



Robot-Assisted Laparoscopic Vesiculectomy for Large Seminal Vesicle Cystadenoma: A Case Report and Review of the Literature

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Clinical Practice Points

- Primary tumors of seminal vesicles (SVs) are very rare. Differential diagnosis often relies on a multimodality approach comprising magnetic resonance imaging and preoperative biopsies.
- We report a case of a large SV cystadenoma causing gross hematuria and lower urinary tract symptoms managed with nerve-sparing, robot-assisted laparoscopic seminal vesiculectomy.
- Most cases of SV cystadenoma reported in published studies were managed with open, invasive surgical approaches. To date, laparoscopic and robotic seminal vesiculectomy can be safely considered the reference standard treatment of benign tumors of SVs, because they combine a minimally invasive approach with optimal surgical, oncologic, and functional outcomes.

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Case Report

Clinical Case

A 47-year-old patient had been referred to our center for gross hematuria and lower urinary tract symptoms (LUTS). His medical history was unremarkable, and no comorbidities were present. The prostate-specific antigen (PSA) level was 1.7 ng/mL. The digital rectal examination revealed a tense and elastic mass with undefined boundaries, cranially to the prostate. The physical examination and laboratory test results were otherwise normal. Transabdominal ultrasonography showed no lesions in the upper urinary tract; however, high-resolution transrectal ultrasonography (TRUS) confirmed the presence of a multiseptated, solid-cystic pelvic mass occupying the retrovesical space. No suspected areas were detected in the peripheral zone of the prostate. In-office cystoscopy was performed to rule out a bladder malignancy. No lesions were found within the bladder; however, unusual bleeding from the seminal colliculus was

found. The right ureteral orifice had also been pushed cranially, likely by extrinsic compression.

Diagnostic Assessment and Magnetic Resonance Imaging Findings

The patient underwent a urography-computed tomography scan, which confirmed the presence of a large mass with undefined boundaries and poor contrast enhancement occupying the retrovesical space. The relationships among the mass, rectum, and bladder were unclear. No abnormalities of the upper urinary tract and no pathologic pelvic lymph nodes were found. To further characterize the nature of the mass and to analyze its relationships with the adjacent organs, magnetic resonance imaging was performed. A retrovesical 6.0- × 4.5-cm, well-defined, pseudonodular mass, arising from the right seminal vesicle (SV) and vas deferens (VD), was found cranial to the prostate (Figure 1). The signal was irregular and heterogeneous on T₁-weighted images, likely owing to mixed serous-hemorrhagic remains. TRUS-guided prostate and SV biopsies were performed to exclude primary or secondary malignancies. No neoplastic proliferation was found in any of the samples from the prostate and SV mass.

Management and Outcome

The patient was scheduled for nerve-sparing (NS) robot-assisted laparoscopic vesiculectomy (RALV). A 4-arm transperitoneal

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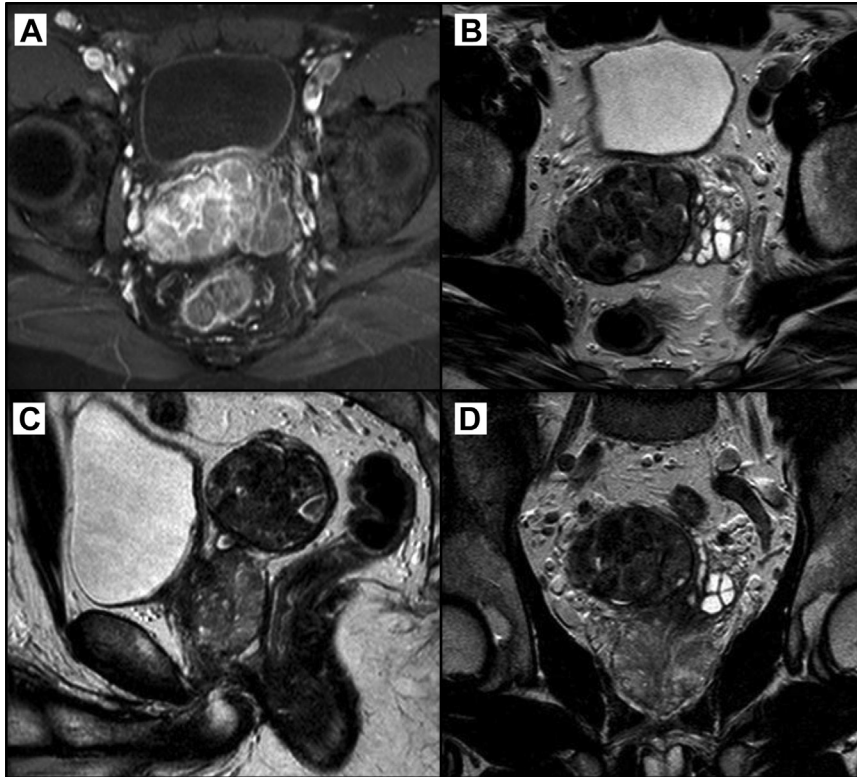
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Robot-Assisted Vesiculectomy for Large SV Cystadenoma

