Supernumerary kidney presenting as urinary leakage after an ipsilateral laparoscopic radical nephrectomy

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KEY WORDS

complications ◗ laparoscopy ◗ kidney cancer ◗ supernumerary kidney

ABSTRACT

We present a case of a patient with supranumerary kidney diagnosed after laparoscopic radical nephrectomy. Urinary leakage, an unusual complication that appeared postoperatively, led to complementary examination and making the right diagnosis. The reevaluation of the preoperative CT (computed tomography) in enhancement phase and the new CT scan confirmed the presence of a real accessory organ connected to the main unit with a small bridge of tissue. The latter right nephrectomy was performed. Despite the scarceness of this anomaly, a thorough interpretation of images obtained during investigative procedures can provide a clue about the presence of this rare entity.

INTRODUCTION

Supernumerary kidney may be the rarest congenital renal anomaly affecting both males and females equally with a higher preponderance (63%) to the left side [1, 2]. It usually lies beneath the ipsilateral kidney (55%) [2]. The true incidence of this entity cannot be calculated because of its very infrequent occurrence. Approximately 100 cases have been reported since it was first described in 1656 [1]. Preoperative diagnosis is difficult. The presence of an accessory renal unit is found either incidentally at surgery or at autopsy and very rarely before treatment [3]. The appropriate literature is not numerous, therefore we report the case of supernumerary kidney diagnosed in a patient presenting an unusual complication after laparoscopic radical nephrectomy.

PATIENT AND METHODS

A 62-year-old man was admitted to our hospital with non-palpable solid mass in his right kidney. The patient presented no significant symptoms except for mild arterial hypertension. A chest X-ray and abdomen computed tomography (CT) were carried out and the presence of organ confined 56-mm in diameter right renal tumor was confirmed. Before the treatment the only available CT images were frontal and horizontal (Fig. 1a, b). The diagnosis seemed to be clear. The patient was qualified for transperitoneal laparoscopic radical nephrectomy (LRN) and operated on with a standard manner under general anesthesia. The operation was performed by an experienced laparoscopic surgeon. The right renal hilar vessels were transected with the endovascular stapler. Some metal clips were used to secure smaller vessels and the ureter. The adrenal gland was partly excised with harmonic scalpel. The adipose capsule above the upper pole was thin and the fibrous capsule was strongly fixed to the surrounding tissue, so the dissection was very delicate and time-consuming. Because of the difficulties during the upper pole separation, the operation time was lengthened by up to 200 minutes. In this phase an increased amount of bleeding was also observed (total blood loss was 1100 ml). The 15-mm EndoCatch was used for intact kidney removal and the

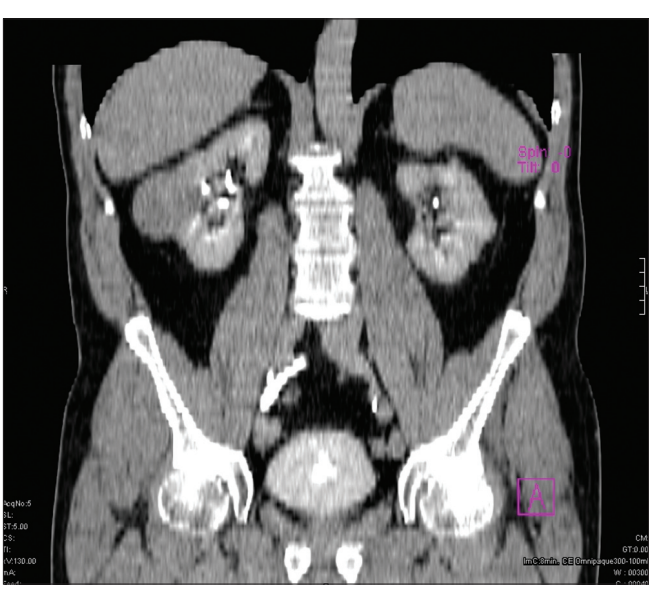

Fig. 1a. Preoperative computed tomography (CT) scans indicating a solid mass in the right kidney – frontal image.

