Non-invasive papillary urothelial carcinoma, low-grade of the renal pelvis mimicking a xanthogranulomatous pyelonephritis in a male patient: A case report and review of literature

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Abstract
We report on a 31-year-old male patient with non-invasive papillary urothelial carcinoma, low grade of the renal pelvis disguised as xanthogranulomatous pyelonephritis. The only symptom of the patient was lower back pain. The initial renal-enhanced computed tomography, magnetic resonance imaging and contrast-enhanced ultrasonography showed that the right kidney had a benign lesion and this inflammatory lesion might be xanthogranulomatous pyelonephritis. A percutaneous renal biopsy was performed and histopathologic examination revealed a xanthogranulomatous pyelonephritis. Initially, we diagnosed it as xanthogranulomatous pyelonephritis and treated it with antibiotics. One and a half years later, the patient suffered from back pain again. The lesion increased significantly and a right renal pelvic lesion with retroperitoneal lymphadenopathy was considered a malignant lesion on computed tomography scan. Therefore, radical resection of right renal pelvis carcinoma was performed under retroperitoneal laparoscopy. Intraoperative frozen section was reported as right renal urothelial carcinoma with no metastasis in renal hilar lymph node. Postoperative histopathologic examination revealed non-invasive papillary urothelial carcinoma, low grade of renal pelvis.

Keywords
diagnosis, papillary urothelial carcinoma, treatment, xanthogranulomatous pyelonephritis

Introduction
Carcinoma originating within the renal pelvis is uncommon, and even more rare is that it mimics a xanthogranulomatous pyelonephritis (XGP). XGP is an uncommon and special type of severe chronic renal parenchymal infection. The pathological feature is renal parenchyma destruction, characterized by lipid-filled foam-like macrophages. As the clinical and imaging manifestations are not typical, it is easy to be misdiagnosed with kidney tumor and other renal infectious diseases.
A 31-year-old male patient was admitted to hospital because of a mass of renal pelvis for half a year and right lower back pain for 1 week. The mass of renal pelvis was found without symptom and the right lower back pain occurred without frequent urination, dysuria, naked hematuria, night sweat, chilling fever, nausea or vomiting.

After admission, urine routine test showed BLD+, WBC+/HF, RBC+/HF. Urinary ultrasound revealed a 4.1 cm × 3.0 cm irregular mass in the upper position of the right kidney, with the clear boundary and no obvious blood flow signal in color Doppler flow imaging (CDFI). Computed tomography urography (Figure 1) demonstrated that after the right kidney is strengthened, the right kidney is reduced in the parenchyma of the upper pole. The border was clear, the cortex and medulla was fuzzy and the surrounding renal capsule was thickened. Soft tissue shadow filling was seen in the right renal pelvis, mildly intensified and the upper ureter was involved. The right kidney lesion is roughly similar as that of before (18 December 2012). Urine exfoliative cytology detected cells with nuclear atypia degeneration.

**Case report**

A 31-year-old male patient was admitted to hospital because of a mass of renal pelvis for half a year and right lower back pain for 1 week. The mass of renal pelvis was found without symptom and the right lower back pain occurred without frequent urination, dysuria, naked hematuria, night sweat, chilling fever, nausea or vomiting.

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The patient suffered from recurrent low back pain 1.5 later. Renal contrast-enhanced ultrasonography (Figure 3) showed that the right renal masses were “slow in and out” with moderate and high enhancement, suggesting that it was a malignant tumor. Computed tomography urography (Figure 4) exhibited that the shape of the right kidney was enlarged, and the irregular soft tissue of the mass could be seen in the right renal pelvis and part of the renal pelvis, mainly in the renal pelvis. The computed tomography value of the mass was about 40HU; after enhancement, the computed tomography value
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was about 68 HU, and the upper end of ureter was involved. The right renal pelvis and calyceal dilated hydronephrosis. Multiple enlarged lymph nodes were seen in the retroperitoneum. The results showed that malignancy in the right renal pelvis and calyceal, with retroperitoneal lymphadenopathy, significantly increased compared with that before (29 May 2013).