Figure 1 Magnetic Resonance Imaging Findings of the Pseudonodular Mass Arising From the Right Seminal Vesicle. (A) Axial T₁-weighted Image Showing a Hyperintense, Heterogeneous Signal With No Pathologic Contrast Enhancement After Administration of Contrast Medium. No Pathologic Pelvic Lymph Nodes Were Visible. Axial (B), Sagittal (C), and Coronal (D) T₂-weighted Images Showing the Well-Defined Pelvic Mass and Its Relationship With the Adjacent Organs. No Signs Were Seen of Local Spread, and the Adipose Tissue Between the Mass and Rectum Was Well Preserved



approach, using a 0° lens, was adopted. After a transversal incision of the peritoneum at the level of the Douglas pouch, a voluminous mass, firmly adherent to the prostate, the left SV, and surrounding tissues, was found. The plane between the mass, rectum, and bladder was carefully and bluntly developed using monopolar scissors and, if needed, a bipolar Maryland dissector, until the tumor had been completely released from the surrounding adhesions. The left VD and SV were preserved during the dissection. The neurovascular bundles were approached bilaterally in an athermal, traction-free manner to preserve continence and potency. The specimen was then removed intact through the camera port using a retrieval bag. Accurate hemostatic control was achieved, and a tube drain was positioned. The console time and estimated blood loss was 120 minutes and 50 mL, respectively. No intraoperative complications were recorded. The postoperative course was uneventful, and the patient was discharged on the fourth postoperative day with normal blood test results and spontaneous voiding. The 2-year follow-up examination showed no evidence of disease recurrence. At the last follow-up examination, the patient was free of symptoms with full preservation of continence and potency.

