Primary testicular mucinous neoplasms: case report and literature review

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Abstract

Testicular epithelial mucinous tumours are an extremely rare, but interesting form of testicular neoplasm. We reviewed the medical literature using PubMed search terms: testis, mucinous cystadenoma, mucinous cystadenocarcinoma, neoplasms and testicular neoplasms. We describe a case from our institution and provide a review of the literature. Only 11 previously reported cases of mucinous testicular tumours have been reported in the English literature. The natural history of these tumours is poorly understood, due to their rarity, but it appears that, like their ovarian counterparts, they have an excellent prognosis. Exclusion of metastasis is an important point for the urologist when encountering a mucinous testicular tumour, as metastatic cystic lesions may mimic a primary mucinous tumour. We describe a case of ossified testicular mucinous tumour of low malignant potential. Such tumours are common in the ovary, but arise very rarely in the testicle. The clinical and histological features of this tumour are presented, and previously reported cases are reviewed to highlight important clinical features.

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Introduction

Surface epithelial tumours are the most common type of neoplasm arising in the ovary. Identical "ovarian type" tumours may occur in the testicle, most of these being of the serous subtype.[1] Mucinous epithelial tumours of the tesicle are extremely rare. Although isolated case reports and small series have been published in the pathology literature, these interesting neoplasms are less well-known to urologists. We report a case of testicular borderline mucinous tumour, and review the literature on this rare but fascinating group of testicular neoplasms.

Case report

A 55-year-old man presented with painless right testicular swelling of 16 years duration. The size of the right testis had gradually increased, eventually prompting him to visit his family physician for evaluation. There were no other specific symptoms related to the testicle; sexual function was intact.

On palpation, the right testicle was almost completely replaced by a non-tender indurated mass. Scrotal skin and spermatic cord were unremarkable, and there was no peripheral or inguinal lymphadenopathy. The left testis was completely normal, and the remainder of the clinical examination was unremarkable. Routine bloodwork and serum tumour markers (β-human chorionic gonadotrophin [β-hCG], α-fetoprotein [AFP] and lactate dehydrogenase [LDH]) were all within normal limits.

Ultrasound imaging revealed a complex, hypovascular mass measuring 6.5 cm in diameter, containing an area of curvilinear calcification measuring about 1.8 cm (Fig. 1). A neoplasm could not be excluded based on this imaging study. No abnormalities were detected on chest radiograph or abdominal computed tomography scan.

A right inguinal orchiectomy was performed. Pathological examination revealed a multicystic mucinous tumour measuring 9.3 × 8.0 × 7.5 cm, essentially replacing the testicle. The tumour was confined to the testicle, separated from the tunica albuginea by a thin rim of compressed testicular parenchyma. A calcified solid area of 4.2 × 4.0 × 2.0 cm arose from the inner cyst wall. Microscopically, the cystic wall was irregularly thickened and fibrotic, with foci of dystrophic calcification and ossification (Fig. 2). The vast majority of the epithelial cyst wall lining was denuded. Where epithelium was still present, it was comprised by a single layer of mucinous epithelium resembling endocervical type cells. Focal intestinal type epithelium, tufting and pseudostratification with mild nuclear atypia were present, qualifying the tumour as a mucinous neoplasm of low malignant potential or "borderline" type (Fig. 3). Areas of mucin extravasation into stroma were present, but there was no stromal invasion by tumour cells. There was no involvement of the tunica albuginea, tunica vaginalis, rete testis or epididymis. The spermatic cord was free of involvement, with a negative margin. Residual testicular parenchyma showed atrophy due to compression. There was no evidence of underlying mixed gonadal dysgenesis. Following surgery, the patient