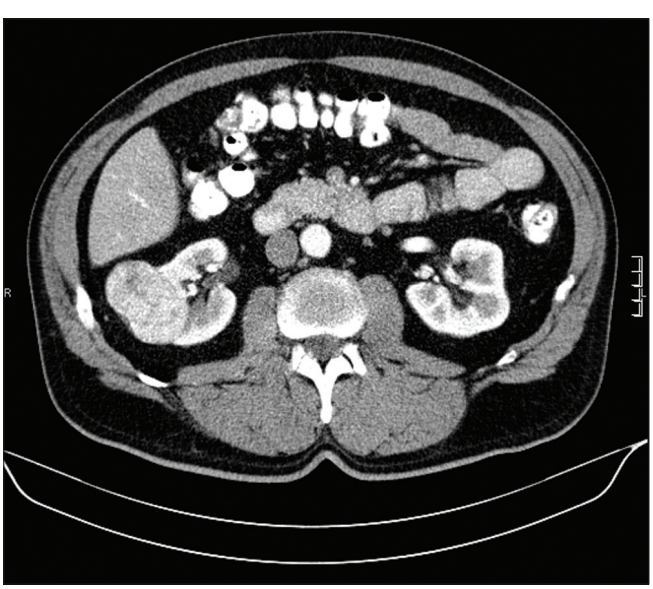

Fig. 1b. Preoperative computed tomography (CT) scans indicating a solid mass in the right kidney – horizontal image.

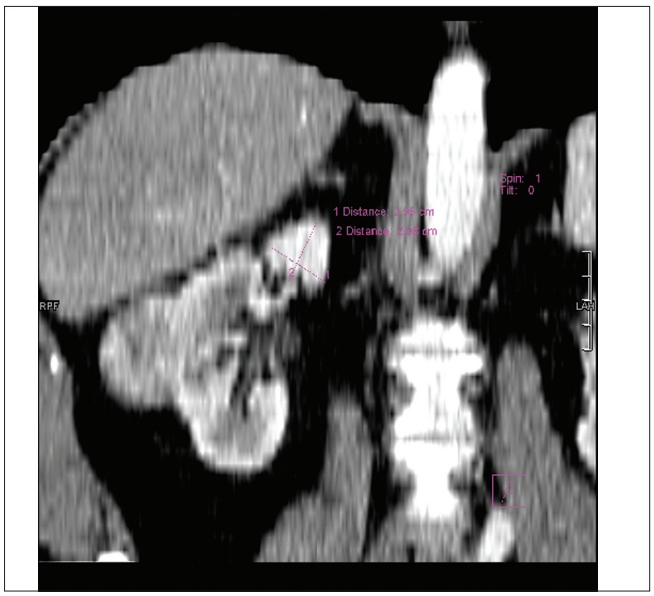

Fig. 2a. Postoperatively reevaluated initial CT scan. The image shows the gap between the units and the binding bridge of tissue as well as the tumor.

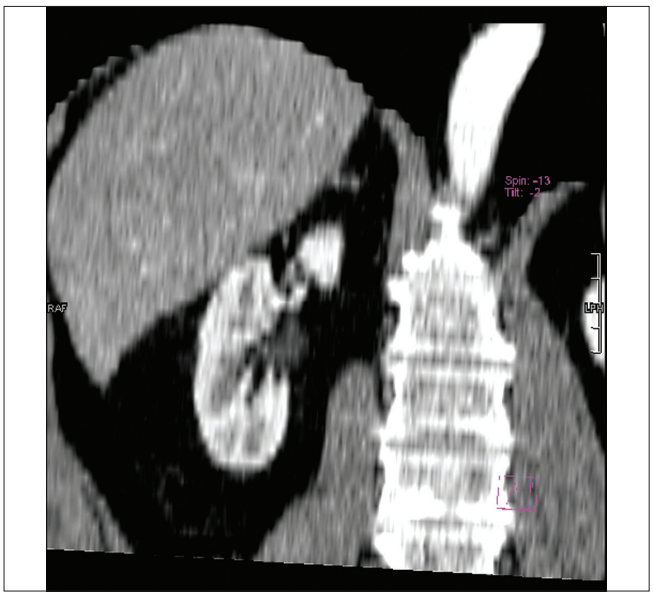

Fig. 2b. Postoperatively reevaluated initial CT scan. A contrast-enhanced arterial phase oblique image shows clearly the separation of the units.