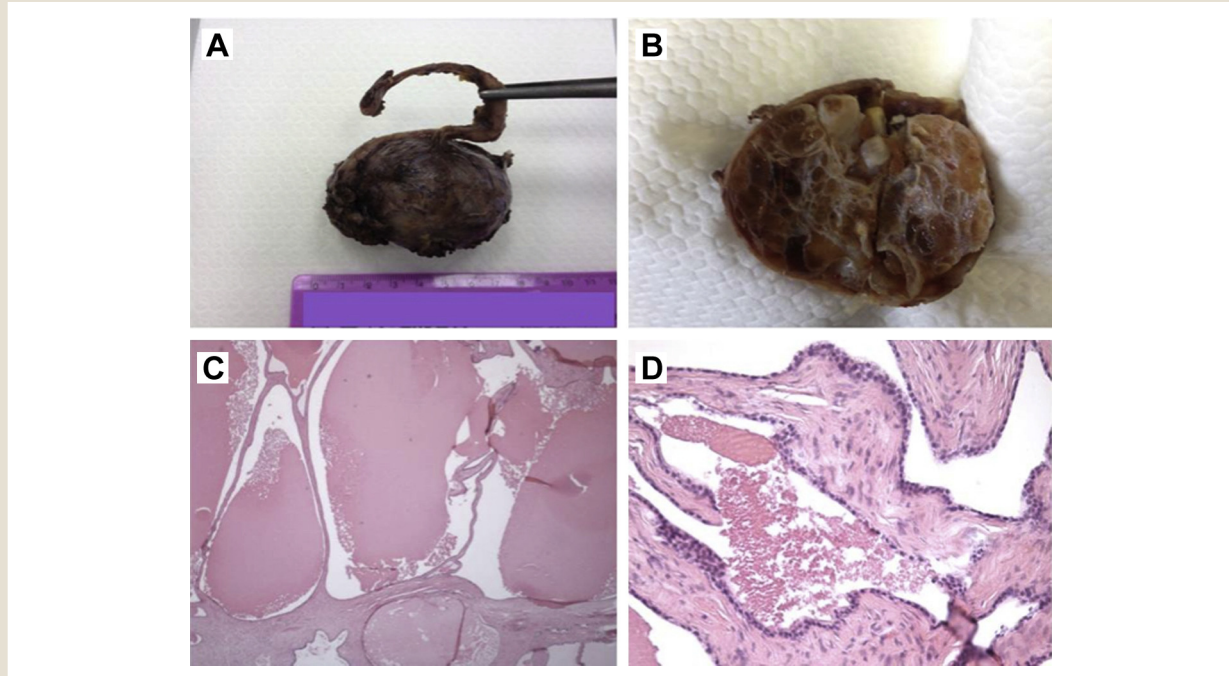
Histopathologic Analysis

The histopathologic examination showed a 7.0 × 4.5 × 4.5-cm SV cystadenoma, according to the World Health Organization (WHO) classification criteria (Figure 2).¹ The stroma resembled the usual fibromuscular stroma of SVs. No significant cytologic atypia, mitotic activity, or necrosis was present. The histochemical panel showed modest positivity for cytokeratin (CK) 7, and the PSA, prostatic acid phosphatase, and CK20 test results were negative. The proliferation index, determined using the immunohistochemical assay and Ki67, was < 1%.

Discussion

Primary diseases of the SVs are very rare. Benign tumors can appear as complex, solid cystic retrovesical masses¹ and are often totally asymptomatic. However, they can also lead to LUTS and unspecific signs, such as hematuria, hematospermia, perineal or postcoital discomfort, and painful defecation.² Occasionally, infertility will be the main feature. The differential diagnosis can be challenging because other pathologic entities, such as SV cysts, diverticula of the ejaculatory ducts, acute inflammatory diseases, abscesses, amyloidosis, and malignancies (mostly arising from the

Figure 2 Surgical Specimen and Histopathologic Analysis. (A) Gross Photograph of the Seminal Vesicle Cystadenoma in Relation to the Deferent Tract. Macroscopically, the Tumor Was Well Defined, Showing a Glistening, Smooth, Tan Surface. (B) The Cut Surface Revealed Multilocular Cysts of Different Shapes Containing Gelatinous Fluid. (C) Histologically, at Low Magnification, the Tumor Was Composed by Multiple Cystic Glandular Branching Formations Separated by a Spindle Cell Stroma. The Cysts Contained Amorphous Eosinophilic Material. (D) At High Magnification, the Simple Cuboidal/Low Columnar Epithelium of the Cysts Is Seen. Nuclei Are Round and Regular. No Significant Cytologic Atypia, Mitotic Activity, and Necrosis Were Present



prostate, bladder, or rectum) can show the same imaging features.³ Therefore, the differential diagnosis must use a multimodality approach. The overall preoperative characterization of the tumor is critical to identify the most appropriate surgical strategy, with the first priority the exclusion of a primary or secondary malignancy.

We have presented a case of a large SV cystadenoma managed with NS RALV. A review of the English-language published studies of SV cystadenoma was performed using the Medline, Embase, and Web of Science databases to October 2014. Twenty case reports have been published on SV cystadenoma (Table 1). The median patient age and median tumor diameter was 49 years (interquartile range [IQR], 42-51 years) and 7.0 cm (IQR, 5.0-12.0 cm), respectively. No perioperative complications were reported in the published series. Local recurrence developed in 2 patients (10%) after 2 and 3 years, respectively. Nonetheless, the follow-up period was highly variable among the studies. The differential use of diagnostic investigations and surgical approaches for SV cystadenoma in the published series is shown in Figure 3. Analyzing the current published data, the most useful diagnostic investigations for the detection and characterization of SV cystadenoma were TRUS, MRI, and preoperative biopsy. The findings from cystoscopy and other techniques usually integrated the diagnosis. The diagnostic workup should always exclude congenital abnormalities of the upper urinary tract, especially renal agenesis. Owing to its multiplanar capability and excellent tissue contrast and resolution,

endorectal MRI is the most accurate tool to accurately define the anatomic relationships of the tumor during surgical planning.³ When the imaging findings are unspecific or inconclusive, TRUS-guided focused biopsies are critical to obtain a precise histopathologic characterization of the lesion. Cystadenoma must be distinguished from mixed epithelial-stromal tumors (MEST) of SVs, which has been reported in previous studies with many different names.⁴ Currently, specific histological criteria must be fulfilled for the definition of MESTs, and the WHO classification has clearly separated this entity from cystadenoma.^{1,3} The differential diagnosis, based on the histologic analysis of the tumor stroma, is an important prognostic factor. Although MESTs usually show benign behavior, they can express histologic and clinical characteristics of malignancy⁴ and could potentially require more radical options. In contrast, seminal vesiculectomy is the recommended treatment of SV solid masses that are benign on biopsy, if symptomatic and with no evidence of local spread.²

