

Case Report

Malignant solitary fibrous tumor of the urinary bladder progressing to widespread metastases and death: a rare case report and literature review

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Abstract: Solitary fibrous tumor (SFT) of the urinary bladder has been rarely reported and malignant bladder SFT is even rarer. Here we present a case of an African-American male with SFT of the urinary bladder (intermediate risk) initially treated by cystoprostatectomy at the age of 59 years. Eight years later, he developed recurrence with widespread metastases to the liver, lungs, and abdominal cavity. He then received temozolomide and bevacizumab with good disease control. However, treatment was paused due to declining performance status. Follow-up at 1 year demonstrated growth of the metastatic lesions. Despite restarting therapy, the patient expired, 11 years after the original diagnosis. Autopsy was performed and revealed widespread metastases within the abdominal cavity (abdominal sarcomatosis) as well as liver, bilateral lung, and diaphragmatic involvement. The cause of death was determined to be metastatic SFT. A comprehensive literature review was performed. Although SFTs are commonly considered benign, a subset of SFTs of the urinary bladder behave aggressively. Risk assessment and proper follow-up for recurrence and metastasis is necessary. The patient was also found at autopsy to have two gastrointestinal stromal tumors (GISTs) in the stomach and near the gastroesophageal junction. To the best of our knowledge, this is the first reported case of a primary urinary bladder SFT resulting in death or having concurrent, multifocal GISTs, and only the second case of a bladder SFT that developed metastases after the initial diagnosis.

Keywords: Solitary fibrous tumor, urinary bladder, metastases, gastrointestinal stromal tumor

Introduction

Solitary fibrous tumor (SFT) is a rare fibroblastic neoplasm that accounts for less than 2% of all soft tissue masses. It is characterized histologically as having a haphazard distribution of ovoid to spindle cells and so-called “staghorn” vessels, and a recurrent molecular *NAB2-STAT6* gene rearrangement [1]. Although it was initially identified in the pleura, SFT can involve any anatomic site including the visceral organs, bones, and superficial and deep soft tissues [1]. These tumors are observed in middle-aged adults ranging between 20 and 70 years old with no sex predilection. Although the majority have a favorable clinical course, SFT is notoriously difficult for prognostication because of the propensity for late relapse or even metastases in 10-40% of cases [2]. Surgical manage-

ment is the mainstay of treatment for SFT with emphasis on obtaining tumor-negative margins. SFT primary to the urinary bladder has been rarely reported. To date, 29 cases were reported in the English literature. Among these, 3 cases displayed local recurrence and only 1 case progressed with metastases with limited follow-up [3]. Herein we report a case with SFT of the urinary bladder who developed recurrence with widespread metastases and eventually expired in the 11th year post-diagnosis.

Case presentation

The patient was a 59-year-old African-American male who first presented for urologic evaluation due to an episode of painless hematuria. The physical exam was remarkable only for mild lower abdominal tenderness. Workup with com-

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puted tomography (CT) imaging revealed a 9.1 × 8.5 × 8 cm heterogeneously enhancing mass apparently arising from the dome of the bladder. He underwent cystoscopy with bladder wash cytology which was negative for malignancy. Repeat CT demonstrated expansion of the mass to 12 × 11 × 10 cm. Repeat cystoscopy revealed reduced bladder volume due to mass effect but was otherwise unremarkable. Laparoscopy revealed a large, dense, vascular mass arising from the bladder in the midline and occupying most of the lower abdomen. There were no obvious intra-abdominal metastases. Biopsy of the mass revealed plump spindle cells, “staghorn” vessels and no necrosis. The tumor cells were positive for CD34, CD99, and BCL2 by immunohistochemical (IHC) stains, which supported a diagnosis of SFT.

Given the size/extent of disease, the patient subsequently underwent a laparoscopic radical cystoprostatectomy with extensive pelvic lymphadenectomy and urinary diversion. Gross examination of the specimen showed a 12 × 12 × 11 cm well-circumscribed tumor located in the fundus of bladder with no mucosal involvement. The tumor had tan-white, firm, and solid cut surfaces. Histologic sections demonstrated similar morphology when compared with the biopsy with extensive (15%) necrosis and no prominent cytologic atypia. The tumor was diagnosed as SFT of the bladder. The mitotic rate was 1/10 high-power fields (HPF). All margins and submitted lymph nodes (33) were negative for tumor and the tumor was staged as pT2bN0 according to the American Joint Committee on Cancer (AJCC), 8th Edition. The patient was discharged on post-operative day 7 in good condition.

Oncologic follow-up was accomplished with yearly CT imaging of the abdomen and pelvis. At serial appointments, the patient had no urinary or abdominal symptoms and had no abnormal physical exam or CT findings suggestive of recurrent or metastatic disease for 8 years.

