Inflammatory Pseudotumor of the Urinary Bladder: case report with image findings

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Inflammatory pseudotumor of the urinary bladder is a rare entity that mimics a malignant bladder tumor both clinically and radiographically. We report a 66-year-old man, presented with gross hematuria. Intravenous urography (IVU), computed tomography (CT), and magnetic resonance imaging (MRI) all demonstrated a pedunculated polypoid mass originated from the dome of the bladder and invaded the bladder wall. On MRI, the lesion exhibited intermediate signal intensity on T1WI image and a rim of low signal intensity with a high signal core on T2WI image, suggesting a sarcomatoid tumor with a myxoid core. The tumor was removed by partial cystectomy and the pathologic report revealed a benign pseudosarcomatous fibromyxoid tumor.

CASE REPORT

A 66-year-old man complained of persistent gross hematuria for 2 months. He was a non-smoker with no history of other diseases or surgery. He had undergone a cystoscopic biopsy in another hospital, but the pathological report described only necrosis and hematoma. He was referred to our urology clinic for further evaluation.

Under the tentative diagnosis of transitional cell carcinoma (TCC), serial examinations were arranged, including intravenous urography (IVU), computed tomography (CT), and magnetic resonance imaging (MRI). IVU revealed a large mass-like filling defect within the bladder. Contrast medium was visible between the mass and the lateral and inferior walls, implying a tumor hanging from the dome of the bladder (Fig. 1). CT scan showed a 6 x 4 x 5-cm soft tissue density mass within the bladder (Fig. 2). After intravenous administration of iodine-contained contrast medium, the mass enhanced heterogeneously with a peripheral ring-like enhancement (Fig. 2b). The mass appeared to be inseparable...
Inflammatory pseudotumor of urinary bladder

from the apical-anterior bladder wall, but urine was present between the mass and the lower bladder wall (Fig. 2b, 2c), again suggesting a mass originating from the apical-anterior bladder wall with possible invasion of the bladder wall. This configuration was more clearly demonstrated on coronal reformatted slices (Fig. 2c).

Since he had no risk factors for TCC and three sets of urine cytology samples were all reported as negative for malignant cells, MRI was arranged to further investigate the nature of the suspicious tumor mass (Fig. 3). The lobulated mass demonstrated intermediate signal intensity on T1-weighted images (Fig. 3a). On T2-weighted images, the tumor mass demonstrated a peripheral rim of low signal intensity with high signal core (Fig. 3b), suggesting a periphery of cellular composition with fluid-like core. This would be consistent with a sarcomatoid

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**Figure 1.** Intravenous urography (IVU) showing a large filling defect within the urinary bladder. The mass lesion can be seen separated from the lateral and inferior bladder walls. A foley catheter is depicted.

**Figure 2.** Computed tomography (CT) of the bladder revealing a heterogeneously enhanced mass with peripheral ring enhancement. **a. b.** Axial sections showing the mass surrounded by urine and separated from the urinary bladder wall. **c.** Coronal reconstruction further demonstrates a mass arising from the apical-anterior bladder wall and extended inferiorly.

**Figure 3.** Magnetic resonance imaging (MRI) **a.** Axial T1-weighted image revealing a soft tissue lesion with low-to-intermediate signal intensity inside the urinary bladder. **b.** Axial T2-weighted image demonstrating a rim of low signal intensity with high signal core, suggesting a cellular periphery with a fluid-like core. **c.** Gadolinium-enhanced T1-weighted image showing a heterogeneously enhanced tumor.
tumor with a myxoid core. The mass enhanced heterogeneously after intravenous gadolinium injection (Fig. 3c), similar to that of post-contrast CT scan. On sagittal and coronal MRI images (Fig. 4), the mass was polypoid and attached to the anterior bladder dome, with the dependent portion occupying most of the bladder lumen.

Cystoscopy showed an easy-bleeding, pedunculated mass attached to the dome of the bladder. A tumor specimen was obtained by transurethral biopsy. The patient subsequently underwent partial cystectomy for complete resection of the tumor. Pathologically, the tumor showed a picture of polypoid myxoid soft tissue tumor, composed of “tissue culture” appearance of fibroblasts in the myxomatous background with vascular rich stroma and interstitial hemorrhage. Mitotic activities were account for 1-3/10 per high power field (HPF). Scattered lymphocytes, plasma cells, and multinucleated giant cells with prominent nucleoli were found, whereas pleomorphic tumor cells were not seen. The pathological diagnosis for both biopsy and surgical specimens was pseudosarcomatous fibromyxoid tumor (Fig. 5). The patient’s postoperative course was uneventful and he was followed up regularly at urologic clinic without signs and symptoms of recurrence.