Discussion

The World Health Organization/International Council of Urology Classification 2004 classified urothelial papillary carcinoma into non-invasive and invasive urothelial papillary carcinoma, low-grade and high-grade. Upper urinary tract urothelial carcinoma (UTUC) is uncommon, accounting for about 5%–10% of all urothelial carcinomas, which occurs in the renal pelvis is the carcinoma of the renal pelvis. The incidence of the carcinoma of renal pelvis is about twice as that of ureteral carcinoma. About 60% of UTUCs were invasive at the time of initial diagnosis, with a high incidence of age. The incidence in males was three times higher than that in females at the age of 70–90 years.4

One of the most common clinical symptoms about carcinoma of renal pelvis is painless hematuria. The tumor invading the ureter may lead to obstruction and swelling. The other symptoms may include the weight loss and fatigue. Moreover, the signs may include palpable abdominal mass and the abdominal wall bulges. The methods of examination mainly include ultrasound, intravenous pyelography, computed tomography, magnetic resonance imaging and contrast-enhanced ultrasound. In this case, the patient had found a right renal pelvis mass for half a year after the physical examination. When the patient was hospitalized for the first time, lower back pain was the first symptom. We should distinguish this disease from kidney tuberculosis, renal pelvic cancer and so on. Therefore, we performed urine exfoliative cytology, renal ultrasound, computed tomography and magnetic resonance imaging, which suggested that it may be an XGP. But ultimately the final pathology of this patient after the second operation is the non-invasive papillary urothelial carcinoma, low grade of the renal pelvis. The tumor was not highly malignant, leading to atypical symptoms at the first visit. The lower back pain was the only symptom and the imaging findings were not typical; we were unable to identify the lesion features. Because of the result of the urine exfoliative cytology, a percutaneous renal biopsy was performed, and pathology suggested a large

Figure 4. CTU showing that the shape of the right kidney was enlarged, and the irregular soft tissue of the mass could be seen in the right renal pelvis and part of the renal pelvis, mainly in the renal pelvis. The CT value of the mass was about 40 HU; after enhancement, the CT value was about 68 HU, and the upper end of ureter was involved. The right renal pelvis and calyceal dilated hydronephrosis. Multiple enlarged lymph nodes were seen in the retroperitoneum. The results showed that malignancy in the right renal pelvis and calyceal, with retroperitoneal lymphadenopathy, significantly increased compared with that before (29 May 2013).

Figure 5. Renal MRI showing that there was a mass in the renal pelvis and calyceal of the right kidney with severe hydronephrosis and the enlarged retroperitoneal lymph nodes.

(Figure 6) non-invasive papillary urothelial carcinoma, low grade of renal pelvis, in a size of 10 cm × 5.1 cm × 4.5 cm, with invasion of the ureter, and no tumor metastasis was found in the lymph nodes (0/1). The patient showed no signs of tumor recurrence after 4 years of follow-up.
number of foam cells, lymphocytes and plasma cells’ infiltration. This report led us to consider XGP as a temporary diagnosis. Oki et al. had the same experience as us and reported that they misdiagnosed a high-grade urothelial carcinoma of the renal pelvis as XGP.

Surgery is one of the most important treatments for UTUCs, such as nephrectomy, radical nephrectomy, lymph node dissection and tumor reduction surgery. During the second admission, computed tomography urography and magnetic resonance imaging revealed that the right renal pelvis mass was significantly larger than before. Considering the possibility of carcinoma of renal pelvis, retroperitoneal laparoscopic radical resection of renal pelvis carcinoma was selected.

