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## Case Report

# Bladder hemangioma: An arduous diagnosis of hematuria

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## ABSTRACT

Urinary bladder hemangiomas are a rare cause of gross hematuria in young patients. Multimodality imaging with ultrasound, computed tomography, and magnetic resonance imaging help define the site and extent of hemangioma. We describe a case of an otherwise healthy 9-year-old male presenting with recurrent gross hematuria. The initial US did not demonstrate a bladder mass, but subsequent cystoscopies showed progressive enlargement of an extensive sessile and partially pedunculated vascular mass. Imaging with ultrasound, computed tomography, and magnetic resonance imaging persistently demonstrated a hypervascular bladder mass without extravesical extension. Ultimately, biopsy of the mass made the diagnosis of bladder hemangioma.

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## Introduction

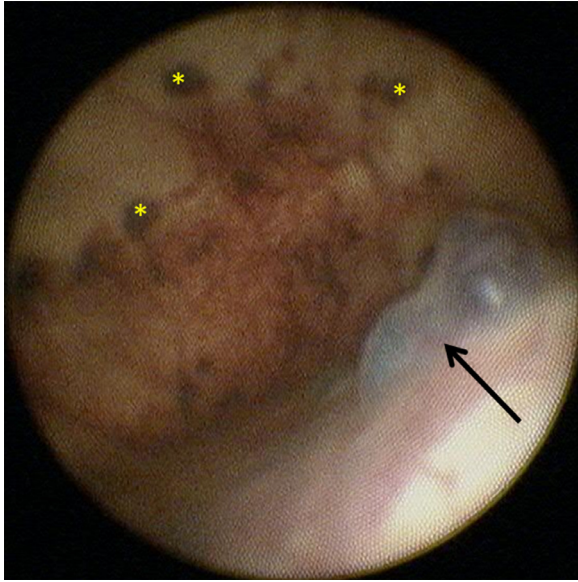
Although urinary bladder hemangiomas are benign tumors, the combination of their alarming presentation and rarity make them a difficult diagnosis. This report illustrates a case of bladder hemangioma with multiple imaging modalities, as well as a brief discussion on the clinical features, the range of imaging presentations, biopsy diagnosis and treatment options. Afterward, there will be reflections on the challenges of the case and an emphasis on the importance of tissue diagnosis and follow-up.

## Case report

An otherwise healthy 9-year-old male presented to an outside institution with daily bright red hematuria for 3 months that was associated with intermittent dysuria and lower abdominal pain. The initial ultrasound was negative. Cystoscopy demonstrated a sessile mass in the left posterolateral bladder wall with large dilated submucosal vessels (Fig. 1). Due to the vascular nature of the lesion, the decision was made not to biopsy.

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**Fig. 1 – Outside cystoscopy.** Intraoperative images from outside cystoscopy demonstrate a prominent sessile mass (arrow) in the left posterolateral bladder wall with large dilated submucosal vessels (\*).

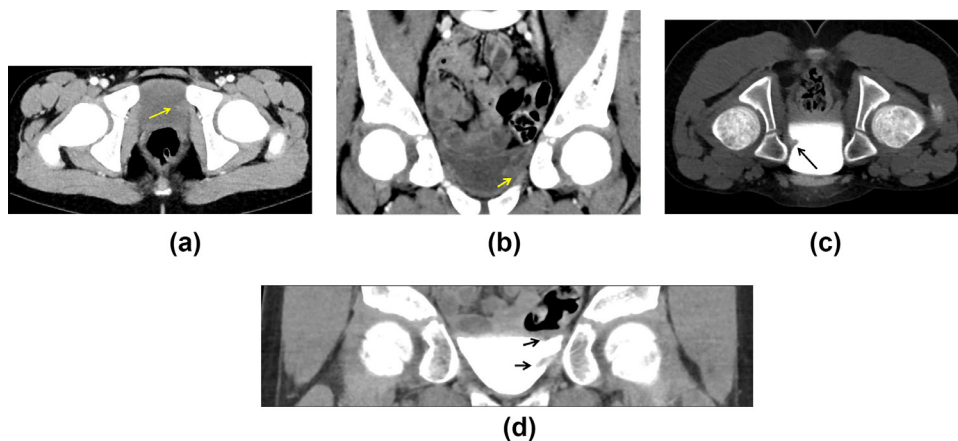
The patient then presented to our institution for a second opinion. At this time, he had 1-year of worsening gross hematuria that had progressed to passing large clots. Computed tomography urogram demonstrated a lobulated mass along the left bladder wall without extravascular extension (Fig. 2A-D). Repeat cystoscopy showed a 1.5-cm lesion with a wide-based stalk, significant submucosal hypervascularity, and areas of active bleeding. The mass was biopsied