In the 9th post-operative year, a routine renal ultrasound (US) incidentally noted three new heterogeneous liver lesions, the largest measuring 4.0 cm. Abdominal magnetic resonance imaging (MRI) showed multiple hypervascular liver nodules, as well as multiple enhancing mesenteric nodes which were consistent with

peritoneal carcinomatosis. Subsequently, a percutaneous liver biopsy was performed. Final pathology was consistent with metastatic SFT, identical in morphology to the originally resected tumor. Next-generation sequencing studies were performed by Foundation Medicine, Inc. on formalin-fixed, paraffin-embedded liver tissue and identified a TP53 R248W gene alteration and *NAB2-STAT6* fusion. Additional findings included stable microsatellite status and low tumor mutational burden (3 mutations per megabase).

A chest CT was obtained for completion of staging and revealed scattered nodules in both lungs, consistent with metastatic disease. The patient was started on sunitinib (37.5 mg daily) but did not tolerate the therapy and subsequent CT imaging revealed significant progression of peritoneal disease. Sunitinib therapy was discontinued, and the patient was switched to temozolomide (150 mg/m²) and bevacizumab (5 mg/kg). Approximately nine months after the initiation of this regimen, he had increasing fatigue, anorexia, and weight loss. Anti-cancer therapy was paused due to declining performance status; imaging demonstrated stability of metastatic lesions, so the patient was monitored off-therapy. Symptomatically, the patient did well in the interim, but follow-up at one year demonstrated growth of the metastatic lesions. At that point, temozolomide and bevacizumab therapy was resumed. After restarting treatment, the patient had multiple hospital admissions, including for deconditioning, an infected perinephric abscess, and COVID-19 infection.

Despite continued treatment, a subsequent US demonstrated extensive progression of mesenteric disease. Interventional radiology performed another image-guided biopsy of the abdominal masses, which again revealed histology similar to the original tumor. Confirmatory IHC stains showed the tumor cells were positive for STAT6, while negative for CD34. Due to continued declining functional status and intractable disease progression, further oncologic treatment was deferred. The patient transitioned to hospice care and expired, 11 years after the original diagnosis. An autopsy was performed. Initial internal examination revealed abdominal sarcomatosis: numerous white, soft tumor nodules on the peritoneal surfaces, omentum and organs and throughout the retro-

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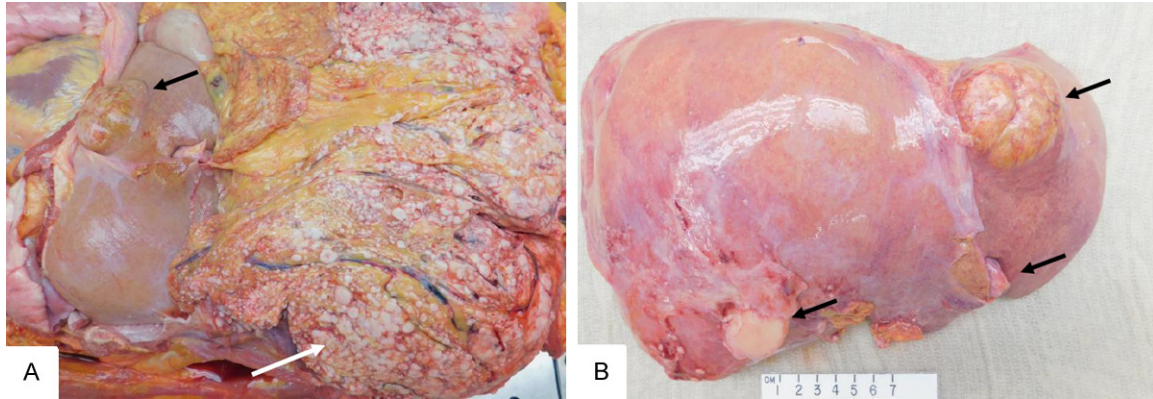


Figure 1. Gross autopsy findings. A: Dense fibrous adhesions throughout the abdomen. Numerous white soft tumor nodules are present on peritoneal surfaces, diaphragm, omentum (white arrow), and mesentery, as well as the liver (black arrow) and lungs. B: Tumor nodules on liver surface (black arrow).