**DISCUSSION**

When a middle-aged man presents with gross haematuria and imaging studies show a mass in the bladder, it is not surprising that TCC will immediately be considered. The case we reported is a reminder that, despite clinical and imaging findings that are most commonly associated with a malignant bladder tumor, benign disease still figures in the differential diagnosis.
Inflammatory pseudotumor of the urinary bladder is a non-neoplastic proliferation of myofibroblastic spindle cells and inflammatory cells with edematous myxoid components [3-5, 7]. It is increasingly being called pseudosarcomatous fibromyxoid tumor [4-6], which more accurately reflects the histology. Originally, these lesions are thought to be an unusual inflammatory response to insults such as infection, trauma, or surgery. However, as more cases have been discovered, it has become clear that many patients have no obvious predisposing factors [1, 3, 4, 7-9]. The tumor has been reported in individuals ranging from adolescence to old age, with a mean age of 38 years [5, 6, 9]. With sporadic cases reported in both men and women, there is inadequate data to determine if there is a gender predilection [1-5]. To date, there have been no report of malignant transformation, although there have been some recurrences of the lesion after resection [1, 3, 4].

Grossly, an inflammatory pseudotumor appears as a single exophytic or polypoid mass, reportedly arising anywhere within the bladder with the exception of the trigone [2-4]. It may be locally aggressive, invading the adjacent bladder wall [1, 5, 9]. The mass is frequently ulcerated and friable [3, 5, 8], which explains why hematuria is the commonest initial sign of the disease.

On imaging examinations, inflammatory pseudotumor is indistinguishable from bladder cancer on IVU or non-contrast enhanced CT images. On contrast-enhanced CT images, though, there is ring enhancement produced by the peripheral spindle and inflammatory cells [1, 4, 5]. This sign is more suggestive of inflammation than of blood clots or malignancy. MRI provides further detailed information regarding the internal composition of the pseudotumor, which makes it a more helpful imaging modality while dealing with a diagnostic dilemma. T1-weighted images are not particularly helpful, as the lesions demonstrate a non-specific iso- to hypointensity. T2-weighted images, on the other hand, reveal the internal composition of the pseudotumor as heterogeneous with central high signal intensity and peripheral low signal intensity rim. The central myxoid components contribute to the high signal intensity, while the surrounding accumulation of fibroblastic spindle cells and inflammatory cells produce peripheral low signal intensity [1-3, 5]. The post-gadolinium enhancement pattern appears heterogeneous and is similar to that of contrast-enhanced CT scan. MRI findings help to distinguish it from TCC, which more commonly appears as an intermediate-signal-intensity mass on T2WI [10]. Imaging thus may suggest inflammatory nature of the mass and can be helpful in surgical planning. Besides, sagittal and coronal reconstructed images are also useful for delineating the location, extension, and configuration of the mass.

Inflammatory pseudotumor may also appear as a heterogeneously enhanced mass lesion with intramural solid and cystic parts. On CT scan, thickening of peripheral bladder wall and perivesical fat stranding indicate tumor involvement. On T1WI MR images, local invasion causes disruption of the low intensity muscular layer. Occasionally, the tumor maybe covered with blood clot that exhibits intermediate signal intensity on T1WI images and distinct low signal intensity on T2WI images [1, 2, 5]. The above findings are not seen in our case.

Due to occasional locally aggressive appearance, the tumor needs to be differentiated from malignant spindle cell tumors pathologically, such as myxoid leiomyosarcoma, embryonal rhabdomyosarcoma, and sarcomatoid carcinoma. However, presence of loosely packed spindle cells within edematous stroma with relatively few mitoses, normal mitotic rate not exceeding 5-10/10 HPF, and absence of nuclear hyperchromatism and pleomorphism are all indicative of a benign lesion [2, 4-6].

CONCLUSION

Improvements in imaging modalities and development of new techniques, especially different MR sequences, are yielding increasing information about specific tissue components of bladder tumors. Pathological evaluation is still required for definitive diagnosis of inflammatory pseudotumor. Thus, tumor resection is necessary. The imaging appearance, however, gives at least some helpful clues that recognize the possibility of this benign lesion when listing the differential diagnosis for a bladder tumor.

REFERENCES

膀胱炎性假瘤：病例報告及影像特徵

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膀胱炎性假瘤是一種罕見的良性疾病，但臨床表現以及影像的呈現常與惡性膀胱腫瘤不易區分。我們報告了一位 66 歲男性病患因血尿來求診，初步影像上看似一個從膀胱頂部長出的惡性腫瘤，但最終開刀後的病理結果是炎性假瘤。病人在求診過程中接受了靜脈注射尿路造影、電腦斷層攝影、核磁共振檢查。文中我們將描述膀胱炎性假瘤的特徵以及影像上的表現。