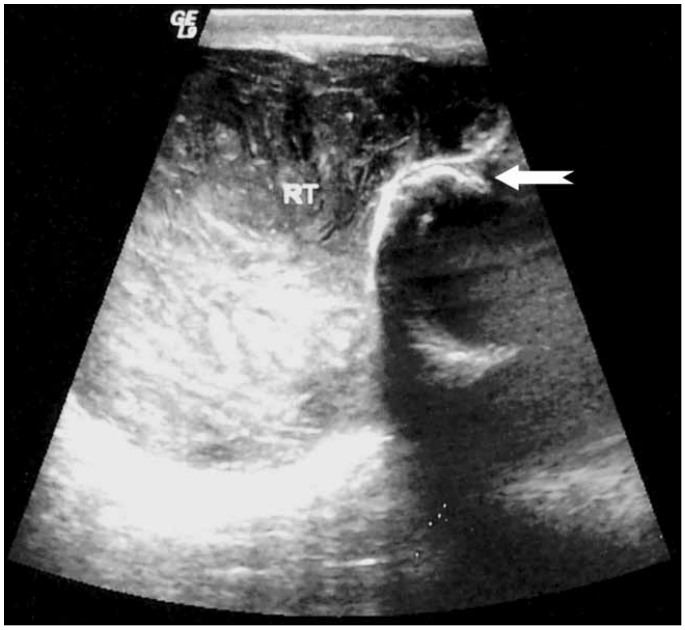

Fig. 1. Right testicular borderline mucinous tumour. Area of curvilinear calcification (indicated by arrow), with ultrasonographic "shadowing" below.

recovered well, and at the time of this report is alive with no recurrence at 50 months follow-up.

Literature review

Mucinous tumours of the testicle and adjacent structures within the tunica vaginalis are rare. Upon reviewing the English literature, we were able to identify 22 cases, not including this present case report.[2-16] The first reported case to our knowledge was by Kellert in 1959 who described a mucinous cystadenoma in the paratestis of an 11-year-old boy.[2] It was accompanied by an oviduct-like structure and presumed to have arisen from occult and unidentified ovarian tissue. At the time of Kellert's report, which was published 14 years after the patient's orchiectomy, the boy was considered to be a case of "true lateral glandular hermaphroditism," having enough intersitital cells to maintain his male character as he was "happily married" and had fathered a child. Nearly 50 years later, only 22 mucinous tumours arising within the scrotum have been reported to our knowledge (Table 1). This includes 13 cases of primary intratesticular mucinous, of which 6 were borderline tumours (including 1 termed an "ossified tumour of low malignant potential"), 4 were cystadenomas, and 3 were either mucinous cystadenocarcinoma or mucinous carcinoma. The histogenesis of these tumours is still debatable.

Due to the rarity of mucinous intratesticular tumours, its natural history is poorly understood. Most of these are single case reports in pathology journals, with a single series from Ulbright and Young, who reported 9 primary mucinous tumours of the testis and paratestis in 2003.[8] In their series

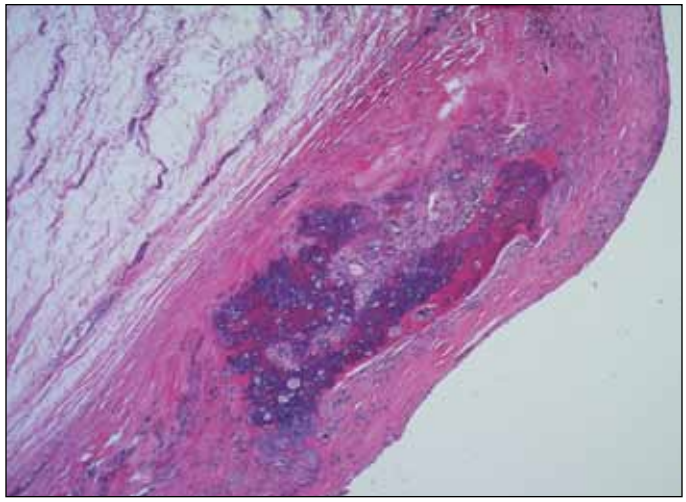

Fig. 2. The cyst wall was irregularly thickened and fibrotic, with foci of dystrophic calcification and ossification. Much of the lining epithelium was denuded. (Hematoxylin and eosin [H&E] staining, 100 × magnification.)