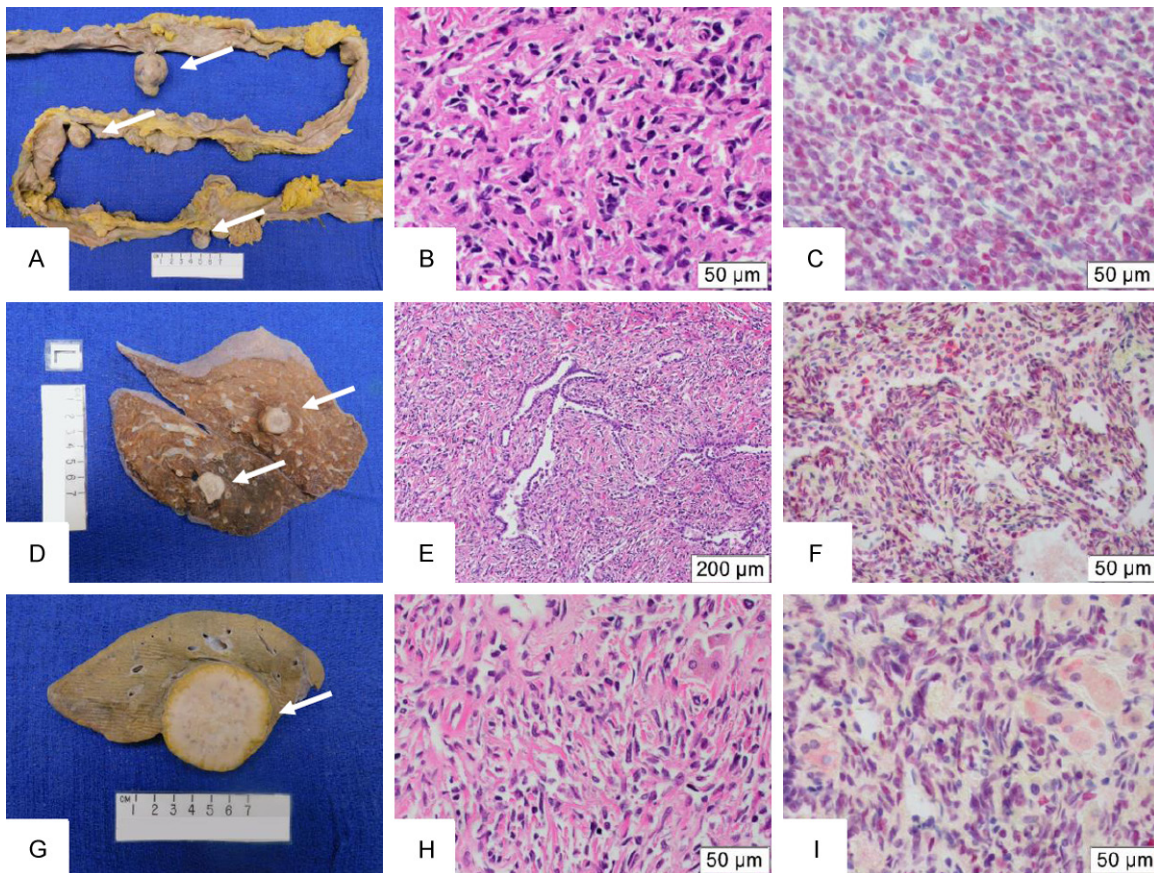


Figure 2. Autopsy findings. A: Intestinal tumor nodules (arrows). B: Intestinal tumor (H&E, 40 ×). C: Positive STAT6 immunostaining in an intestinal nodule (40 ×). D: Representative lung lesions (arrows). E: Lung tumor compresses normal alveolar respiratory space (H&E, 10 ×). F: Positive STAT6 immunostaining in a lung nodule (40 ×). G: A representative liver nodule (arrow). H: Liver tumor (H&E, 40 ×). I: Positive STAT6 immunostaining in a liver nodule (40 ×).

peritoneum (**Figure 1A, 1B**). The mesentery was diffusely replaced and distorted by numerous soft, white tumor nodules. The entire small and large bowel was encased by tumor as well (**Figure 2A**).

Firm, red-white, well-circumscribed nodules were noted throughout the pleura and pulmonary parenchyma, up to 2.1 cm in greatest dimension (**Figure 2D**). The liver was riddled with tan-pink to purple, firm, well-circumscribed

