Malignant Glomus Tumor of the Urinary Bladder

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- We present a case of a malignant glomus tumor arising in the urinary bladder of a 57-year-old woman with metastatic pulmonary nodules who died 2 months later. Pathologically and clinically confirmed malignant glomus tumors are exceedingly rare, especially those that arise in the visceral organs. The present case retained its architectural similarity to a benign glomus tumor and consisted of sheets of highly malignant round cells showing cytoplasmic positivity for smooth muscle actin. On reticulin histochemical staining, we found that reticulum fibrils surrounded individual tumor cells, suggesting cellular investment by basement membrane. We discuss the concept of malignant glomus tumors and emphasize the criteria that distinguish them from other malignant tumors.

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Glomus tumors are mesenchymal neoplasms composed of cells that closely resemble the modified smooth muscle cells of the normal glomus body. These neoplasm are rare, accounting for less than 2% of soft tissue tumors. Most glomus tumors are small, benign neoplasms that occur in the dermis or subcutis of the extremities. Moreover, malignant glomus tumors are exceedingly rare, accounting for less than 1% of glomus tumors. To our knowledge, no cases arising in the urinary bladder have been previously reported. We document a 57-year-old woman with a urinary bladder mass, which was diagnosed as a malignant glomus tumor.

REPORT OF A CASE

A 57-year-old woman presented with a 2-month history of gross hematuria. She had previously received a diagnosis of myelomeningocele when about 100 days old and had received a right simple nephrectomy for renal tuberculosis 30 years before admission. Magnetic resonance imaging showed a 6.5 × 5 × 5.8-cm solid mass located in the left lateral wall and in the inferior portion of the urinary bladder with an extension to the left perivesical fat tissue (Figure 1, A), and chest computed tomography showed multiple hematogeneous unevenly sized metastatic nodules scattered in both lungs (Figure 1, B). After a cystoscopic examination, a transurethral resection was performed. However, after 2 months of follow-up, she died due to pulmonary failure in spite of chemotherapy.

PATHOLOGIC FINDINGS

Microscopic findings showed a solid proliferation of uniform cells, which had infiltrated into the subepithelial connective tissues and proper muscles of the urinary bladder. Tumor cells were primarily perivascular in distribution (Figure 2, A). They were composed of uniformly round cells having a prominent central nucleus with small amounts of eosinophilic cytoplasm and well-defined cell borders (Figure 2, B). Under high-power magnification, the cells showed diffuse cytologic atypia (anisonucleosis, nuclear membrane irregularities, and prominent nucleoli) and a focal spindle morphology. The mitotic rate was about 50 per 10 high-power fields with a maximum of 12 per high-power field. Multifocal tumor necrosis and hemorrhage were also noted. Immunohistochemical staining showed marked diffuse positivity for smooth muscle actin (Figure 2, C). All other markers, including cytokeratins, epithelial membrane antigen, S100 protein, desmin, CD31, and CD34, were negative. On reticulin histochemical staining, we found that reticulin fibrils surrounded individual tumor cells (Figure 2, D).

COMMENT

Glomus tumors are usually benign and solitary. However, a few cases of malignant glomus tumors have been reported, but during the past years, the true malignant nature of glomus tumors has been the subject of debate. The reasons for this were that biologic confirmation of histologically malignant glomus tumors was lacking and that rare malignant glomus tumors with metastases lacked a benign glomus component, and thus, the diagnosis accuracy was questioned. However, a small number of pathologically or clinically malignant glomus tumors have been described, and their malignant nature is substantiated by these studies.

The classification scheme and the characteristics of glomus tumors with atypical features were proposed by Folpe et al.9 According to this classification, the diagnostic criteria of malignancy are as follows: (1) size greater than 2 cm and a subfascial or visceral location; (2) atypical mitotic figures; or (3) moderate-to-high nuclear grade and 5 or more mitotic figures per 50 high-power fields. The overall metastatic rate of tumors fulfilling any of the proposed criteria of malignancy is 38%. Our patient had a large tumor (6.5 cm in maximal diameter) with a visceral location (urinary bladder) and marked nuclear atypia with high mitotic activity (50/10 high-power fields).
to the above criteria, our case is consistent with a malignant glomus tumor, and it was clinically confirmed by the presence of metastasis.

Gould et al. subdivided malignant glomus tumors into 2 categories, depending on the presence or absence of a benign precursor: (1) malignant glomus tumor arising within a glomus tumor, and (2) de novo malignant glomus tumor. A benign glomus tumor surrounding a malignant area is found in about half of the cases. The malignant areas can assume one of 2 types. In the first type, the malignant component resembles a leiomyosarcoma or fibrosarcoma, whereas in the second type, the malignant component retains an overall architectural similarity to benign glomus tumor and consists of sheets of highly malignant—appearing round cells. The present case was suggested to be de novo malignant glomus tumor with the second malignant type, because the tumor retained an overall architecture that was similar to benign glomus tumor.

Initially, we had difficulty making the diagnosis, not only because there was no apparent benign glomus tumor component but also because the urinary bladder is an unusual location for a glomus tumor. Differential diagnoses included sarcomatoid urothelial carcinoma, hemangiopericytoma, leiomyosarcoma, and malignant myopericytoma. The immunohistochemical results showed smooth muscle actin positivity and negativity for any epithelial markers and CD34, thus differentiating sarcomatoid carcinoma and hemangiopericytoma. Epithelioid leiomyosarcomas have a round or polygonal cell appearance with smooth muscle actin positivity. However, malignant glomus tumors are differentiated from epithelioid leiomyosarcomas, as glomus tumors usually have delicately branching diminutive vessels, as opposed to rather thick-walled blood vessels, and have distinct cell borders with uniform cellular compartmentalization by the basement membrane. In addition, the possibility of malignant myopericytoma was suggested. Malignant myopericytoma has recently been described, and it shares some morphologic and immunophenotypic similarities with benign myopericytoma, but the former clearly demonstrates malignant histologic features and an aggressive clinical behavior. Myopericytoma is characterized by multilayered concentric proliferations of spindle cells with myoid features around blood vessels, whereas our case showed focal proliferation of tumor cells around blood vessels. Moreover, the typical myoid appearance of myopericytoma was not noted, ruling out the possibility of malignant myopericytoma.

Malignant glomus tumors arising in the visceral organs, including the stomach and lung, have been reported, but have not previously been reported in the urinary bladder. To our knowledge, this is the first report of a malignant glomus tumor arising in the urinary bladder—in this instance, in a 57-year-old woman. When a tumor composed of malignant round or epithelioid cells is encountered, malignant glomus tumor should be included in the differential diagnosis. In all locations, when a typical glomus tumor is recognized, it is regarded as the most important clue to the diagnosis of malignant glomus tumor. However, in difficult cases without a benign precursor, the immunohistochemical demonstration of smooth muscle actin expression and individual cells surrounded by the basement membrane may be valuable in the diagnosis.
Figure 2. Microscopic findings of the malignant glomus tumor. The tumor cells were primarily perivascular in distribution (A, hematoxylin-eosin, original magnification ×40) and showed uniformly round cells with prominent central nuclei and small amounts of eosinophilic cytoplasm with well-defined cell borders (B, hematoxylin-eosin, original magnification ×400). Immunohistochemistry showed strong and diffuse immunoreactivity (C, smooth muscle actin, original magnification ×400). Reticulum fibrils formed a meshwork around individual tumor cells (D, reticulin, original magnification ×400).

References


