Prostatic Glands and Urothelial Epithelium in a Seminal Vesicle Cyst

Report of a Case and Review of Pathologic Features and Prostatic Ectopy

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We report a case of a seminal vesicle cyst containing prostatic glands and urothelial epithelium in a patient with no other urogenital anomalies. The detection of prostatic tissue, which is of endodermal origin, in a seminal vesicle cyst, a mesonephric duct derivative, is unusual. We review the pathologic features of seminal vesicle cysts and discuss the histogenesis of prostatic and urothelial tissue.

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REPORT OF A CASE

A 33-year-old white man presented with severe perineal pain of several weeks’ duration. A diagnosis of acute prostatitis was made after the initial evaluation, and the patient was started on a 1-month course of antibiotic treatment. On follow-up visit, his pain had not improved so another month of antibiotic treatment was begun. Because he continued to have pain, a transrectal ultrasound of the prostate was obtained. The study revealed a 5.6-cm, fluid-filled cystic dilatation of the right seminal vesicle and 2 tiny hyperechoic foci on the right side, adjacent to the verumontanum. These hyperechoic foci were suspicious for stones within the distal aspect of the ejaculatory duct. A computed tomographic scan (Figure 1) confirmed the ultrasound impression. Results of a complete blood count, urinalysis, serum electrolytes, and renal function tests were within normal limits. A laparoscopic exploration was performed. The cystic mass appeared to be arising from the right seminal vesicle and was separate from the prostate and bladder. The left seminal vesicle was identified and appeared normal. The cyst was dissected from the surrounding structures, opened, and drained. Turbid fluid was aspirated from the cyst. The cyst wall was removed. An intraoperative frozen section obtained from the cyst wall showed that the cyst was benign. The patient did well after surgery and his pain resolved. A repeat computerized tomographic scan of the pelvis 6 months later showed no evidence of recurrence.

The entire surgical specimen, which consisted of a piece of membranous tissue that measured 6 × 3 × 0.2 cm, was submitted for histologic examination. Microscopically, the cyst wall consisted of a thick muscular layer lined by urothelial epithelium and invaginating typical prostatic-type glands with luminal concretions (Figures 2 and 3). In a few areas, typical seminal vesicle epithelium was observed as branching high-columnar glands with lipochrome pigment and rare, bizarre nuclei (Figure 4). Cellular debris was present in the lumen adjacent to this epithelium (Figure 4, A); dilated glands with inspissated secretions were also seen. Spermatozoa were not present. Transition of the epithelium from seminal vesicle type to urothelial or prostatic type could not be directly observed because of the orientation of the sections. With polyclonal prostate-specific antigen (PSA) immunostain, most prostatic glands were strongly and diffusely positive (Figure 3, B); the epithelium overlying these glands was focally positive at multiple sites. The nuclei of all basal cells were highlighted with p63 immunostain; the cytoplasm of basal cells of the prostatic glands and of basal layers of overlying urothelium were highlighted with cytokeratin (CK) 5/6. The CA 125 test was negative in prostatic and urothelial cells. Uroplakin and CK20 weakly stained the surface cells of the urothelial lining (Figure 3, C); prostatic glands had negative results with this stain.

COMMENT

Seminal vesicle cysts are rare. According to Scully et al,1 100 cases, with accompanying renal dysgenesis/agenesis, had been recorded by 1980. During the past 2 decades, the widespread use of sectional imaging procedures has increased detection of seminal vesicle cysts. We found 79 cases with or without renal dysgenesis/agenesis reported after 1980 in an extensive review of the MEDLINE literature.

Seminal vesicle cysts can be congenital or acquired. Most of these cysts are probably asymptomatic. They usually are found in patients in the second to fourth decades of life. Symptoms develop during the years of sexual activity when secretions are maximum or drainage is inadequate as the result of a malformed or secondarily stenosed duct system. The significance of seminal vesicle cysts lies in their association with other urogenital anomalies, infertility, local symptoms, and differential diagnosis from other retrotrigonal cysts. Recently, laparoscopic surgery has been successfully used for treatment.2

Origin of the Seminal Vesicle Cysts

Congenital seminal vesicle cysts seem to be invariably associated with other urogenital anomalies, always involving the hemitrigone, the ureteric bud, or the distal vas deferens. This fact may be related to a general dysregulation of the embryonic development of the distal meso-
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Figure 1. Postcontrast axial computerized tomographic image demonstrated thin-walled hypodense cyst without definite contrast enhancement in the region of right seminal vesicle (arrows).