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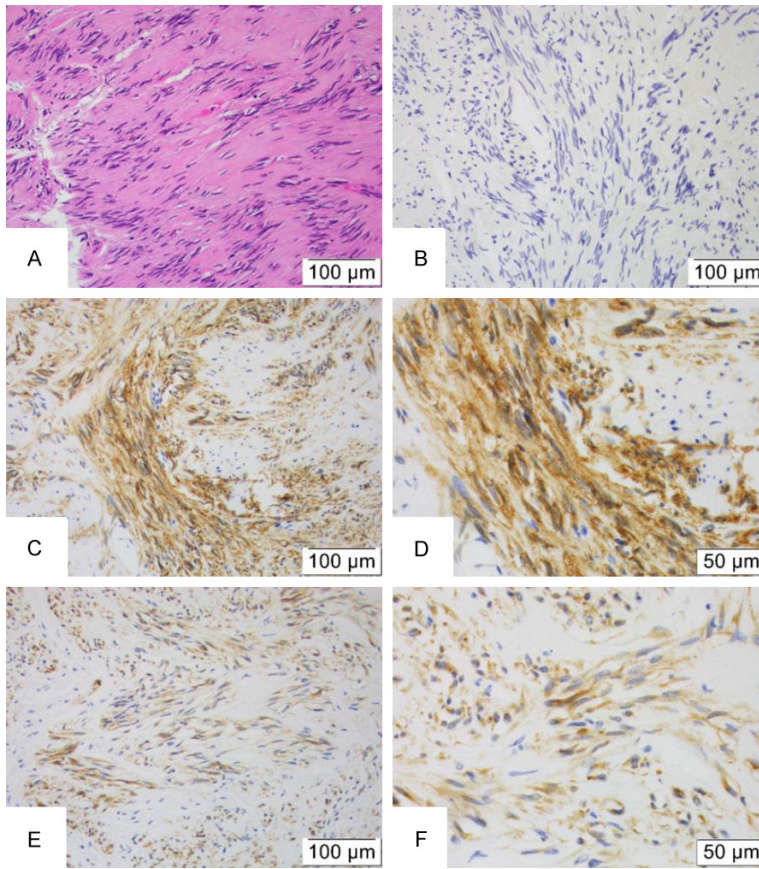


Figure 3. Representative sections of concurrent gastrointestinal stromal tumors. (A) Gastric nodule near gastroesophageal junction (H&E, 20 ×). (B) Negative STAT6 immunostaining in the gastric nodule (20 ×). (C and D) Positive DOG1 immunostaining in the gastric nodule (C: 20 ×; D: 40 ×). (E and F) Positive CD117 immunostaining in the gastric nodule (E: 20 ×; F: 40 ×).

masses, up to 6.5 cm in greatest dimension (**Figure 2G**). The cut surfaces of the nodules in the liver, lungs and intestine were white and red with focal hemorrhage and necrosis. The histology and IHC profile of the nodules were similar to the originally diagnosed SFT (**Figure 2B, 2C, 2E, 2F, 2H** and **2I**).

In addition, within the gastric body, adjacent to the lesser curvature, as well as near the gastroesophageal (GE) junction, two similar-appearing 1 cm well-circumscribed subserosal calcified nodules were discovered. The histology and IHC studies revealed spindle cell lesions (**Figure 3A**) that were positive for DOG1 (**Figure 3C, 3D**), CD117 (**Figure 3E, 3F**), and smooth muscle actin (SMA), focally positive for desmin, while negative for STAT6 (**Figure 3B**) and S-100, consistent with gastrointestinal stromal tumors (GISTs).

Discussion

Solitary fibrous tumor (SFT) is a rare mesenchymal neoplasm that has been reported to arise from many organs including the urinary bladder [4]. Our PubMed search using the key words “solitary fibrous tumor” and “bladder” revealed 29 cases of urinary bladder SFT in the English literature (**Table 1**). SFT is most commonly diagnosed between the fifth and seventh decades of life with an equal distribution among men and women [5]. Based on our search, the urinary bladder SFT occurs 3.3 times more in males than females with an age ranging from 11 to 85 years (mean =54.2; Male: 55.4; Female: 50.1).

From the published data, including the present case, predominant symptoms include hematuria (37%), urinary obstruction (20%), and abdominal/pelvic pain (20%). To a lesser extent, urinary urgency and frequency (17%), dysuria (13%), and abdominal bloating/fullness (7%) were observed at presentation. However, asymptomatic cases diagnosed incidentally may also occur [4]. Additionally, hypoglycemia can be the initial indicator of SFT, which is due to a paraneoplastic syndrome known as Doege-Potter syndrome. This syndrome is secondary to ectopic secretion of insulin-like growth factor II by the tumor [6]. Radiologic features of SFTs of the bladder are considered nonspecific [7]. Sonography may show a variable pattern of echogenicity with relatively well-defined margins [7]. On non-contrast CT scans, SFT demonstrates soft-tissue attenuation while on contrast CT, strong enhancement and associated cysts, regions of hemorrhage, and/or necrosis can be observed [7]. MRI shows predominantly low or intermediate signal intensity on both T1- and T2-weighted images, dependent on collagenous and fibrous stromal content, vascularity, and chronicity of

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Table 1. Reported cases of solitary fibrous tumor of the urinary bladder and the present case