Various surgical approaches have been described in published studies for SV cystadenoma. Owing to the anatomic location, surgical access to the SVs can be challenging, and the decision mainly relies on the expertise of the surgeon.² Most cases in the published studies were managed with an open technique using an anterior transvesical⁵ or a retrovesical⁶ approach. Radical cystoprostatovesiculectomy has also been performed.⁷ After the first report of the use of a laparoscopic approach to SVs by

Robot-Assisted Vesiculectomy for Large SV Cystadenoma

Table 1 Strategies for Diagnosis and Surgical Approaches for Seminal Vesicle Cystadenoma According to Published Series

Study	Patient Age (years)	Tumor Size (Greatest Diameter) (cm)	Diagnostic Strategy	Surgical Procedure	Perioperative Complication	Local Recurrence After Surgery (years)
Soule et al ¹⁶ , Proc Staff Meet Mayo Clin, 1951	47	14		Open (conservative)	No	No
Damjanov et al ¹⁷ , J Urol, 1974	52	5.5	Autopsy		No	No
Lundhus et al ¹⁸ , Scand J Urol Nephrol, 1984	39	7.4		Open (CysProV)	No	No
Mazur et al ¹⁹ , Am J Surg Pathol, 1987	49	7		Open (conservative)	No	Yes (2)
Bullock et al ²⁰ , J R Soc Med, 1988	59	12		LV	No	Yes (3)
Raghuveer et al ²¹ , Indian J Pathol Microbiol, 1989						
Mazzucchelli et al ²² , J Urol, 1992	63	3		Open (conservative)	No	No
Ranschaert et al ²³ , J Belge Radiol, 1992	50	12		Open (conservative)	No	No
Lagalla et al ²⁴ , Abdom Imaging, 1993	33		TRUS, CT, FNA, cytology, biopsy	Open (conservative)	No	No
Santos et al ²⁵ , Pathology, 2001	49	15		Open (conservative)	No	No
Gil et al ²⁶ , Int Braz J Urol, 2003	49	7	Abd US, CT, MRI	Open (conservative, retrovesical approach)	No	No
Lee et al, ⁶ Int J Urol, 2006	46	7.5	CT, MRI, explorative laparotomy	Open (conservative)	No	No
Lorber et al, ⁵ Eur Urol, 2011	52	14	CT, MRI, Abd US, biopsy	Open (conservative, transvesical)	No	No
Kural et al, ¹⁴ J Endourol, 2011	48	6	TRUS, biopsy	RALV	No	No
Ploumidis et al, ¹⁵ Int J Surg Case Rep, 2012	45	17.2	TRUS, CT, MRI, CYS, FNA-cytology, intraoperative biopsy	RALV	No	No
Arora et al ²⁷ , Urology, 2013	23		TRUS, MRI	Open (conservative)	No	No
Zhu et al, ¹¹ Asian J Androl, 2013	31	5	CT, MRI	LV	No	No
Zhang et al, ¹³ Urology, 2013	32	5		LV	No	No
Zhang et al, ¹³ Urology, 2013	64	4.5		LV	No	No
Zhang et al, ¹³ Urology, 2013	50	3.8		LV	No	No

Abbreviations: Abd US = abdominal ultrasonography; CT = computed tomography; CYS = cystoscopy; CysProV = cystoprostatovesiculectomy; FNA = fine needle aspiration; LV = laparoscopic vesiculectomy; MRI = magnetic resonance imaging; TRUS = transrectal ultrasonography.