and fulgurated. Pathology showed acute inflammation with the presence of eosinophils, consistent with eosinophilic cystitis. The patient was subsequently referred to Pediatric Allergy/Immunology, where he underwent extensive allergy workup with no identifiable cause. He was initiated on antihistamines and bladder hygiene.

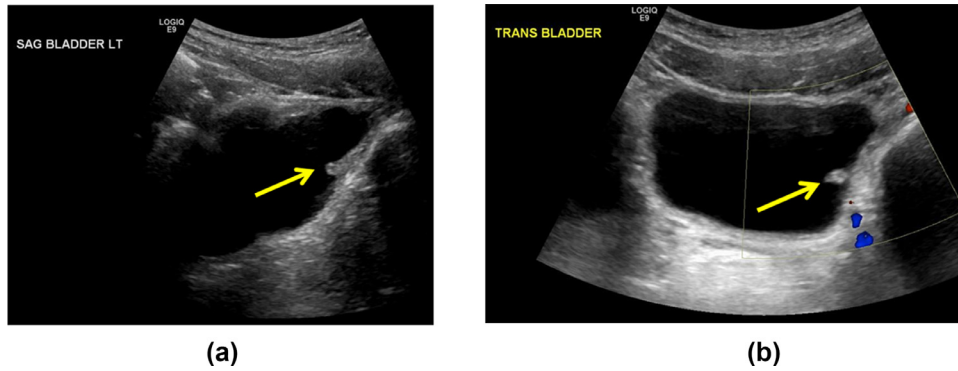
Three years later, the patient presented again with gross hematuria associated with passing clots and mild dysuria. Repeat ultrasound showed a focal nodular area of thickening along the left lateral bladder wall (Fig. 3A and B). Cystoscopy demonstrated increased number and size of the vascular lesions (Fig. 4), which were biopsied and fulgurated. Again, pathology confirmed eosinophils within the lamina propria. He also underwent bilateral retrograde pyelograms to rule out any upper tract lesions. There was a filling defect in the right lower pole of the kidney, and a ureteral stent was placed for passive dilation to allow for staged ureteroscopy.

In the interim, he underwent magnetic resonance imaging to rule out an underlying vascular malformation. This demonstrated an enhancing sessile left bladder wall lesion without extravascular extension (Fig. 5A-C). He subsequently underwent transurethral resection of the 3-cm bladder mass and right ureteroscopy which demonstrated a compound papilla but no clot, tumor, or other abnormality. The bladder biopsy was again negative for malignancy.

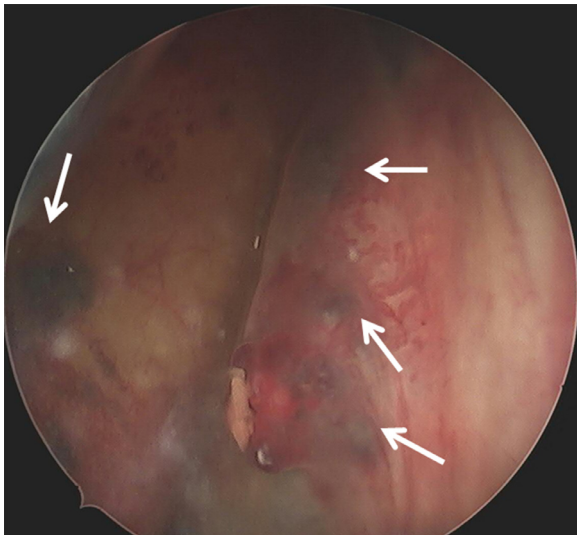
Due to persistent intermittent hematuria, the patient was subsequently evaluated in our Vascular Malformations Clinic, where a diagnostic pelvic angiogram was recommended. This was negative for arteriovenous malformation (Fig. 6). Six months later, he underwent cystoscopy with biopsy of the pedunculated mass as well as several submucosal vascular lesions (Fig. 7). All visible lesions were treated with neodymium: Yttrium Aluminium Garnet (Nd:YAG) laser ablation. Pathology revealed hemangioma without the presence of eosinophils. The patient has been asymptomatic since.