Author [Ref]	Year*	Age/ Sex	Clinical presentation	Gross findings	Tumor size (cm)	Necrosis & Mitosis	Treatment	Follow-up (months/ recurrence or metastasis)
Vargas et al. [15]	2021	64/F	lower abdominal fullness	N/P	N/P	N/P	Surgical resection	N/P
Sun et al. [16]	2020	52/M	Urinary urgency and frequency	N/P	7	Absent & Low mitotic activity	Partial cystectomy	12 months/Absent
Kratiras et al. [17]	2019	31/M	Hematuria, dysuria, dull abdominal pain	N/P	5.3	Present & 23/10 HPF	Transurethral resection followed by radical cystectomy	5 months/Absent
Rovegno et al. [18]	2019	69/M	Abdominal pain, hematuria, lower urinary tract symptoms	N/P	10	Present (>10%) & 0/10 HPF	Mass resection, radical cystoprostatectomy	N/P
Urbina-Lima et al. [6]	2019	61/M	Generalized asthenia, weight loss and hypoglycemia	N/P	23	N/P & 2/10 HPF	Partial cystectomy	N/P
Kouba et al. [3]	2017	33/F	Hypoglycemia	Well circumscribed mass with white, myxoid-like appearance	3.5	N/P & 0/10 HPF	Transurethral resection	63 months/Absent
^{a,b} Kouba et al. [3]	2017	41/M	Urinary obstruction	Well circumscribed mass with white, myxoid-like appearance	5.7	N/P & 4/10 HPF	Surgical resection	132 months/Recurrence at 72 months Metastasis at 130 months
^a Kouba et al. [3]	2017	11/M	N/P	Well circumscribed mass with white, myxoid-like appearance	2.2	N/P & 6/10 HPF	Transurethral resection	12 months/Recurrence at 12 months
Tong et al. [19]	2017	85/F	Dysuria	Grayish yellow kernel, solid and tenacious cut surface with grey red outer membrane	12	N/P	Complete resection	3 months/Absent
Tanaka et al. [4]	2016	60/M	Incidental US finding	Tumor with regular surface	8	N/P & 0/10 HPF	Wide excision	24 months/Absent
Tanaka et al. [4]	2016	60/M	Incidental US finding	Well-circumscribed mass	4	Absent & 1/10 HPF	Partial cystectomy and radical prostatectomy	10 years/Absent
Mustafa et al. [20]	2016	36/F	Urgency, straining to void and increased abdominal girth	N/P	10	Absent & <2/10 HPF	Cystectomy with mass excision	N/P
Dozier et al. [5]	2015	41/M	Weight loss, progressive abdominal bloating	Gray-white mass with ill-defined whorled-like pattern and randomly assorted tan fleshy nodules	28	Present & 10/10 HPF	Complete surgical resection	8 months/Absent
Tian et al. [21]	2014	66/M	N/P	N/P	7.9	Present & N/P	N/P	2 years/Absent
^a Otta et al. [10]	2014	78/M	Hematuria, acute urinary retention	N/P	N/P	N/P	Transurethral resection	41 months/Recurrence at 5 months
Mozafarpour et al. [22]	2014	54/M	Intermittent abdominal pain, hematuria	Encapsulated gray creamy spongy tissue	13.9	Present & <3/10 HPF	Radical surgical excision	12 years/Absent
Spairani et al. [23]	2014	60/M	Voiding difficulty	Lobulated unencapsulated, well-circumscribed mass with smooth, firm, and white-tan cut surfaces	9	Absent & 1/10 HPF	Partial cystectomy	11 months/Absent
Cheng et al. [24]	2012	67/M	Low abdominal pain, microscopic hematuria	Encapsulated gray-white tumor with multinodular and focally necrotic cut surface	16	Present & >4/10 HPF	Partial cystectomy and segmental resection of the intestine	18 months/Absent

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Wang et al. [25]	2010	50/M	Terminal gross hematuria, residual urine sensation, urination pain	N/P	8	N/P	Surgical resection	9 months/Absent
Bruzzone et al. [26]	2010	74/M	Chills, diaphoresis, acute abdominal pain, hematuria	Ovoidal mass coated by adipose tissue and with well delimited margins	10	N/P	Radical surgical excision	N/P
Heinzelbecker et al. [27]	2008	24/F	Hematuria	N/P	8.5	N/P	Transurethral resection follow partial cystectomy	2 years/Absent
Tzelepi et al. [28]	2007	59/F	Hematuria	Well circumscribed unencapsulated polypoid mass with white, solid and gelatinous cut surface	8.5	N/P & <1/10 HPF	Radical cystectomy	77 months/Absent
Kim et al. [29]	2004	56/M	Voiding difficulty, frequency	Encapsulated, rubbery mass with, creamy white, multinodular, whorled cut surface	12	N/P & 2-3/10 HPF	Wide excision	12 months/Absent
Leite et al. [30]	2004	60/M	Incidental MRI finding (preoperative workup for prostate cancer)	Tumor with pale, elastic, fasciculate, homogeneous cut surface	3.2	Absent & 3/10 HPF	Surgical resection	11 months/Absent
Corti et al. [31]	2001	50/M	Pelvic pain, dysuria, hematuria	Well-circumscribed firm nodular mass	6.5	Absent & <2/10 HPF	Cystoprostatectomy	18 months/Absent
Westra et al. [32]	2000	67/M	Incidental cystoscopy finding during TURP	Well-circumscribed mass with yellow-white, solid, and whirled cut surface	4	Absent/10/10 HPF	Cystoprostatectomy	9 months/Absent
Westra et al. [32]	2000	67/M	Incidental MRI finding (recurrent prostate cancer surveillance)	Well-circumscribed mass with yellow-white, solid, and whirled cut surfaces	N/P	Absent/N/P	Transurethral resection	1 month/Absent
Bainbridge et al. [33]	1997	50/F	Urinary frequency, "prolapsing sensation" upon voiding	N/P	5.2	Absent & 1/10 HPF	Transurethral resection	18 months/Absent
Bainbridge et al. [33]	1997	42/M	Pelvic pressure	Well-circumscribed mural mass with gelatinous cut surface and numerous small cyst-like spaces	20	Absent & 3/10 HPF	Partial cystectomy	6 months/Absent
^b Present case		59/M	Hematuria	Well-circumscribed tumor with tan-white, firm, solid cut surface	12	Present (15%) & 1/10 HPF	Cystoprostatectomy, Temozolomide, bevacizumab	11 years/Metastases to liver, lungs, peritoneum at 8 years. Died of disease at 11 years

