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Cut-off Sign in Ureter

Üreterde Cut-off İşareti

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Abstract
Obstructive uropathy occurs due to several common causes such as kidney stones, vesicoureteral reflux, posterior urethral valve and urothelial tumors. Additionally, there are some rare causes such as solid tumors, retroperitoneal fibrosis, primary lymphomas (e.g. Non-Hodgkin lymphomas). A 20-year old male with lower back pain underwent a bone scan for differential diagnosis of back pain. The bone scan findings were normal, except for the presence of unilateral renal stasis accompanied by a short segment ureteral stasis. Due to the abrupt termination of the ureteral activity, namely the "cutoff sign", a subsequent SPECT/CT imaging was performed for differential diagnosis of ureteral stasis. Non-diagnostic CT sections revealed a para-aortic soft tissue mass compressing the ureter. The abrupt termination of stasis in the ureter may warrant the application of SPECT/CT in cases with no previous history of urinary tract pathology. SPECT / CT may provide additional benefits of clarifying the etiology and this case underlines the added value of SPECT/CT imaging in subtle scintigraphic findings.

Keywords: Cutoff sign; SPECT/CT; Renal stasis in bone scan

Özet
Obstrüktif üropati böbrek taşları, vezikoüreteral reflü, posterior üretral kapak ve ürotelyal tümörler gibi yaygın nedenlere bağlı olarak ortaya çıkar. Ayrıca solid tümörler, retroperitoneal fibrozis, primer lenfomalar (Non-Hodgkin lenfomalar vb.) gibi nadir nedenler de vardır. Bel ağrısı olan 20 yaşındaki erkek hastaya sırt ağrısı ayırıcı tanısı için kemik taraması yapıldı. Kısa segment üreter stazının eşlik ettiği tek taraflı renal staz dışında kemik sintigrafisi bulguları normaldi. Üreteral aktivitenin ani sonlanması, yani "cut-off işareti" nedeniyle, üreter stazının ayırıcı tanısı için takip eden bir SPECT/BT görüntülemeye odaklanıldı. Tanısal olmayan BT kesitlerinde üretere bası yapan bir para-aortik yumuşak doku kitlesi saptandı. SPECT/BT uygulaması, üreterde stazın aniden sonlanması durumunda, özellikle de daha önce üriner sistem patolojisi öyküsü olmayan olgularda, etiyoloji aydınlatmada önemli ek faydalar sağlayabilir. Bu vaka ile ince sintigrafik bulgularda SPECT/BT görüntülemenin katma değerinin altı çizilmiştir.

Anahtar Kelimeler: Cut-off bulgusu; SPECT/BT; Renal staz

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INTRODUCTION

Two cases of Non-Hodgkin Lymphoma were reported recently which were diagnosed by means of ultrasound examination and a subsequent histopathological examination of groin lymph nodes [1, 2]. But to date, according to our knowledge, scintigraphic cut off sign in urinary tract has not been reported previously. In this case, we present a patient with an abrupt termination of the ureteral activity at the bone scan.

CASE REPORT

A 20-year old male with lower back pain underwent a bone scan for differential diagnosis of back pain. The bone scan findings were normal, except for the presence of unilateral renal stasis accompanied by a short segment ureteral stasis. Due to the abrupt termination of the ureteral activity, namely the "cutoff sign", a subsequent SPECT/CT imaging was conducted for differential diagnosis of ureteral stasis.
Following iv injection of 74 MBq Tc99m-MDP (methylenediphosphonate) whole body images were obtained. The only pathological finding of the bone scan was left-sided renal proximal ureteral activity stasis (Fig 1, white arrow). The ureter activity in the distal portion could not be seen as it could in the upper third, which formed an abrupt termination matching a "cut off sign."

