Case Study of the Month

Solitary Fibrous Tumour of the Prostate Identified on Needle Biopsy

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1. Case report

A 60-yr-old man with lower urinary tract symptoms whose laboratory values were normal, with a serum prostate-specific antigen (PSA) of 0.60 ng/ml, was found to have an enlarged and hard left lobe of the prostate on digital rectal examination. Transrectal ultrasound (TRUS), computed tomography (CT), and magnetic resonance showed a large, solid, and circumscribed mass, hypoechoic, located in the left transition zone (Figs. 1 and 2). A diagnosis of solitary fibrous tumour (SFT) was rendered based on the histopathologic and immunohistochemical findings in 12 TRUS-guided needle biopsies. At nerve-sparing retropubic radical prostatectomy, the mass appeared to be well delineated, with no invasion of the bladder neck or pelvic wall. Frozen section examination showed negative resection margins and no deposits in the regional lymph nodes. The patient’s postoperative recovery was uneventful. A CT scan of the abdomen and the patient’s clinical examination, including cystoscopy, showed no evidence of residual tumour 6 mo after surgery.

The final pathology report described a well-circumscribed, rubbery mass measuring 8 × 7 × 6 cm and weighing 170 g, with tan-yellow, focally white, cut surface and a thin rim of compressed prostatic tissue, located in the left transition zone (Fig. 3).

The histologic and immunohistochemical examination of the radical prostatectomy specimen showed features identical to those seen in the biopsies. At low-power magnification, the tumour had a smoothly contoured periphery and was surrounded by normal prostatic tissue. Lesional tissue revealed a low to moderately cellular process set in a densely...
sclerotic collagenous matrix interrupted by pockets of oedematous stroma. The tumour consisted of short spindled cells possessing meagre amounts of eosinophilic cytoplasm and bland nuclei with uniformly distributed chromatin and inconspicuous nucleoli (Fig. 4). The mitotic rate was one mitosis per 50 high-power fields (HPFs). Separation of the cells from the dense collagen focally imparted a pseudoangiomatous appearance. Paucicellular foci with increased sclerotic or oedematous stromal matrices were observed. The vascular density varied in different areas of the tumour but, generally, was slightly greater than that of the surrounding normal prostate. The vascular element consisted of capillary-sized vessels with muscular walls. The vessels had either a rounded configuration or, more commonly, were ectatic with an irregular contour, resulting in an angiofibromatous appearance.

The tumour also featured scattered cellular zones exhibiting cells arranged in a haphazard pattern. The cells exhibited nuclear atypia in the form of mild hyperchromasia and variation in the nuclear size and shape (Fig. 5). Mitotic activity was fewer than two mitoses per 10 HPFs. No necrosis was identified.

The tumour cells were immunoreactive to CD34 and bcl-2 (Figs. 6 and 7) and were negative for CD117 (c-kit), anaplastic lymphoma kinase (ALK-1), smooth muscle actin, and progesterone receptors (PRs).

2. Discussion

SFTs are uncommon spindle-cell neoplasms, usually arising from the pleura. Extrapleural/extrathoracic SFTs have been increasingly described in various locations, including the genitourinary tract [1,2]. Fewer than 20 cases of SFT of the prostate, reported as single cases and one series of 13 cases seen on either needle biopsies or transurethral resections (TURs), have been
reported in patients ranging in age from 21 to 75 yr [3–7].
Four additional cases originating from the periprostatic tissues and involving the prostate, two of them from the Denonvilliers’ fascia, have also been described [4]. The most common clinical findings included urinary retention, urinary frequency, dysuria, and hypoglycaemia. They demonstrate a broad size distribution, ranging from 2 to 14 cm, with many reported to be >5 cm [3–8].

Microscopically and immunohistochemically, prostatic SFTs appear similar to those identified in extraprostatic sites. Admixed prostatic tissue is not commonly associated with these lesions. Immunohistochemistry generally reveals diffuse reactivity for CD34 and bcl-2. Staining for CD99, beta-catenin, p53, smooth muscle actin, and muscle-specific actin has also been reported. These tumours are negative for pancytokeratin, S-100, c-kit, ALK-1, and PRs [5].

SFT should be differentiated from a variety of benign and malignant spindle-cell tumours involving the prostate (Tables 1 and 2). The two most crucial neoplasms that should be distinguished from SFT on prostate biopsy are specialised stromal tumours of the prostate, particularly stromal tumours of uncertain malignant potential (STUMPs), and gastrointestinal stromal tumour (GIST) [9].