^aCases with local recurrence. ^bCases with metastases. ^cYear of report. M, male; F, female; N/P, not provided; ref., reference; HPF, high power field.

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the tumor [5, 7]. Non-specific symptoms and radiologic findings necessitate histopathologic diagnosis along with immunohistochemistry and other ancillary testing [4].

Grossly, SFTs are typically well-circumscribed masses with nodular cut surfaces [8]. Occasionally, they may show hemorrhage, myxoid changes, and cystic degeneration [8]. Histologically, SFTs are typically composed of haphazardly arranged ovoid to spindle cells in the so-called “patternless pattern”, with pale eosinophilic cytoplasm in a background of variable collagenous stroma. Characteristic branching and hyalinized staghorn-shaped blood vessels are often appreciated [8]. Its wide histologic spectrum includes paucicellular lesions with abundant stromal keloidal-type collagen to highly cellular tumors and myxoid or lipomatous differentiation [8].

Immunohistochemistry plays a crucial role in the diagnosis [5]. The neoplastic cells often show strong and diffuse expression of CD34 [5, 8]. They are also commonly positive for CD99, vimentin and BCL2, while negative for CD117, SMA, desmin and S-100 [5]. *NAB2-STAT6* gene fusions are pathognomonic for SFT and IHC staining for STAT6 is an extremely sensitive and specific surrogate marker for all fusions and is very helpful in the diagnosis of SFT [8].

Although the malignant criteria are defined as large tumor size, high mitotic count, cytologic atypia, necrosis, and infiltrative growth [5, 8], a new risk stratification model based on a point system is believed to be more accurate in predicting the clinical course of the disease. Points are assigned for age (<55 years (0 point), ≥55 years (1 point)); tumor size (<5 cm (0 point), 5 cm to <10 cm (1 point), 10 cm to <15 cm (2 point) and ≥15 cm (3 point)); mitotic figures/10HPFs (0 (0 point), 1-3 (1 point) and ≥4 (2 points)); and necrosis (<10% (0 point), ≥10% (1 point)). Based on total points, the tumor is then assigned a low risk (0-3 total points), intermediate risk (4-5 total points) and high risk (6-7 total points) [8, 9]. For our patient (age: 59 years; tumor size: 12 cm; mitoses: 1/10 HPF; necrosis: 15%; total score: 5 points), the risk of metastases based on the modified four-variable risk model was intermediate.

In general, the rate of recurrence (distant or local) has been reported as 10-30% or 10-40%

for SFTs [2, 8]. Including the present case, our review of the literature discovered 25 cases of urinary bladder SFT where follow-up information was available. Three (12%) of these cases had progressive disease with local recurrence (at 5, 12, and 72 months) and two (8%), including our case, had metastatic disease (at 96 and 130 months) [3]. Due to the variable clinical course and unpredictable behavior of SFTs, surgery is recommended as the treatment of choice [5]. For unresectable tumors, chemotherapy and radiation therapy have also been offered with a variable success rate [5].

In our case, next generation sequencing identified *NAB2-STAT6* gene fusions and a TP53 R248W gene mutation. This result is consistent with a prior study of 91 SFT cases in which TP53 mutations were found in 41% of malignant SFTs and suggested that dysfunction of TP53 contributed to malignant transformation [11]. TP53 could be a genomic driver for malignancy in our current case. As this is only the second case of urinary bladder with metastasis, the underlying genomic underpinning for aggressive behavior of bladder SFT needs more case studies.