**Fig. 2 – CT urogram at initial referral.** (A) Axial CT demonstrates a lobulated contour or mass (arrow) along the left bladder wall. (B) Coronal CT shows that the mass is confined to the bladder wall without extravascular extension (arrow). (C) Axial and (D) Coronal prone delayed phase CT images redemonstrate the lobulated, multifocal mass arising from the left bladder wall and dome (arrows).



**Fig. 3 – Ultrasound at 3-year recurrence. (A) Sagittal grayscale ultrasound of the bladder demonstrates a focal nodular area of thickening along the left lateral bladder wall (arrow). (B) Transverse ultrasound with Doppler of the area demonstrates no internal vascularity (arrow).**

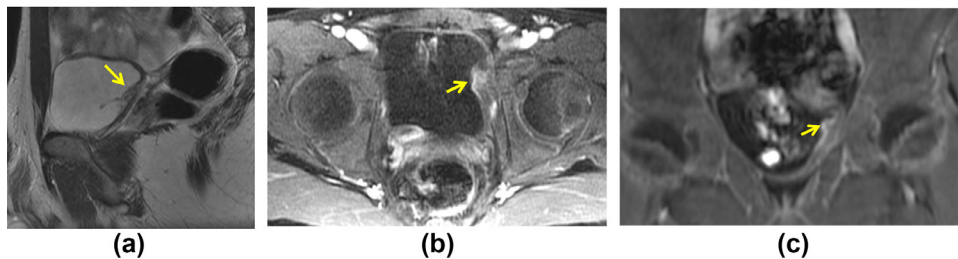


**Fig. 4 – Cystoscopy at 3-year recurrence. Intraoperative images from cystoscopy demonstrate an increased number and size of vascular lesions (arrows).**

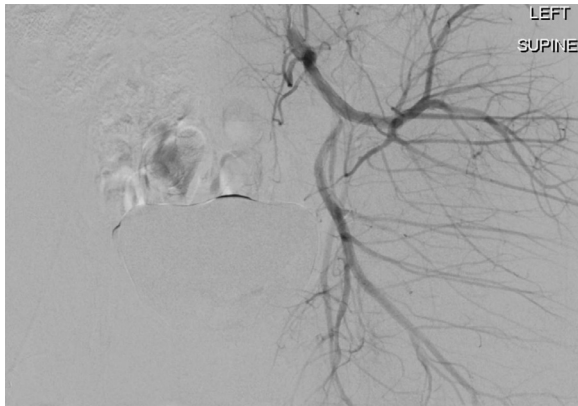
## Discussion

Hemangiomas in most areas of the body are common benign tumors. However, urinary bladder hemangiomas are extremely rare congenital tumors and account for 0.6% of all primary bladder neoplasms [1]. The usual presentation is recurrent painless gross hematuria in a male under 30 years old. It can occur in isolation or be part of a syndrome, such as Sturge-Weber or Klippel-Trenaunay Weber. Cystoscopic findings of a lobulated bluish-red vascularized submucosal mass in a young patient with recurrent hematuria strongly suggests the diagnosis. However, endometriosis, melanoma, and sarcoma can appear similarly [2].

