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CASE REPORT

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Benign glomus tumor of prostate: a case report

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Abstract

Glomus tumor (GT) is a neoplastic lesion of mesenchymal origin arising from the neuromyoarterial canal or glomus body. Although most GT occur in the peripheral soft tissue and extremities, these tumors can grow anywhere in the body. Here, we describe an uncommon case of GT involving the prostate.

Keywords Prostate, Glomus tumor, Magnetic resonance, Diagnosis

Background

Glomus tumor (GT) is a neoplastic lesion of mesenchymal origin arising from the neuromyoarterial canal or glomus body. The tumor can occur anywhere in the body, including soft tissue and extremities, the genitourinary tract, the gastrointestinal tract, and the respiratory tract, but most of them located in the dermis or subcutis in the subungual region. Subungual glomus tumors often present with typical clinical triad of intermittent pain, excruciating tenderness, and cold sensitivity. While glomus tumors that occur elsewhere often appear as painful nodules, or asymptomatic. Here, we describe an uncommon case of glomus tumor involving the prostate.

Case presentation

The 63-year-old male was admitted on July 13, 2023 with a primary complaint of intermittent right lower abdominal pain for the past 8 months and increased urinary frequency for the last 14 days. He had not been receiving regular medical treatment or medication. He had no history of prostate cancer and no hematuria or hemospermia. Digital rectal examination revealed irregular enlargement of prostate. Biochemical tests showed elevated carcinoembryonic antigen (15.8 μg/L) and normal serum prostate-specific antigen (PSA) (1.21 μg/L).

During the ultrasound examination, irregular prostate enlargement was observed, with a hypoechoic mass in the central region measuring approximately 33 mm × 28 mm. Magnetic resonance (MR) scan showed that T1-weighted imaging showed irregular enlargement of the prostate, T2-weighted images showed a well-marginated, oval, hyperintense lesion with a hypointense rim located in right basal part of the prostate. Dynamic contrast-enhanced magnetic resonance imaging showed strong enhancement (Fig. 1). The patient was diagnosed with a benign prostate tumor.

In our hospital, "transurethral resection of the prostate" was performed under general anesthesia. Endoscopically, the pronounced prostate hyperplasia led to urethral compression and narrowing, with the prostate protruding into the bladder. The lesion was excised, resulting in significant bleeding that was difficult to control, along with evident vascular hyperplasia. Hematoxylin and eosin (H&E) revealed that the neoplasm consists of clusters of uniform cells with non-atypical nuclei and

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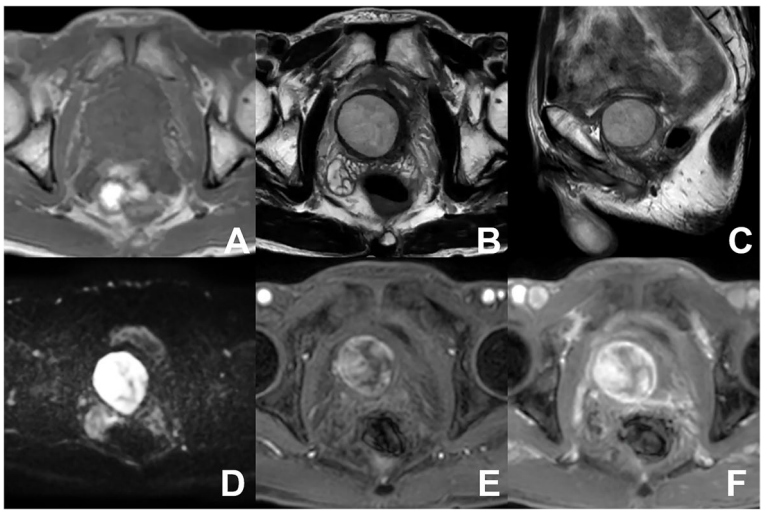

Fig. 1 Preoperative magnetic resonance scan. **A** T1-weighted imaging revealed irregular enlargement of the prostate. **B**, **C** T2-weighted images revealed a well-marginated, oval, hyperintense lesion with a hypointense rim located in right basal part of the prostate, measuring approximately 3.3 cm by 3.2 cm. **D** Diffusion-enhanced imaging revealed the lesion was hyperintense. **E**, **F** Dynamic contrast-enhanced magnetic resonance imaging revealed that the lesion exhibited significant peripheral enhancement.

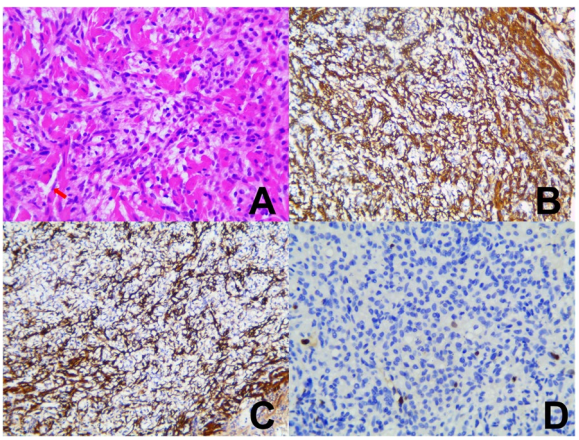

Fig. 2 Postoperative pathology. **A** H&E staining reveals numerous tumor cells. And tumor cells have oval or round nuclei with amphophilic to eosinophilic cytoplasm and minimal mitotic activity. Tumor cells surrounding capillary-sized vessels (red arrows) (H&E, ×20 magnification). **B**, **C** IHC staining for SMA and h-caldesmon are positive. **D** Ki67 index is less than 3%

eosinophilic cytoplasm, arranged around dilated vessels. Immunohistochemical (IHC) staining revealed that the neoplastic cells reacted positively to the smooth muscle actin (SMA), h-caldesmon (Fig. 2), calponin and vimentin. Ki67 index is less than 3%. These findings are consistent with the diagnosis of a benign glomus tumor of the prostate. During the 8-month follow-up, the patient experienced no recurrence.