Coexistence of other type(s) of tumor(s) with SFT is not common. According to the literature, bladder leiomyoma with synchronous SFT of the pleura [12], concurrent malignant SFT arising from the omentum and endometrial endometrioid adenocarcinoma [13], and pleural SFT, multiple GISTs, moyamoya disease, and hyperparathyroidism in a patient with neurofibromatosis type 1 [14] have been reported, all with an uncertain mechanism for coexistence.

In conclusion, SFT is a fibroblastic neoplasm that rarely arises from the urinary bladder and causes non-specific symptoms. The diagnosis depends primarily on histopathologic and immunophenotypic findings. The majority of cases behave indolently and have a favorable prognosis with complete resection. However, clinicians should be aware of the risk of recurrence and distant metastases, and patients should have appropriate follow-up.

We have described a case of primary SFT of the urinary bladder with initial treatment success from complete surgical resection but later recurrence with widespread metastases and eventual death. To our knowledge, this is the

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first reported case of a patient with urinary bladder SFT who died of the disease (autopsy-proven), and only the second case reported that developed metastases after the initial diagnosis. In addition, this malignant SFT coexisted with two GISTs within the stomach and near the GE junction, for which the clinical significance and pathobiology remain unclear.

Disclosure of conflict of interest

None.

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References

- [1] Davanzo B, Emerson R, Lisy M, Koniaris L and Kays J. Solitary fibrous tumor. *Transl Gastroenterol Hepatol* 2018; 3: 94.
- [2] Huang SC and Huang HY. Solitary fibrous tumor: an evolving and unifying entity with unsettled issues. *Histol Histopathol* 2019; 34: 313-334.
- [3] Kouba E, Simper NB, Chen S, Williamson SR, Grignon DJ, Eble JN, MacLennan GT, Montironi R, Lopez-Beltran A, Osunkoya AO, Zhang S, Wang M, Wang L, Tran T, Emerson RE, Baldrige LA, Monn MF, Linos K and Cheng L. Solitary fibrous tumour of the genitourinary tract: a clinicopathological study of 11 cases and their association with the NAB2-STAT6 fusion gene. *J Clin Pathol* 2017; 70: 508-514.
- [4] Tanaka EY, Buonfiglio VB, Manzano JP, Filippi RZ and Sadi MV. Two cases of solitary fibrous tumor involving urinary bladder and a review of the literature. *Case Rep Urol* 2016; 2016: 5145789.
- [5] Dozier J, Jameel Z, McCain DA, Hassoun P and Bamboat ZM. Massive malignant solitary fibrous tumor arising from the bladder serosa: a case report. *J Med Case Rep* 2015; 9: 46.
- [6] Urbina-Lima AD, Roman-Martin AA, Crespo-Santos A, Martinez-Rodriguez A, Cienfuegos-Belmonte IR, Olmo-Ruiz M, Esteban-Artiaga R and Molina-Suarez JL. Solitary fibrous tumor of the urinary bladder associated with hypoglycemia: an unusual case of Doege-Potter syndrome. *Urol Int* 2019; 103: 120-124.
- [7] Park SB, Park YS, Kim JK, Kim MH, Oh YT, Kim KA and Cho KS. Solitary fibrous tumor of the genitourinary tract. *AJR Am J Roentgenol* 2011; 196: W132-W137.
- [8] Demicco E, Fritchie K and Han A. Solitary fibrous tumor. In: Board Wcote, editors. *Soft tissue and bone tumours*. 5th edition. 2020. pp. 104-108.
- [9] Demicco EG, Wagner MJ, Maki RG, Gupta V, Iofin I, Lazar AJ and Wang WL. Risk assessment in solitary fibrous tumors: validation and refinement of a risk stratification model. *Mod Pathol* 2017; 30: 1433-1442.
- [10] Otta RJ, Acosta MA and Gordillo C. A rare case of solitary fibrous tumour of the bladder. *Can Urol Assoc J* 2014; 8: E552-E553.
- [11] Park HK, Yu DB, Sung M, Oh E, Kim M, Song JY, Lee MS, Jung K, Noh KW, An S, Song K, Nam DH, Kim YJ and Choi YL. Molecular changes in solitary fibrous tumor progression. *J Mol Med (Berl)* 2019; 97: 1413-1425.
- [12] Mavridis C, Georgiadis G, Lagoudaki ED, Skamagkas I, Heretis I, Koutsopoulos AV and Marmoulakis C. Bladder leiomyoma with synchronous solitary fibrous tumor of the pleura. *Case Rep Urol* 2020; 2020: 3717506.
- [13] Harada N, Nobuhara I, Haruta N, Higashiura Y, Watanabe H and Ohno S. Concurrent malignant solitary fibrous tumor arising from the omentum and grade 3 endometrial endometrioid adenocarcinoma of the uterus with p53 immunoreactivity. *Case Rep Obstet Gynecol* 2014; 2014: 216340.
- [14] Yamamoto Y, Kodama K, Yokoyama S, Takeda M and Michishita S. A pleural solitary fibrous tumor, multiple gastrointestinal stromal tumors, moyamoya disease, and hyperparathyroidism in a patient associated with NF1. *Case Rep Surg* 2015; 2015: 375416.
- [15] Vargas JF, Gandhi D, Bajaj D, Serhal M, Erazo IS and Singh J. Solitary fibrous tumor of the urinary bladder: an unusual case report with literature review. *Radiol Case Rep* 2021; 16: 3898-3902.
- [16] Sun S, Tang M, Dong H, Liang C, Yan T, Li J, Liu B and Li J. Solitary fibrous tumor involving urinary bladder: a case report and literature review. *Transl Androl Urol* 2020; 9: 766-775.
- [17] Kratiras Z, Spapis V, Koniaris E, Kozyrakis D and Skriapas K. Malignant solitary fibrous tumor of urinary bladder: a rare clinical entity. *Arch Ital Urol Androl* 2019; 91.
- [18] Rovegno FA, Hernandez CY, Gradin S, Spir AR and Rovegno AR. Solitary fibrous tumor of the pelvis involving the bladder. Case report and literature review. *Urol Case Rep* 2019; 24: 100864.
- [19] Tong XN, Cheng T, Zhang M, Zhang SY, Li S, Gao Y and Shuang WB. A case of huge solitary fibrous tumor in bladder. *Clin Genitourin Cancer* 2017; 15: e105-e110.
- [20] Mustafa HJ and Menon S. Solitary fibrous tumor in a female urinary bladder. *Urol Case Rep* 2016; 7: 1-2.

