LEFT RENAL VEIN TRANSPOSITION FOR TREATMENT OF THE NUTCRACKER SYNDROME

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The nutcracker syndrome refers to compression of the left renal vein between the aorta and the superior mesenteric artery, which results in renal vein and left gonadal vein varices. Herein, we report our experience with left renal vein transposition for treatment of the nutcracker syndrome. To the best of our knowledge, this is the first reported case of the left renal vein transposition for treatment of the nutcracker syndrome in Iran.

Keywords: Left renal vein hypertension • nutcracker syndrome • varicocele

Introduction

In nutcracker syndrome, the left renal vein (LRV) is compressed between the aorta and the superior mesenteric artery (SMA), which results in a high renal venous pressure. This could consequently promote the development of renal pelvis and ureter varices, with an associated gross or microscopic hematuria. Other possible symptoms include flank and abdominal pain, left-sided varicocele, orthostatic proteinuria, autonomic dysfunction, chronic fatigue,1 and hypertension.2

Pathophysiology of the nutcracker syndrome has not still been well-understood. However, it is proposed that the syndrome may be due to abnormal branching of SMA from the aorta.3

Case Report

A 23-year-old man presented with pain and heaviness in his left testis for 5 to 6 months. He had undergone inguinal varicocelectomy one year before, due to the same complaint. On physical examination, he had a grade 3 varicocele on the left side; the grade did not decrease in the supine position. The site of previous operation could be seen on the left inguinal area. The examination was otherwise normal.

Complete blood count, blood urea nitrogen, electrolytes, and urinalysis were all normal.

Color Doppler renal ultrasonography showed the presence of a dilated LRV with a diameter of 13 mm (normal range: 7.2 ± 1.8 mm) in the renal hilum, and 2 mm where it passed between the aorta and SMA. The peak systolic blood velocity (PSV)
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was 10 cm/s in the renal hilum (normal range: 18.6 ± 3.7 cm/s) and 74 cm/s during passage between the aorta and SMA.

Magnetic resonance imaging (MRI) of the kidney showed severe dilatation of the LRV (Figure 1). Based on the above findings, the patient was scheduled for operation.

An abdominal midline incision was made and the left colon and small bowel were mobilized. All the veins draining into the LRV were ligated and bisected. After placement of a Satinski clamp, the inferior vena cava was opened longitudinally 5 cm distal to the confluence of the renal vein. The left renal artery was clamped and the left kidney cooled externally. The LRV was excised and reanastomosed to the inferior vena cava, with a 5 – 0 prolene suture (Figure 2).

Duration of arterial clamping and cold ischemia of the left kidney was 25 – 30 minutes. Anastomosis of the LRV to the inferior vena cava took around 7 – 10 minutes. After declamping of the left renal artery, it developed a good pulsation. The thrill and perfusion of the left kidney were very well, with no sign of ischemia.

The patient had an uneventful postoperative hospital course and was discharged from the hospital one week later. Repeated color Doppler ultrasonography of the LRV, one week and one month after operation, showed normal diameter with a PSV of 50 cm/s, without any clot formation or stenosis. The varicocele improved significantly after operation.

Discussion

The nutcracker syndrome is a condition in which the LRV is compressed between the aorta and SMA. The diagnosis of the nutcracker syndrome can be established by left renal venography, with measurement of the pressure gradient between the LRV and the inferior vena cava.4 Since this examination is invasive, less invasive methods for diagnosis are desirable.

Several methods for confirming the nutcracker syndrome have been proposed such as computed tomography (CT) scan, ultrasonography, color Doppler ultrasonography,4 MRI, three-dimension CT angiography, and MR angiography.5

Currently, open surgery for treatment of the nutcracker syndrome has been focused on two procedures: renal autotransplantation and LRV transposition.1 Renal autotransplantation is more invasive than transposition of the LRV. Therefore, it seems that transposition of the LRV, when possible, is a better therapeutic option for the nutcracker syndrome.

References