Figure 2. A, Thick muscular cyst wall and prostatic glands with luminal concretions. B, Higher magnification of muscular wall (hematoxylin-eosin stain, original magnifications ×40 [A] and ×100 [B]).

Figure 3. A, Urothelial-like lining epithelium, with underlying prostatic-type glands and luminal concretions (hematoxylin-eosin stain, original magnification ×200). B, Positive immunoperoxidase staining of prostatic glands for prostate-specific antigen (original magnification ×600). C, Positive immunoperoxidase staining of urothelial surface cells for uroplakin (original magnification ×200).

Figure 4. A, Typical complex branching seminal vesicle epithelium with cellular debris in lumen. B, Epithelium consisted of tall columnar cells that focally contained cytoplasmic lipochrome pigment (hematoxylin-eosin stain, original magnifications ×40 [A] and ×200 [B]).

Pathologic Findings

Diagnosis of seminal vesicle cysts relies on imaging studies, intraoperative findings, gross confirmation of the anatomy, and microscopic examination. Seminal vesicle cysts usually have a diameter of 5 to 6 cm (range, 4–16 cm). They are usually monolocular with a smooth, sometimes folded, inner lining. Among more than 100 case reports that we reviewed, histopathologic findings were described in fewer than 30 cases. These findings revealed that the cysts consisted of a fibrous or muscular wall that was lined by a denuded or nondescript simple epithelium. Only a few reports described papillary columnar epithelium with pigmented cells, which clearly indicated seminal vesicle epithelium. Chronic inflammation was present in the cyst wall in a few cases. Because these findings are not specific, differential diagnosis from other retrotrigonal cysts can be problematic. Paramedian location and the absence of the ipsilateral seminal vesicle intraoperatively and during gross examination can be an indication of the seminal vesicle origin of the cysts. Identification of typical seminal vesicle epithelium is diagnostic. Cystadenoma of the seminal vesicle, multilocular prostatic adenoma, hydatid cyst, dermoid cyst, and intestinal duplication cyst can be identified by histopathologic evaluation. Identifi-
cation of both seminal vesicles or their remnants may aid in the differential diagnosis of other regional cysts, including diverticula of the bladder, cysts of ejaculatory ducts and vasa deferentia, benign cystic mesothelioma, and mesenteric cysts. Unlike seminal vesicle cysts, müllerian duct or utricle cysts are found in the midline.

Seminal vesicle cyst aspiration yields brownish, turbid fluid that cytologically shows cell debris. The cyst fluid showed “dead” spermatozoa in more than half the cases in which it was examined, which partly can be the result of reporting bias where presence rather than absence of spermatozoa would be reported. When present, spermatozoa point to seminal vesicle or ejaculatory duct origin of the lesion. Aspirated cysts usually recur; therefore, aspiration is not curative. Besides, in the geographic regions where hydradid cyst is endemic, aspiration is contraindicated.

