demonstrating aberrant crossing vessels in the case of UPJ obstruction. In patients with UPJ obstruction, the average incidence rate of aberrant crossing vessels near the UPJ is approximately 46% with open surgery but reaches 79% with helical CT angiography. Magnetic resonance angiography can be used to diagnose UPJ obstruction in patients who are allergic to iodinated contrast material.

Recently, treatment by open surgery has been replaced by endourological techniques in adults, and robotic-assisted laparoscopic technique is currently the procedure of choice. Dismembered pyeloplasty with anterior transposition of the collecting system and preservation of the crossing vessels is usually performed, because the crossing vessels may aggravate, but is not the primary cause of UPJ obstruction.

Diuretic renography should be performed 3–6 months postoperatively. Other follow-up imaging examinations may be indicated in selected cases.

Conflicts of interest statement

The author declares that he has no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

References