XGP is a chronic pyelonephritis caused by urinary tract obstruction, repeated renal infections and inflammatory diseases. Some of the patients often have diabetes. The incidence of XGP is extremely low, less than 1% of infectious nephropathy. It is a special type of chronic pyelonephritis. XGP has no specific clinical manifestations, but it sometimes has the following characteristics: a history of repeated urinary tract infection, lower back pain, fever, wasting, anemia; urine culture found Escherichia coli and Proteus; rapid erythrocyte sedimentation rate (ESR); and abnormal liver function. The pathology of XGP is characterized by progressive destruction of infected renal parenchyma and release of lipids, which are phagocytized into vesicles by macrophages. The characteristic signs under the microscope are a large number of lipid-containing foam cells in the cytoplasm and their nucleus is small and consistent with fine granular chromatin, but without nuclear division and heteromorphism, and Sudan staining positive. The renal biopsy result of this patient was XGP, and the lower back pain significantly improved after anti-inflammatory treatment, leading to misdiagnosis. Meanwhile, xanthogranuloma could also be the end result of obstruction caused by an upper tract urothelial carcinoma. According to past experience, ultrasound-guided fine needle biopsy is a simple and practical method to obtain definite diagnosis. However, this case suggests that ultrasound-guided renal biopsy cannot completely figure out the possibility of malignant tumor.

Malek and Elder considered that it can be divided into three periods of intrarenal types according to the pathological process. The lesion is confined to the renal parenchyma, only the renal pelvis or part of the renal parenchyma being involved. The intrarenal lesion occurs in the same period, but has penetrated the renal capsule to the perirenal fascia phase. The lesion involves most or all of the kidneys and invades perirenal tissues and organs. The pathological staging of the patients has an important guiding significance for the treatment.

According to the extent of the lesion, XGP can be divided into diffuse type and localized type. Diffuse type extensively invades renal parenchyma
and perirenal tissue and forms multiple necrotic foci in renal tissue most of which are conglutinated with adjacent organs, and even form pyogenic cavity, and there are cholesterol crystal cracks around it. There are small vessel hyperplasia, inflammatory granuloma structure, renal interstitial fibrous hyperplasia, glomerular fibrosis and renal function loss. Localized type is a focal lesion of the renal parenchyma. Partial renal parenchyma is replaced by foam cells and has different hyperplasia of fibrous tissue. Morphologic changes are similar to renal cell carcinoma, and the loss of whole renal function is later than diffuse type.10

Before the operation, the diagnosis of XGP is often unclear. It is difficult to identify with kidney tumors and kidney tuberculosis, and the patients with renal failure or failure of conservative treatment should be treated with surgery in time. The method of operation should be determined according to the clinical stage and type. The purpose of the operation is to remove all granulation tissue. Partial nephrectomy may be used if it is in stage I, stage II and localized lesions being located at one pole of the kidney. Radical nephrectomy and peripheral debridement of suspected lesions can be performed in diffuse type or stage III lesions.11 We notice that it is possible to coexist with renal neoplasms or renal tuberculosis. Godec12 reported on a patient with XGP, in situ transitional cell carcinoma and focal prosoplasia revealing abrupt conversion of transitional epithelium to moderately well-differentiated adenocarcinoma. Jeney’s13 case was the extremely rare coincidence of XGP and a transitional cell carcinoma of the renal pelvis.

Radical resection is one of the secure options when intraoperative frozen sections are difficult to diagnose.14 In recent years, there are more and more reports of XGP in laparoscopic nephrectomy. But it is difficult to free the kidney pedicle under the laparoscope for stage III lesions, especially when the lesions involve the inferior vena cava and the duodenum is prone to damage.15

Summarizing the literature and combining this case, we know that XGP can coexist with renal pelvis, ureter and bladder transitional cell carcinoma, and renal pelvic cancer can also be disguised as XGP. Therefore, strict diagnosis and treatment should be paid attention to clinical data such as medical history and imaging. Ultrasound-guided needle biopsy can be used as one of the diagnostic methods, but the most accurate diagnostic method is the pathological results after surgery.

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