STUMPs are characterised by four patterns: (1) scattered atypical stromal cells associated with benign glands, (2) resembling glandular-stromal hyperplasia yet with hypercellular stroma, (3) extensive myxoid stroma, and (4) phyllodes pattern. The pattern of SFT that could be confused with an STUMP would be myxoid SFT, which is uncommon. Additionally, in contrast to SFT, STUMPs lack the dense wirelike hyalinised deposits and lack vessels with a haemangiopericytomatous appearance. Immunohistochemical markers, such as PRs, smooth muscle actin, and CD34, are present in many of the specialised stromal tumours of the prostate. GIST arising from the rectal wall may be sampled either incidentally or because of its effacement of the prostate. GIST can be differentiated from SFT by its expression of c-kit.

Based on a combination of pathologic factors, including size (>10 cm), mitotic activity (more than four mitoses per 10 HPFs), nuclear pleomorphism, infiltrative boundaries, and necrosis, pleura-based SFTs are distinguished into benign or malignant varieties. These pathologic factors do not always correlate with clinical behaviour. Owing to the rarity of extrapleural/extrathoracic SFTs, especially those of the genitourinary tract, correlation between histologic findings and clinical outcome is poor, and the clinical behaviour is difficult to predict. Complete resection of the tumour is currently the single main prognostic factor, emphasising the importance of the evaluation of resection margins [10].

Treatment options for patients in whom an SFT is identified on prostatic biopsy include (1) additional biopic or transurethral prostatectomy sampling in an attempt to define the extent of the lesion and to rule out a higher-grade

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**Table 1 – Morphologic comparison of spindle lesions of the prostate**

<table>
<thead>
<tr>
<th>Morphology</th>
<th>Solitary fibrous tumour</th>
<th>Stromal tumours of uncertain malignant potential</th>
<th>Stromal sarcoma</th>
<th>Sarcomatoid carcinoma</th>
<th>Leiomyoma</th>
<th>Leiomyosarcoma</th>
<th>Rhabdomyosarcoma</th>
<th>Stromal myofibroblastic tumor</th>
<th>Gastrointestinal stromal tumour</th>
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<tr>
<td>Uniform spindled cells with bland nuclei in a “patternless” pattern among a background of ropy collagen</td>
<td>Four patterns: (1) degenerative atypia, (2) hypercellular stroma, (3) benign phyllodes-like, (4) myxoid stroma with bland cells</td>
<td>Two patterns include: (1) solid growth of overtly malignant cells with storiform, epithelioid, fibrosarcomatous, or patternless patterns, (2) malignant phyllodes-like</td>
<td>Admixture of high-grade prostatic adenocarcinoma and spindled “sarcomatoid” component with variable heterologous element formation</td>
<td>Well-organized smooth muscle fascicles lacking mitotic activity and with little to no atypia</td>
<td>Intersecting fascicles showing mitoses, cytologic atypia, and necrosis</td>
<td>Primarily embryonal subtype consisting of small round cells with variable eosinophilic cytoplasm, occasional elongated/strap cells, and, commonly, a myxoid background</td>
<td>Uniform, reactive myofibroblasts with a cell-culture appearance in a background of variable inflammation and extravasated red blood cells</td>
<td>Spindled cells in a fascicular growth pattern with perinuclear vacuoles</td>
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**Table 2 – Immunohistochemical characteristics of nonepithelial prostatic spindle-cell lesions**

<table>
<thead>
<tr>
<th>CD34</th>
<th>SMA</th>
<th>Desmin</th>
<th>Myogenin</th>
<th>CD117</th>
<th>ALK-1</th>
<th>PRs</th>
<th>PSA</th>
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<td>++</td>
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**Legend:**
- SFT = solitary fibrous tumour
- STUMP = stromal tumours of uncertain malignant potential
- SS = stromal sarcoma
- Leiomyosarcoma
- Rhabdomyosarcoma
- IMT = inflammatory myofibroblastic tumour
- GIST = gastrointestinal stromal tumour
- SMA = smooth muscle actin
- CD117 = c-kit
- ALK-1 = anaplastic lymphoma kinase
- PRs = progesterone receptors
- PSA = prostate-specific antigen.
component; (2) close clinical follow-up, especially in older men in whom the lesion is focally present and nonpalpable; and (3) nerve-sparing radical prostatectomy, especially in younger men with a palpable lesion, severe urinary symptoms, or an extensive lesion on imaging, aiming at preserving sexual and urinary functions. Cystoprostatectomy should be avoided unless the tissue planes between the prostate mass and the bladder are obliterated by the neoplastic growth.

Conflicts of interest: The authors have nothing to disclose.

References


EU-ACME question

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Question:

What is the most suitable option for treatment of a solitary fibrous tumour of the prostate identified on prostatic biopsy material in a younger man with a palpable lesion?

A. Cystoprostatectomy
B. Cryoablation
C. Pelvic exenteration
D. Radical prostatectomy