Images in Nephrology
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Posterior nutcracker phenomenon

Yong Bum Jang1, Kyung Pyo Kang1, Sik Lee1, Won Kim1, Hyo Sung Kwak2 and Sung Kwang Park1

1Department of Internal Medicine and Renal Regeneration Laboratory and 2Department of Radiology, Chonbuk National University Medical School and Research Institute of Clinical Medicine, Jeonju, Korea

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Case

A 26-year-old woman was referred to us because of her hypertension and microscopic haematuria. Her past medical and family histories were unremarkable and the physical examination was not contributory. The urinary analysis revealed numerous red blood cells without dysmorphic changes. The laboratory tests revealed haemoglobin 13.6 g/dl, haematocrit 39%, white blood cell count 4300/mm3, blood urea nitrogen 16 mg/dl and creatinine 0.7 mg/dl. The excretory urogram was normal and the ultrasonography revealed normal-sized kidneys. Multidetector computed tomography (MDCT) that was carried out to exclude nutcracker phenomenon revealed a dilated left renal vein after it passed between the aorta and the vertebra (Figure 1a). In the inferior MDCT image of the same patient, a prominent left ovarian vein implicating the formation of collateral circulation (Figure 1b) was seen. MDCT volume rendering of the same patient illustrated compressed left renal vein distended distally as well as the dilated ovarian vein by the blood drained from the left renal vein (Figure 2), constituting the high renal venous pressure.

Discussion

The anterior nutcracker phenomenon results from compression as the left renal vein passes between the superior mesenteric artery and the aorta and is, in general, followed by subsequent development of venous varicosities of the renal pelvis, ureteral and the gonadal vein. This phenomenon is manifested in pain in the left flank and/or abdominal, unilateral haematuria, and occasionally by a varicocele in the male and by abnormal menstruation in the female [1,2]. The term ‘posterior nutcracker phenomenon’ refers to the left renal venous hypertension secondary to the compression of the retroaortic left renal vein, which crosses between the aorta and the vertebral column [3]. The main presenting symptom is haematuria with or without left flank pain. This disorder is easily overlooked if routine diagnostic procedures are used alone, and its incidence is likely underestimated.

Renal phlebography and measurement of the venous pressure have been regarded as procedure of choice in diagnosing these cases. However, because of some drawbacks to the procedures, such as pressure variation by the posture of the patient and a wide overlap between the abnormal (elevated) and normal ranges seen in venous pressure measurement or the invasive nature of phlebography, other less invasive imaging techniques are preferred in the diagnostic workup [1]. Non-invasive imaging techniques may prove highly valuable in the diagnostic management of patients with haematuria or flank pain due to nutcracker syndrome, but the findings are not always specific to this disease. The presence of a dilated, and radio-enhanced left gonadal vein with a normal unenhanced right gonadal vein increases the diagnostic probability of nutcracker syndrome [4]. In the differential diagnosis of haematuria, especially in cases where the left kidney is involved, the possibility of nutcracker phenomenon should be taken into consideration. MDCT of the renal vein should be considered as one of the non-invasive diagnostic procedures to be used in demonstrating the anatomical characteristics of nutcracker syndrome [4].
Conflict of interest statement. None declared.

References


Fig. 1. (a) MDCT revealed a dilated left renal vein (white arrow) after passing between the aorta (A) and the vertebra (V). (b) On the inferior MDCT image of the same patient, a prominent left ovarian vein was noted (white arrowhead), implicating the formation of collateral circulation.

Fig. 2. MDCT volume rendering of the same patient illustrates the compressed left renal vein (white arrow) with distal distension as well as the dilated ovarian vein (white arrowhead) by the blood drained from the left renal vein. A, aorta.