Kavoussi et al⁸ in 1993, minimally invasive surgery (MIS) has been increasingly performed to approach retrovesical structures such as tumors or cysts.⁹ Transperitoneal laparoscopic vesiculectomy for SV cystadenoma was recently performed, achieving optimal oncologic outcomes and easy recovery after surgery.^{10,11} With the advantages over conventional laparoscopy, in particular, the magnified 3-dimensional vision, EndoWrist instrument technology, and superior ergonomic environment for the operating surgeon, a robotic approach has been increasingly selected for the treatment of cysts and other abnormalities of the SVs.^{12,13} To date, only 2 cases of SV cystadenoma have been managed with RALV using a transperitoneal approach.^{14,15} This technique replicates the surgical principles of posterior approach to SVs during robot-assisted radical prostatectomy (RARP). In this context, some investigators have recommended previous experience in RARP before approaching a retrovesical mass with the robotic technique.¹⁵

In the present case, the diagnostic workup could safely exclude primary or secondary malignancies of the SVs, avoiding any need for intraoperative biopsies. NS RALV provided easy access to the

retrovesical anatomic structures, with optimal exposure of the SV mass and guaranteed optimal functional and oncologic outcomes. Although most reported cases of SV cystadenoma were managed with open surgery, MIS can be considered the new reference standard for the treatment of such benign tumors. Additional studies are needed to confirm the feasibility and oncologic safety of this technique.

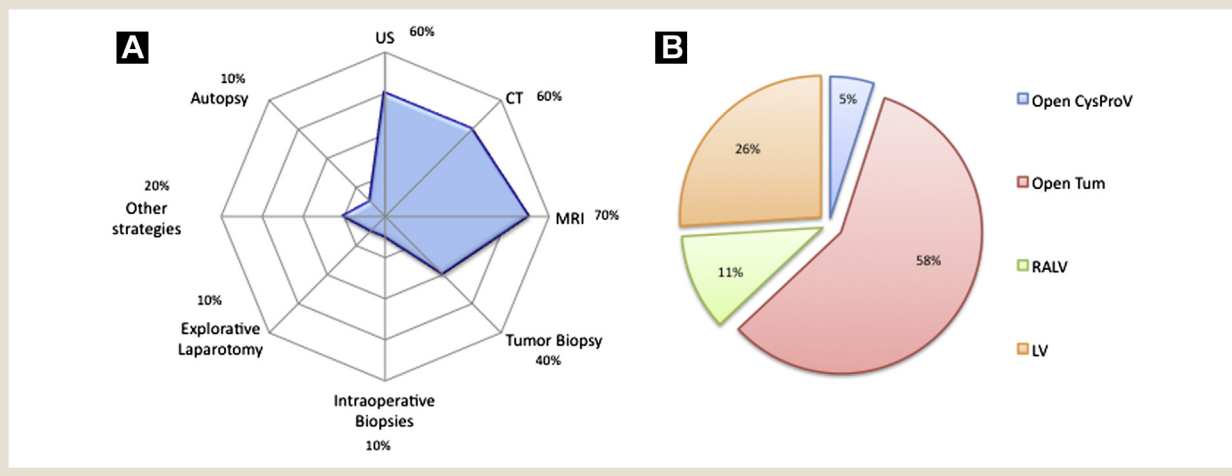
Conclusion

We have presented a case of a large SV cystadenoma causing LUTS and gross hematuria managed by NS RALV. Primary tumors of SVs are very rare. The differential diagnosis can be challenging and must use a multimodality approach. Once the benign nature of the tumor has been confirmed at preoperative biopsy, minimally invasive seminal vesiculectomy can achieve optimal perioperative and oncologic outcomes and can be safely considered the standard reference treatment.

Disclosure

The authors have stated that they have no conflicts of interest.

Figure 3 Overview of the Differential Use of Diagnostic Investigations and Surgical Treatment Options for Seminal Vesicle Cystadenoma Among Published Series. (A) In 10 of 20 Studies (50%), the Diagnostic Workup Was Accurately Described. Ultrasonography (US) Was Used in 6 Cases (60%), Endorectal Magnetic Resonance Imaging (MRI) in 7 (70%), Computed Tomography (CT) in 6 (60%), Preoperative Biopsy in 4 (40%), Intraoperative Biopsy and Explorative Laparotomy in 1 Case (10%) Each, Cystoscopy, Fine Needle Aspiration, Cytology, and Other Modalities in 2 (20%). Finally, 1 Case (10%) Was Found at Autopsy. (B) In 19 of 20 Studies (95%), the Surgical Technique Was Well Defined. An Open Approach Was Used in Most Cases, With Tumorectomy (Tum) in 11 Cases (58%) and Radical Cystoprostatovesiculectomy (CysProV) in 1 (5%). Laparoscopic Vesiculectomy (LV) and Robot-Assisted LV (RALV) Was Performed in 5 (26%) and 2 (11%) Cases, Respectively



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