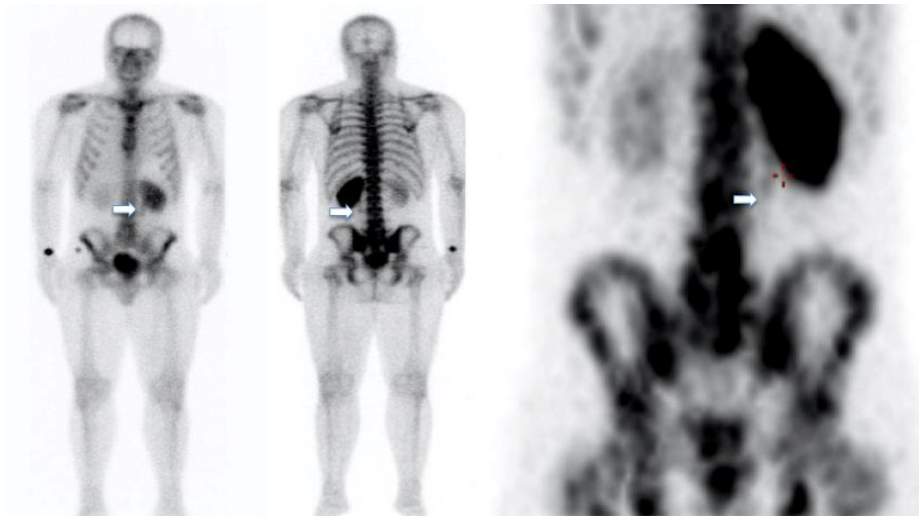

Figure 1: Tc99m-MDP (methylenediphosphonate) whole body images

SPECT / CT (Discovery NM/CT 670, Dual Head Camera, GE Healthcare) was applied to investigate the causes of the stasis. The SPECT scan was perfomed using low-energy high-resolution collimation, 180° tomography, a 128×128 matrix of 4.8 mm pixel size and 30 steps of 30 seconds in a continuous-rotation mode followed by a low-dose CT scan, which was carried out with 120 kV and 97 mAs using adaptive dose modulation. The CT data were generated with a 2.5-mm slice thickness using a smooth reconstruction kernel.
The dilated left ureter and radioactivity stasis were clearly observed on the SPECT/CT sections. Red arrows show the activity accumulation and dilatation of the ureter above the mass lesion. (Fig 2 a, Fig 2 b, Fig 2 c). The subsequent caudal sections of non-diagnostic CT images show a soft tissue mass surrounding the ureter in the aortocaval region. The stasis disappeared at the level of the incidental mass (Fig 2 d, Fig 2 e, Fig 2 f). The compressive mass diameters were 35 x 17mm. It was located at the level of the third vertebra. The non-specific bone scan finding of renal and ureteral stasis was compatible with the lower back pain defined by SPECT CT.

Early reporting of the mass lesion-induced renal stasis with SPECT / CT resulted in nephrostomy to maintain renal function in the patient [5].

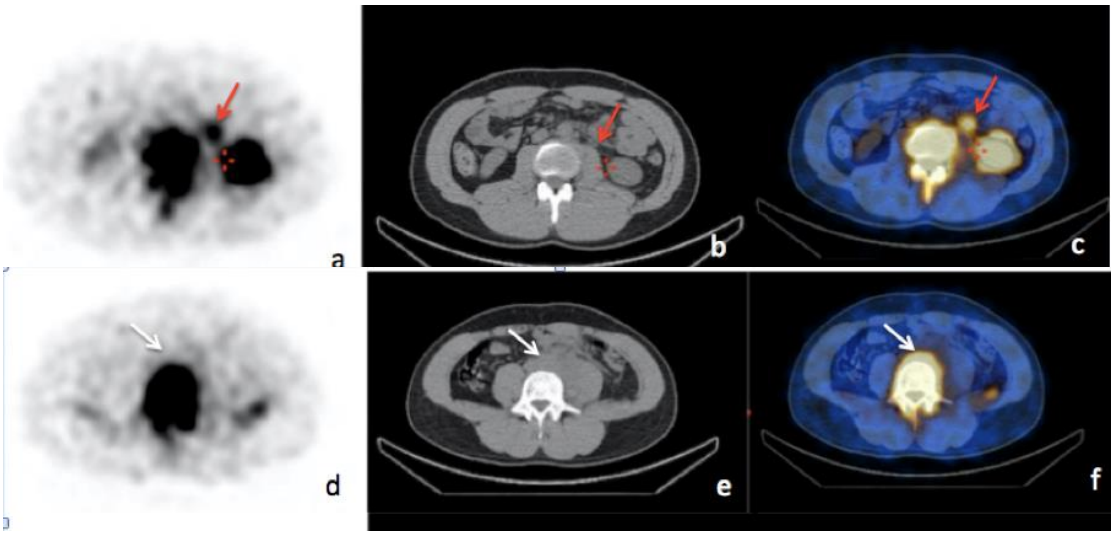

Figure 2: The dilated left ureter and radioactivity stasis were detected on the SPECT/CT sections (Fig 2 a, Fig 2 b, Fig 2 c). The subsequent caudal sections of non-diagnostic CT images show a soft tissue mass surrounding the ureter in the aortocaval region (Fig 2 d, Fig 2 e, Fig 2 f).

DISCUSSION

Obstructive uropathy is a common uropathology which happens due to occlusive causes such as renal stones, vesicoureteral reflux, posterior urethral valve, urothelial tumors and some compressive lesions including solid tumors, retroperitoneal fibrosis and primary lymphomas (quite rarely) that cause renal stasis and hydronephrosis, with or without invasion [3, 4]. Although the cutoff sign is described as an X-ray finding for colonic gas, which is a classical finding of acute pancreatitis, the scintigraphic cut off sign has not been previously reported [6, 7].

As a conclusion, the abrupt termination of stasis in the ureter may warrant the application of SPECT/CT in cases with no previous history of urinary tract pathology [8]. SPECT / CT may provide additional benefits while clarifying the etiology.

Ethical approval and consent to participate

Written informed consent to publish this information was obtained from study participant.

Consent for Publication

Patient included in this case report gave written informed consent to publish the data contained within this study.

Conflict of Interest

The authors declare that they have no competing interests.

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Authors Contribution

All authors (AC, AE, IK and AA) shared the collection of published data, analyzing the results, manuscript writing and final revision. All authors have read and approved the manuscript.

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