of 9 cases, thick fibrotic cyst walls, dystrophic calcification, metaplastic ossification and dissection of mucin into and beyond the cyst wall were common findings in these tumours. Indeed, calcification is not an uncommon histological finding in longstanding mucinous tumours of any type, and although 1 case is described as "ossified," this does not imply a specific variant or subtype within the category of mucinous tumours.[10] Maruschke and colleagues reported an ovarian type surface epithelial carcinoma of the testis presenting with a 20-year history of testicular swelling, with metastatic spread to the retroperitoneal lymphatic system 2 years after surgical excision.[14]

Discussion

The origin of intratesticular mucinous tumours is speculative, and several hypotheses for their histogenesis exist. A long-held theory is that they arise from metaplasia of the mesothelium of the tunica vaginalis, a concept proposed by Sundarasivarao, and supported by Ulbright and Young, and Lauchlan.[8,17,18] The possibility that inflammation results in mesothelial introduction into the testicle and mucinous metaplasia has been suggested by Shimbo and colleagues.[6] Others have postulated that these tumours may arise from mullerian remnants, such as the appendix testis.[19] Still others propose one-sided teratoma cell differentiation. Although this proposition is felt by many to be less likely, as the typical age of presentation for these tumours is beyond that normally seen for teratomas, these tumours lack other potential teratomatous components and do not display intratubular germ cell neoplasia.[8,9,20]

It is important for the pathologist to distinguish borderline or "low malignant potential" tumours from carcinomas with stromal invasion. It is well-known that, in the ovary, muci-

Table 1. Reported primary testicular/paratesticular mucinous tumours

Patient age (yr)	Tumour location	Pathological diagnosis	Follow-up	Reference
55	Testicular	LMP	NDR at 3.7 yr	Current case
11	Paratesticular	Cystadenoma	NDR at 14 yr	(2)
18	Paratesticular	Cystadenoma	NDR at 1.5 yr	(3)
55	Testicular	Carcinoma	NDR at 1 yr	(4)
39	Testicular	Cystadenoma	NDR at 1 yr	(5)
43	Testicular	Cystadenoma	NDR at 2.5 yr	(6)
55	Testicular	Cystadenoma	NDR at 5 mo	(7)
54	Paratesticular	Cystadenoma	NDR at 1.8 y	(8)
57	Paratesticular	Cystadenoma	Unknown	(8)
65	Paratesticular	LMP	NDR at 7 yr	(8)
68	Paratesticular	LMP	NDR at 12 yr	(8)
64	Testicular	LMP	NDR at 2 yr	(8)
59	Testicular	LMP	NDR at 4 yr	(8)
44	Testicular	LMP	NDR at 8 yr	(8)
69	Paratesticular	Carcinoma	DOD at 2 mo	(8)
35	Testicular	Cystadenoma	NDR at 8 mo	(9)
69	Testicular	LMP	NDR at 4 yr	(10)
42	Paratesticular	LMP	Unknown	(11)
59	Testicular/epididymus (bilateral)	LMP	NDR at 2 yr	(12)
60	Testicular	Carcinoma	NDR at 2 yr	(13)
67	Testicular	Carcinoma	Alive with metastases at 2 yr	(14)
66	Paratesticular (epididymus)	LMP	DOC at 10 yr	(15)
54	Testicular	LMP	Unknown	(16)

DOC = dead of other causes; DOD = dead of disease; LMP = low malignant potential; NDR = no disease recurrence.

nous tumours of low malignant potential have a significantly better survival rate than mucinous adenocarcinomas.

In the testicle there is too little data to extrapolate survival rates in men with analogous tumours. Based upon the small number cases in the literature, it appears such tumours within the scrotum likely share the excellent prognosis of their ovarian counterparts. Of the 22 cases reported, only 3 lack patient follow-up.