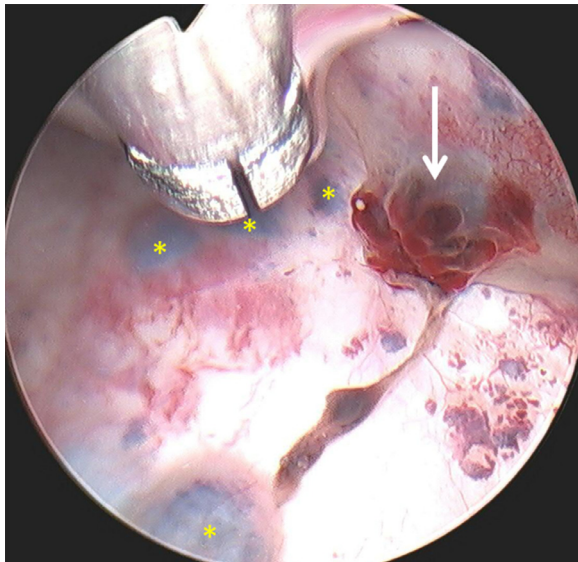
Most bladder hemangiomas are solitary, sessile lesions with a predilection for the dome, posterior wall, and trigone [1]. Approximately one-third are limited to the submucosa, but most extend into the bladder wall and occasionally grow into the perivesical space. Its hypervascularity is reflected on all imaging modalities. For example, hemangiomas can show increased activity on blood pool scintigraphy [4]. They can exhibit two distinct morphologies on ultrasound: either a circumscribed round intraluminal solid mass or diffuse bladder



**Fig. 5 – MRI at 3-year recurrence. (A) Sagittal T2-weighted image demonstrates a sessile left bladder wall mass (arrow) without extravascular extension. (B) Axial and (C) Coronal contrast-enhanced T1-weighted images with show enhancement of the mass (arrows). There is no associated lymphadenopathy.**



**Fig. 6 – Pelvic angiogram at 3-year recurrence. The pelvic angiogram with selective left internal iliac artery angiography is negative for vascular anomalies in the bladder.**



**Fig. 7 – Repeat cystoscopy at 3-year recurrence. Intraprocedural images from cystoscopy show a pedunculated mass (arrow) and several submucosal vascular lesions (\*).**

wall thickening with punctate calcifications [3]. In addition, they can be hyperechoic or hypoechoic to the bladder wall. On magnetic resonance imaging, hemangiomas have low to intermediate T1 signal and marked high T2 signal [5].

The diagnosis can be difficult as imaging features are nonspecific, and the differential diagnosis is broad [3]. Other causes of a lobulated bladder lesion include metastases, pheochromocytomas, endometriosis, inflammatory myofibroblastic tumor, eosinophilic cystitis, and rhabdomyosarcoma. Diffuse bladder wall thickening can be seen in cystitis and vesical neurofibromatosis. Urothelial cell carcinoma can appear as either a polypoid or sessile mass or even diffuse wall thickening.

Biopsy of the vascularized component is required for definitive diagnosis. Hemangiomas can be distinguished from angiosarcomas by the lack of mitotic figures [3]. The most common type is the cavernous form, which accounts for 78% of cases. Additional types include capillary and arteriovenous hemangiomas. Treatment varies depending on tumor size. Partial or simple cystectomy or radiation therapy may be required for bulky or multiple tumors [6]. However, transurethral resection, fulguration, and YAG laser ablation are standard treatments for small tumors.

This case was challenging for multiple reasons. The initial ultrasound did not demonstrate any intraluminal abnormalities, but cystoscopy demonstrated a sessile, highly vascular lesion that was not biopsied elsewhere due to concern for significant bleeding. The initial biopsy of the exophytic mass yielded a few eosinophils, while biopsies of the other vascular lesions showed benign urothelial mucosa with dilated blood vessels, which led to a diagnosis of eosinophilic cystitis. The lesions progressed and gross hematuria recurred despite antihistamine treatment. Subsequent biopsy confirmed hemangioma and lesions were successfully treated with laser ablation. Despite the risk of postbiopsy bleeding, this was not reflected clinically in this case [1]. Even though hemangiomas are benign tumors, follow-up for recurrence or residual tumor is imperative.

## Conclusion

Urinary bladder hemangiomas most commonly present as solitary, sessile hypervascular lesions on imaging and cystoscopy, but can also present as diffuse bladder wall thickening. Imaging aids in the diagnosis and treatment by providing information on the size of the mass and whether any extravesical extension has occurred.

## Patient consent

Written informed consent for the publication of this case was obtained from the patient and his legal guardian.

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