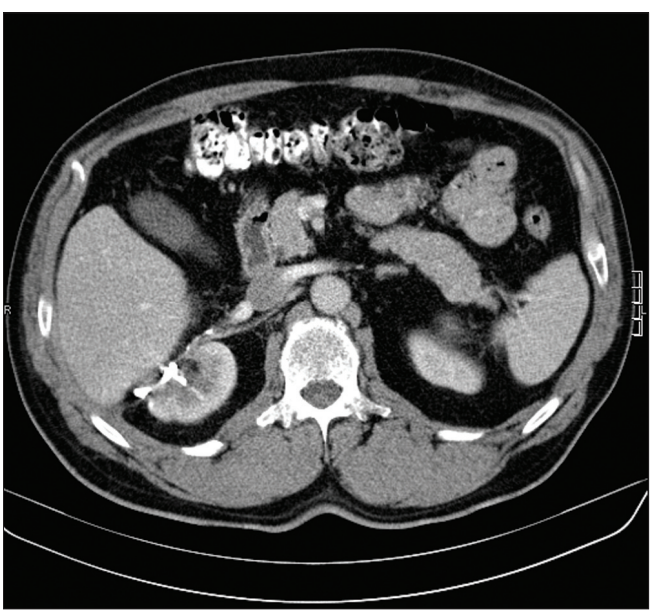

Fig. 3a. The follow-up CT exam. A coronal reformatted image shows regular structure and excretion of the supranumerary kidney. The percutaneous drain is also depicted.

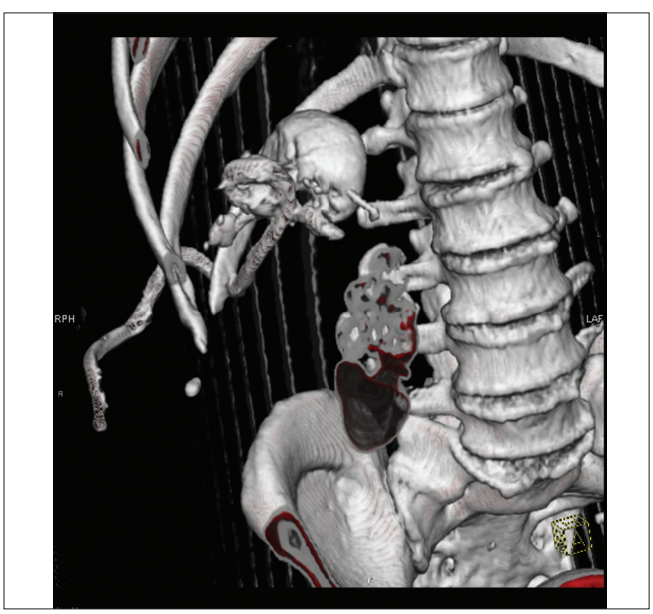

Fig. 3b. The follow-up CT exam. A contrast-enhanced excretory phase computed tomography (CT) transverse image demonstrates the blood supply to the supranumerary kidney.

drainage tube was left in the subhepatic area. The histopathological examination revealed renal cell carcinoma (RCC – subtype clear cell, Fuhrman G2) within intact renal capsule (pT1bN0). No intra- nor perioperative complications were observed. The drainage tube was removed on postoperative day 3, despite the fact that 150 ml of yellow fluid was collected daily. This fluid was considered peritoneal liquid and the patient was discharged on the same day. After 2 days the patient was readmitted because of strong lumbar pain, shivers and fever. The ultrasound exam showed a nonechoic space located in the subhepatic area, in the right lumbar region. The peristalsis was proper and laboratory findings were normal except for the increased serum leukocyte level. The subhepatic abscess was diagnosed and percutaneous drainage was performed and 300 ml of pus was collected and examined. The therapy with fluoroquinolone was introduced according to the microbiology finding. The patient's condition improved rapidly and he was discharged home after 3-day hospitalization with recommendation to measure the daily amount of collected fluid.

On the 14-day follow-up visit the patient was in good condition, but the daily amount of bright yellow fluid collected from the drain increased gradually up to 350 ml. The examination of the fluid showed the creatinine level of 101 mg/dL. The fluid was considered to be urine. A new CT scan and reassessment of initial exams was carried out. The reevaluation of the preoperative CT in the enhancement phase revealed the accessory organ located cranially to the right kidney with a small bridge of tissue binding those two together. A separate upper ureter was also visualized (Fig. 2 a, b). A new CT exam revealed the presence of a 6-cm long properly functioning kidney situated below and behind the liver. This kidney had normal renal vasculature from the aorta and inferior vena cava (Fig. 3 a, b). A true supernumerary kidney was recognized and the patient was operated on after a few days. The operation started with the laparoscopic approach, however due to some difficulties in dissecting the kidney it was completed in an open manner. The removed organ was typically reniform but smaller than the normal

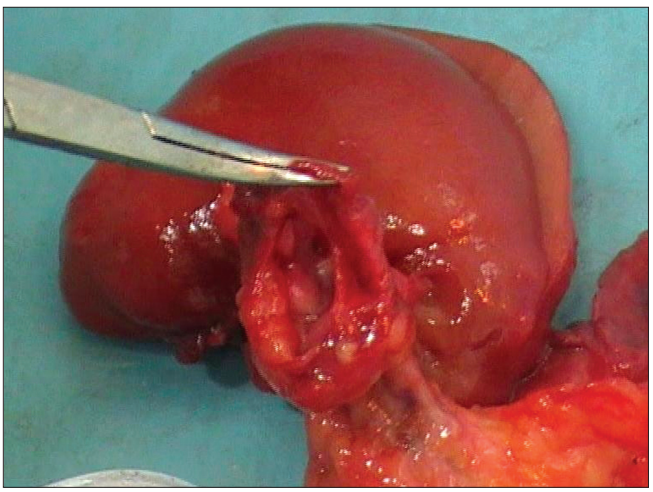

Fig. 4. The resected specimen.