Prostatic Tissue

Prostatic tissue has been reported in the retrotrigone, urethra, urinary bladder, seminal vesicle, epididymis, pre-sacral area, spleen, anal canal, female urinary bladder, uterine cervix, and ovarian hilus.6–9 A multilocular pros-tatic cystadenoma can be found adjacent to, within, or at-tached to the prostate. Prostate tissue could originate from misplaced urogenital endodermal embryonic rests, local metaplasia, or as a teratomatous component. Ectopic or metaplastic prostatic glands are particularly common along the urethra and in the urinary bladder. Cohen et al10 reported prostatic differentiation, as evidenced by the presence of prostate secretory granules immunoreactive with monoclonal anti-PSA antibody, in almost all periure-thral glands seen along the length of the penile urethra. The same authors found evidence of prostatic differentia-tion in cases of cystitis cystica/glandularis from male sub-jects, suggesting that prostatic differentiation is an integral part of cystitis glandularis. These observations could explain the presence of prostatic tissue in the seminal vesicle cyst in the case reported here; therefore, this tissue would be of metaplastic nature. It is possible that such differ-entiation reflects the multipotential nature of the reserve cells of the muscosa of the genitourinary tract. We found urothelial and prostatic differentiation in the entire lining of the seminal vesicle cyst, suggestive of metaplasia, rather than ectopy. Also, metaplasia is usually seen as an adap-tive response to a change in a local environment, which was the ejaculatory duct obstruction in our patient. The paramedian location, imaging and intraoperative findings, including the gross absence of a separate right seminal vesicle or its remnant, excluded the possibility of this les-sion being a prostatic cyst. The presence of a well-defined muscular wall and the focal presence of unequivocal seminal vesicle-type epithelium also support a seminal vesicle origin rather than a prostatic cyst. The PSA, p63, and CK5/6-positive, CA 125–negative immunohistochemical phenotype of the prostatic glands excludes seminal vesicle differentiation.11 The CK20-positive and uroplakin-posi-tive umbrella cells on the surface of the urothelium con-firm urothelial differentiation of the lining epithelium. The only case we found of benign prostatic tissue in the sem-inal vesicle, other than ours, was reported in a patient with prostate adenocarcinoma.8

Prostatic glands are urogenital endoderm-derived, with mesodermal stroma. Seminal vesicles and the trigone are believed to be mesonephric (wolfian) duct derivatives, which is mesoderm-derived and is generally considered to be incapable of differentiating toward prostatic lines. Smith et al8 reported a case of PSA-positive prostatic tissue in the ovarian hilus, apparently arising from mesonephric remnants within a spectrum of histologic differ-entiation, including rete and mesonephron-like epithelial structures, and a ciliated epithelium resembling the ep-i-didymal lining, all in a fibromuscular stroma. Once this possibility has been considered, a proportion of the re-ported ectopic prostatic tissue—at least in the peritrigonal area, seminal vesicle, and uterine cervix—could also be explained by metaplasia of mesonephric tissue.

To our knowledge, only 1 case of adenocarcinoma in-volving ectopic prostate has been reported.12 Nevertheless, primary prostatic carcinoma arising from the seminal vesicle or other prostatic ectopy should be differentiated from secondary invasion from the prostate. Benign scattered prostatic glands outside the prostate capsule and in the subvesical skeletal muscle can also potentially be misdi-agnosed as adenocarcinoma or secondary invasion. The proposed criteria of Benson et al21 for use of PSA immuno-staining for diagnosing prostate carcinoma invading the seminal vesicles should be interpreted with caution be-cause a range of urogenital epithelia have the potential for prostatic differentiation. Although most literature and our experience indicate the normal seminal vesicle does not stain with PSA, some authors have observed strong stain-ing of seminal vesicles (32%) with polyclonal but not with monoclonal PSA antibody.14 However, the reactivity was focal (3%–15% of cells) and was observed in areas that were cytologically and architecturally typical of seminal vesicle. Polyclonal anti-PSA is used widely in the United States; therefore, this antibody should be used with caution to differentiate seminal vesicle epithelium from pros-tatic adenocarcinoma. In our case, most cells in areas cy-tologically and architecturally indistinguishable from prostatic glands were reactive for this marker. CA 125 and MUC6 are other immunohistochemical markers that stain the seminal vesicle epithelium, but not the prostatic glands, and may be helpful in differential diagnosis of primary seminal vesicle carcinoma from invasion from a prostatic primary.11,15

In conclusion, it appears that different types of epithelium lining the urogenital tract have the potential to un-dergo prostatic differentiation. Examples of this potential are the presence of prostatic tissue in the wall of the urin ary bladder, retrovesical space, seminal vesicle, epididymis, testis, and root of penis. Although this is particularly common in men, it has also been described in women in the cervix, ovary, and urinary bladder.

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References


