

RENAL PELVIC UROTHELIAL CARCINOMA IN HORSESHOE KIDNEY

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A 40-year-old man with asymptomatic gross hematuria visited our hospital. He had been followed up on the horseshoe kidney and left ureteral stone. Cystoscopy revealed a flow of gross hematuria from the left orifice. Drip infusion pyelography, retrograde pyelography, abdominal computerized tomography, magnetic resonance imaging revealed a renal pelvic mass in the upper pole of left kidney. Left nephroureterectomy and isthmusectomy and partial cystectomy were done. A microwave tissue coagulator (Microtaze® AZM-520, AZWELL) was used to divide the isthmus. There was very little bleeding and leakage of urine from the divided isthmus. The postoperative course was favorable.

(Acta Urol. Jpn. 50: 439–442, 2004)

Key words: Horseshoe kidney, Renal pelvic urothelial carcinoma, Microwave tissue coagulator

INTRODUCTION

The horseshoe kidney is a common anomaly of the upper urinary tract. Renal pelvic urothelial carcinoma with the horseshoe kidney is an uncommon urologic lesion. Surgery of the horseshoe kidney is dangerous, because the frequency of anomalous vascular supply of the horseshoe kidney is high and the isthmus consists of parenchyma. The use of a microwave tissue coagulator to divide the isthmus was effective in our case.

CASE REPORT

A 40-year-old man had been followed up for a horseshoe kidney and a left ureteral stone since 2002. He presented intermittent painless gross hematuria

on March 5, 2003. Physical examination revealed a healthy male with normal vital signs and no demonstrable abnormalities. Laboratory data were within normal limits except for urinalysis, which revealed 20 to 30 red blood cells per high-power field. Urinary cytology was negative for the malignant cells. Renal ultrasonography did not show an abnormal mass sign. Cystoscopy revealed a flow of gross hematuria from the left orifice. Drip infusion pyelogram (DIP) demonstrated horseshoe configuration, a left upper pole mass and urinary stasis over the isthmus (Fig. 1). Retrograde pyelography confirmed a radiolucent filling defect and urinary cytology from the left ureteral catheter was class III for the malignant cell. Abdominal computerized tomography showed a horseshoe kidney with a

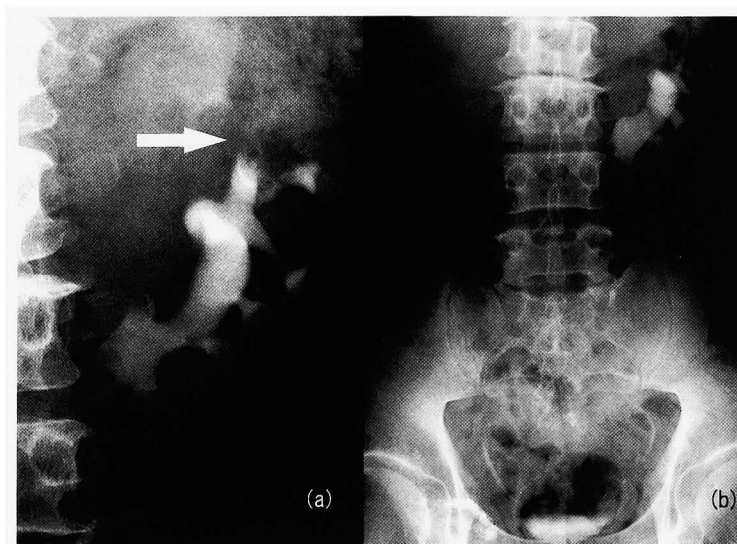


Fig. 1. (a) Drip infusion pyelogram (DIP) shows a left upper pole mass (arrow). (b) Standing position after void shows urinary stasis over the isthmus.