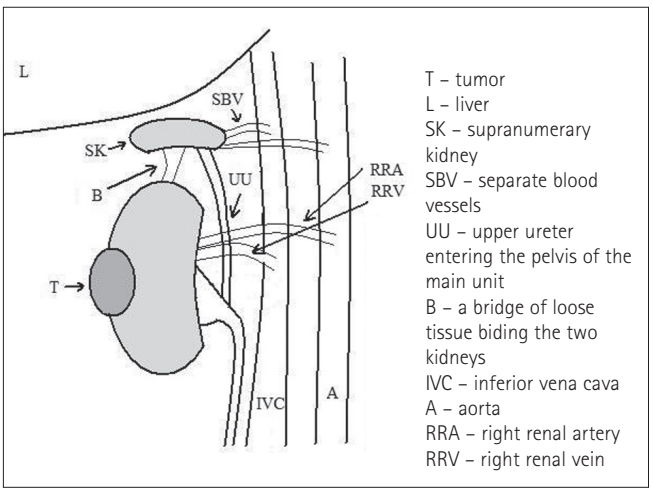

Fig. 5. Line diagram depicting the case.

kidney and its capsule seemed to be intact. A short ureter entered to remnant of the main pelvis, which was cut off and left during the first operation (Fig. 4). The postoperative period was uneventful and the patient was discharged on the fourth day.

The histopathology of the resected specimen showed normal encapsulated renal parenchyma with typical collecting system and a 10-mm long ureter. These findings confirmed the rarity of the case.

DISCUSSION

The true supernumerary kidney is an accessory organ with its own collecting system, blood vessels, and renal parenchyma, which are surrounded by a single capsule. It may be either completely separate from the main ipsilateral kidney or attached to it by loose fibrous tissue [1, 3]. The supernumerary kidney is generally smaller than the main one and is located somewhat caudad to the dominant kidney. Occasionally, the supernumerary kidney lies cranially or orthotopically to the normal kidney [2, 4].

The average age at diagnosis in all reported cases was 36 years. The most common complaints were pain, fever, hypertension, and a palpable abdominal mass. Subsequent pathologic conditions affecting supernumerary kidneys include hydronephrosis, pyonephrosis, calculi, tumors, or para-aortic mass [1, 4-8]. Various types of supernumerary kidney have been described [2]. Our case is depicted by the line diagram (Fig. 5).

The authors fully realize that in this case a diagnostic mistake could be made. It is theoretically probable that, as a result of technical error, the operating team cut off and left *in situ* the upper pole of the kidney.

Therefore, the authors emphasize the following facts about the presented case:

1. The operation was carried out by a surgeon with 15-year experience in urological laparoscopy. Previously, he performed more than 100 laparoscopic nephrectomies.

2. During the dissection of the kidney a fibrous capsule of the upper pole was visualized, but not damaged. This was confirmed by either macroscopic or pathological examination of the resected specimen.

3. The latter (supernumerary) kidney had a complete fibrous capsule, its own collecting system and a typical couple of blood vessels. The CT examination as well as assessment of a resected unit revealed the above-mentioned features. These findings were also confirmed microscopically.

No accurate diagnosis before the first operation can be explained by the following:

1. Preoperative diagnosis was based on a few selected CT scans confirming the presence of a tumor in the right kidney.

2. There was no suspicion of any other anomalies in ultrasound examination.

3. The diagnosis of renal tumor seemed to be so evident that neither radiologist nor urologist suspected any other abnormalities. It is possible that the "gold watch effect" had worked. Furthermore, it is worth emphasizing that the re-evaluation of the initial CT study was possible only because of the original examination had survived in a hard disc memory of the CT-unit.

The coincidence of tumor in a normal kidney with a supernumerary unit is obviously a rarity. Since congenital defects and anomalies of a genitourinary tract are quite common, a very careful assessment of diagnostic images is essential, particularly before laparoscopic treatment. A thorough investigation while interpreting exams will give a clue about the presence of even so rare entity. Ignorance of this condition can lead to inadvertent miss of a supernumerary renal unit and subsequent morbidity.

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