Discussion

Glomus tumors (GTs) are mesenchymal tumor consisting of glomus cells originating from normal glomus, blood vessels, and smooth muscle cells [1]. Most GTs are benign and often occur in the skin of the head and neck, muscles, and distal limbs, the subungual region of the digits [2]. GT in the prostate is very uncommon finding, only one case of malignant prostate glomus tumor has been reported [3]. Currently, there are no reports on benign glomus tumors of the prostate, making this potentially the first case. An accurate diagnosis relies on pathological examination.

Histologically, GTs are usually well-circumscribed nodules comprised of uniform round cells with centrally located nuclei and well-defined cell borders [2]. GTs are subdivided into solid glomus tumor, glomangioma, and glomangiomyoma. 75% of cases are solid glomus tumor, with poor vasculature and scant smooth muscle component. Glomangioma, the second most common type (20%), has a prominent vascular component. Glomangiomyoma are the rarest type, with prominent vascular and smooth muscle components [4, 5]. Due to the fact that glomus bodies are specialized neurovascular organs of the skin, tumors are most commonly located in the deep dermis or subcutaneous tissue of the limbs involved in temperature regulation [4]. They arise in regions abundant in glomus bodies, such as the subungual areas of the digits or the deep dermis of the palm, wrist, forearm, and foot [2]. Nevertheless, a few of case reports indicate that glomus tumors can arise from sites where glomus bodies are absent, such as the mediastinum, penis, nerves

and bones [5, 6], and also including the prostate, which is highlighted in this case report. It has been proposed that some GTs might be induced by the differentiation of pluripotent mesenchymal cells or ordinary smooth muscle [5]. IHC staining is valuable for diagnosing glomus tumors and distinguishing them from other conditions, as glomus tumor cells are stain-positive for type IV collagen, vimentin, h-caldesmon, calponin and smooth muscle actin, while the results for desmin, AE1/AE3, and S-100 proteins are usually negative [7–9].

Radiological examination can effectively assess the tumor's location, size, extent of invasion, and distant metastasis. However, the MR Imaging features of GT are nonspecific and can also be found in other tumors like prostate cancer, extra-gastrointestinal stromal tumor (EGIST), neuroendocrine tumors, and hemangioma. Prostate cancer, the most prevalent malignancy of the prostate, typically originates in the peripheral zone of the prostate and is accompanied by a significant elevation in serum PSA levels. And the IHC markers such as P50, PSA, and PAP are positive [10]. Secondly, EGIST is a rare uncommon manifestation of gastrointestinal stromal tumors originating from the abdominal soft tissue [11]. CD117 and CD34 are highly sensitive IHC markers commonly used for diagnosing EGIST due to their similar pathological features and molecular biological characteristics with GIST [12]. Delay of germination 1 (DOG1) has higher specificity and sensitivity in the diagnosis of EGIST, and it is often used as the final diagnostic marker in cases with unclear tumor cell morphology [13]. Third is the neuroendocrine tumors, which is another rare and highly aggressive malignant tumor. Patients with neuroendocrine carcinoma typically show low levels of serum PSA and demonstrate limited responsiveness to endocrine therapy [14]. Early-stage disease may present with distant metastasis and paraneoplastic syndrome [15]. Immunohistochemical analysis showing positive expression of neuron-specific enolase (NSE), chromogranin a (Cga), and synuclein (Syn) plays a crucial role in diagnosing neuroendocrine carcinoma [9]. Hemangioma of the bladder or posterior urethra presenting with hematuria, hemospermia or urethral bleeding have been sporadically reported [16, 17]. Hemangioma arising in prostatic tissue causing lower urinary tract symptoms without hematuria or hemospermia is extremely rare [18].

The primary treatment for GT is surgical operation. Since the tumors are non-encapsulated and may exhibit irregular borders, there is a risk of recurrence if the nodule is incompletely excised. Large case series show recurrence rates after complete excision ranging from 0–6.6% [19]. But as described in our case, endoscopic resection is also an option for GT occurring in the prostate [20]. However, it is also important to consider the location and malignant potential of the tumor when deciding between surgical and endoscopic resection. [6]. Similar to other treatment options for prostate tumors, transurethral resection may be an effective method for GTs of the prostate. Completely resected small tumors without necrosis and mitosis have a favorable prognosis. However, due to the potential for malignancy, long-term follow-up and monitoring are strongly recommended [13].

Conclusion

In conclusion, this case report underscores the importance of considering benign glomus tumor as a possibility when encountering a hyper-vascular lesion in the prostate with a normal serum PSA level.

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Authors' contributions
ZL, CA, HW obtained and analyzed the clinical data. ZL, JT, and YW wrote the manuscript. ZL, YJ, HZ, and ML designed and constructed the figures. YZ designed and supervised the study and edited the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials
The data used and analyzed during the current study are available from the corresponding author on reasonable request.

Data availability
Data is provided within the manuscript.

Declarations

Ethics approval and consent to participate
Ethical approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patient provided his written informed consent to participate in this study. Written informed consent was obtained from the patient for the publication of any potentially identifiable images or data included in this article.

Consent for publication
Written informed consent was obtained from the patient for the publication of any potentially identifiable images or data included in this article.

Competing interests
The authors declare no competing interests.

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