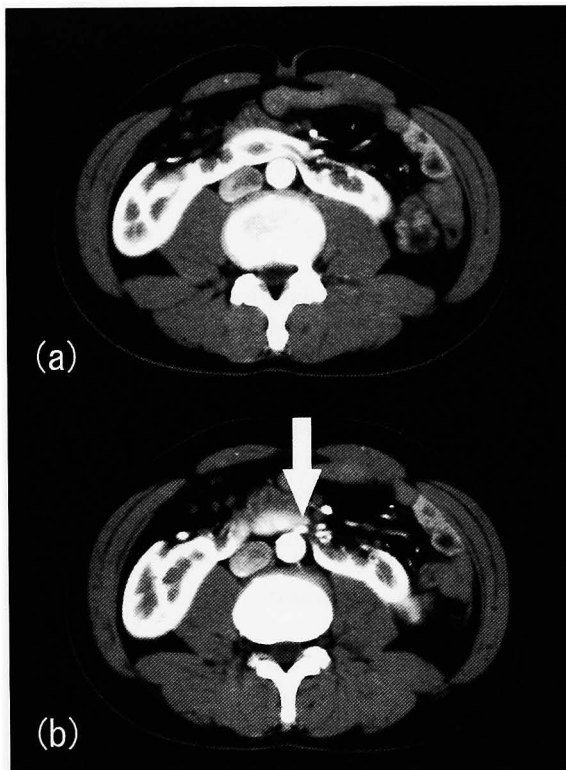


Fig. 2. (a) CT with augmentation shows a parenchymatous isthmus. (b) CT with augmentation shows an artery from the aorta to the isthmus (arrow).

parenchymatous isthmus (Fig. 2, a). Augmented CT revealed a single artery from aorta to the isthmus directly (Fig. 2, b). Magnetic resonance imaging of the abdomen showed a mass in the upper pole of the left kidney. Transabdominal exploration was performed. Two left renal veins and one renal artery were ligated and dissected. The artery to the isthmus which bifurcated from the aorta was ligated and dissected. A microwave tissue coagulator (Microtaze® AZM-520, AZWELL) was used to dissect the isthmus of the horseshoe kidney (Fig. 3).

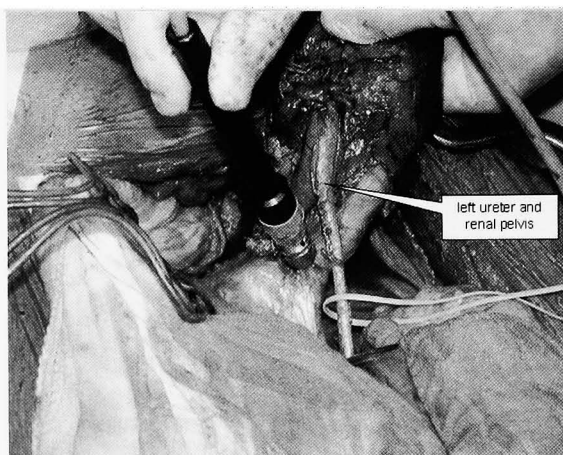


Fig. 3. The electrode of microwave tissue coagulator was inserted 6 times at 5 mm intervals across the isthmus.

The electrode was inserted 6 times at 5-mm intervals across the isthmus. The coagulated isthmus was then transected with an electric knife. There was no notable bleeding from the divided isthmus. Then, left nephroureterectomy, including a cuff of the bladder, was performed en bloc. Indigo carmine was injected intravenously to check for injury to the collecting system. Leakage of the dye was not observed. The postoperative course was uneventful. Histology showed a grade 1, pTa, urothelial carcinoma on the left renal calix. The patient is clinically well 4 months after surgery.