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- [21] Tian TT, Wu JT, Hu XH, Yang GM, Sun J, Chen WX and Tian XC. Imaging findings of solitary fibrous tumor in the abdomen and pelvis. *Abdom Imaging* 2014; 39: 1323-1329.
- [22] Mozafarpour S, Khorramirouz R, Tajali A, Salavati A and Kajbafzadeh AM. Surgically treated bladder hemangiopericytoma/solitary fibrous tumor: report of a 12-year asymptomatic follow-up. *Int Urol Nephrol* 2014; 46: 483-486.
- [23] Spairani C, Squillaci S, Pitino A, Ferrari M, Montefiore F, Rossi C, Fusco W and Bigatti G. A case of concomitant occurrence of solitary fibrous tumor and urothelial high-grade invasive carcinoma of the urinary bladder. *Int J Surg Pathol* 2014; 22: 252-259.
- [24] Cheng SH, Wang SS, Lee CH, Ou YC and Cheng CL. Malignant solitary fibrous tumor of the urinary bladder. *J Chin Med Assoc* 2012; 75: 479-482.
- [25] Wang T, Chen R, Qiao J, Hu T, Liu J, Yang W and Ye Z. Solitary fibrous tumor in bladder: a case report. *J Huazhong Univ Sci Technolog Med Sci* 2010; 30: 412-414.
- [26] Bruzzone A, Varaldo M, Ferrarazzo C, Tunesi G and Mencoboni M. Solitary fibrous tumor. *Rare Tumors* 2010; 2: e64.
- [27] Heinzlbecker J, Becker F, Pflugmann T, Friemann J and Walz P. Solitary fibrous tumour of the urinary bladder in a young woman presenting with haemodynamic-relevant gross haematuria. *Eur Urol* 2008; 54: 1188-1191.
- [28] Tzelepi V, Zolota V, Batistatou A and Fokaefs E. Solitary fibrous tumor of the urinary bladder: report of a case with long-term follow-up and review of the literature. *Eur Rev Med Pharmacol Sci* 2007; 11: 101-106.
- [29] Kim SH, Cha KB, Choi YD and Cho NH. Solitary fibrous tumor of the urinary bladder. *Yonsei Med J* 2004; 45: 573-576.
- [30] Leite KR, Srougi M, Miotto A and Camara-Lopes LH. Solitary fibrous tumor in bladder wall. *Int Braz J Urol* 2004; 30: 406-409.
- [31] Corti B, Carella R, Gabusi E, D'Errico A, Martorana G and Grigioni W. Solitary fibrous tumour of the urinary bladder with expression of bcl-2, CD34, and insulin-like growth factor type II. *Eur Urol* 2001; 39: 484-488.
- [32] Westra WH, Grenko RT and Epstein J. Solitary fibrous tumor of the lower urogenital tract: a report of five cases involving the seminal vesicles, urinary bladder, and prostate. *Hum Pathol* 2000; 31: 63-68.
- [33] Bainbridge TC, Singh RR, Mentzel T and Katenkamp D. Solitary fibrous tumor of urinary bladder: report of two cases. *Hum Pathol* 1997; 28: 1204-1206.