In the remaining 19 cases with patient follow-up (including our present case), 1 patient was alive for at least 14 years, with a median follow-up of 2 years for the nineteen reported cases, including ours. There were 4 cases of carcinoma: 1 patient died 2 months after diagnosis with frankly invasive carcinoma and peritoneal tumour deposits with no other potential primary tumour site identified;[8] 1 patient was found to have retroperitoneal lymph node metastases 2 years after diagnosis;[14] and 2 patients were alive without clinically evident recurrence of disease at 1 and 2 years, respectively.[4,13] Of the 15 patients with tumours not considered "overtly-malignant," none were reported to have developed recurrence or metastases, and 1 patient died from unrelated causes 10 years post-surgery.[15] Overall, considering the 19 cases with follow-up, 17 were disease-free following orchiectomy at various points post-surgery (Table 1). Since all patients received surgical therapy for their respective tumours, the outcome of a purely observational approach to tumour management is unclear.

From a practical point of view, when encountering a mucinous tumour of the testis or paratestis, it is important for the urologist to exclude the possibility that it represents a metastasis. Metastatic mucinous tumours to the testicle are more common than primary mucinous testicular tumours. More than two thirds of cases occur in men over the age of 50, and 10% of patients present initially with a unilateral testicular mass.[21] Recently Hoang and colleagues reported a recurrence of an appendiceal mucinous neoplasm extensively involving the abdomen and presenting clinically due to involvement of the scrotum.[22] Metastases from the colon, stomach and very rarely from the pancreas represent 53% of metastatic tumours to the testicle;[8] these may produce

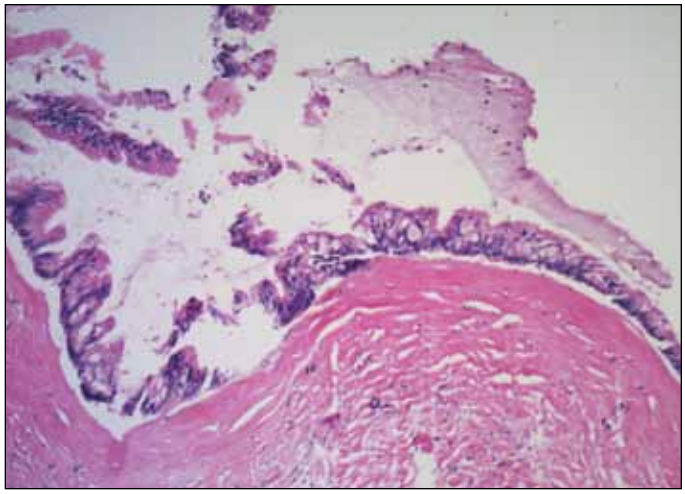

Fig. 3. A single layer of mucinous epithelium resembling endocervical type cells lines the cyst wall. Focal intestinal type epithelium, tufting and pseudostratification with mild nuclear atypia was present, qualifying the tumour as a mucinous neoplasm of low malignant potential or "borderline" type. (Hematoxylin and eosin [H&E] staining, 200 × magnification.)

cystic lesions in the testicle mimicking a primary mucinous tumour.[23-25] Metastatic tumour from the prostate, ileal carcinoid, kidneys and melanoma do not typically show features similar to a primary testicular mucinous tumour.[26-28] Additionally, tumour growth in the testicular interstitium, prominent vascular space involvement and tumour multifocality are more common of metastatic mucinous tumours. Bilateral testicular involvement also strongly suggests metastatic disease, although this occurs in less than 15% of known metastatic testicular tumours.[28] Since it would be rare for metastasis to the testicle to be the first clinical manifestation of disease, the clinical history and additional investigations would usually be expected to clarify such a situation. In most reported cases of testicular mucinous tumours, imaging of additional body areas as well as laboratory investigation for known tumour markers were performed; most of these investigations ruled out other forms of primary testicular tumours, as well as obvious primary disease at other sites.

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