DISCUSSION

Horseshoe kidney occurs in 1/400 or 0.25% of the population¹⁾. Lucke and Schlumberger²⁾ found 7.77% renal pelvic urothelial carcinoma in an analysis of 1,600 malignant renal tumors. Ware³⁾ reported that the incidence of renal pelvic urothelial carcinoma in a horseshoe kidney can be estimated at 0.0025 or 2.1 cases/10,000,000 theoretically. Blackard and Mellinger⁴⁾ and Buntley⁵⁾ reported 20% renal pelvic urothelial carcinoma in horseshoe kidneys having malignant neoplasm in two overlapping series. In Japanese literature, Hayashi⁶⁾ reported 17.1% renal pelvic tumors in 35 cases of horseshoe kidneys having a malignant neoplasm. The incidence of renal pelvic urothelial carcinoma in a horseshoe kidney is approximately 3 to 4 times that in a normal kidney, possibly the result of chronic obstruction, lithiasis and infection, which are common complications in the horseshoe kidney. The frequently anomalous vascular supply creates an obstacle to renal pelvic drainage leading to urinary stasis and calculus formation³⁾. This stasis may predispose to renal pelvic urothelial carcinoma due to prolonged urinary carcinogen exposure or to squamous cell carcinoma due to chronic irritation. Blackard⁴⁾ reviewed 72 cases of renal tumors associated with the horseshoe kidney. Thirty percent of them were renal pelvic urothelial carcinoma, and 18% of renal pelvic urothelial carcinoma were squamous cell carcinoma. This case was the 20th case of renal pelvic urothelial carcinoma associated with a horseshoe kidney reported in the Japanese medical literature on Medline. Five cases of 20 renal pelvic tumors with a horseshoe kidney were squamous cell carcinoma (25% of renal pelvic urothelial carcinoma). The frequency of squamous cell carcinoma suggests association with chronic inflammation due to renal stone. This case was urothelial carcinoma despite the history of left ureteral stone, but urinary stasis was demonstrated as well in DIP. The incidence of hydronephrosis with a horseshoe kidney range from 21 to 45%, but including mild hydronephrosis, the incidence may be higher⁷⁻⁹⁾. Our case did not have hydronephrosis but the urinary

tract was pressed by the isthmus. Our case had a habit of smoking (20/days). Prolonged contact with carcinogenic components of tobacco might be associated with the predisposition of urothelial carcinoma in this case.

Seventy percent of horseshoe kidneys have vascular malformations⁸⁾. The artery to the isthmus which bifurcated from the aorta was revealed in 65% of horseshoe kidneys. Twenty percent of horseshoe kidneys had an artery bifurcated from the common iliac artery and 15% had from the renal artery⁹⁾. It may be dangerous to cut the isthmus of parenchyma and the artery to the isthmus, but a microwave tissue coagulator is useful to cut the isthmus. A microwave tissue coagulator was used for partial nephrectomy without clamping the renal pedicle. Matsui¹⁰⁾ reported that a microwave tissue coagulator is safe and useful for the wedge resection of renal cell carcinoma without vascular control. Bipolar molecules, which have both positive and negative charges, such as proteins and water in the tissue, are excited by an activated microwave, and the energy is converted to heat within the tissue. Coagulation of a conically shaped tissue, approximately 10 mm in depth and 10 mm in diameter at the base, was achieved by partial nephrectomy. The coagulated parenchyma could be then transected with a sharp knife or an electric knife. A microwave tissue coagulator is also effective to dissect parenchymatous isthmus with abnormal artery.

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(Received on January 16, 2004)
(Accepted on February 10, 2004)

馬蹄鉄腎に発生した腎盂腫瘍の1例

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馬蹄鉄腎に発生した腎盂腫瘍の1例を経験したので報告する。40歳, 男性, 馬蹄鉄腎と左尿管結石で経過観察中に無症候性血尿で当院を受診した。膀胱鏡にて左の尿管口から血尿の流出を認め, 静脈性腎盂造影, 逆行性腎盂造影, CT, MRIにて左腎上極に腎盂腫瘍を認めた。左腎尿管摘除術, 峽部切除術および膀胱

部分切除術を施行した。峽部を切除する際にマイクロ波組織凝固装置 (Microtaze® AZM-520, AZWELL) を使用した。峽部切除断端からの出血と尿流出はほとんど認められなかった。術後経過順調で退院した。

(泌尿紀要 50 : 439-442, 2004)