

**Case Report**

# Malignant Mesothelioma of the Spermatic Cord - A Rare and Aggressive Entity

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**Malignant mesothelioma is an uncommon, aggressive neoplasm that develops from cells of the mesothelium, the protective lining that covers many internal organs in the body. As of 2013, only 10 spermatic cord cases were reported in the English literature. Here we report a recent case of this exceptionally rare entity. A 66-year-old man presented with a 3-month history of an enlarging mass in the left inguinal area, and associated pain with straining and physical exertion. Radiologic studies revealed an oval mass in the left inguinal canal, as well as a left inguinal hernia. After surgical resection, the mass was found to be 9 × 5 × 5-cm, firm, fusiform, pink-tan, and surrounded by an ill-defined tan capsule. Sectioning revealed tan cut surfaces with variegated pale yellow and hemorrhagic regions. Microscopic sections showed a partially necrotic, high-grade malignant neoplasm, which infiltrated fat, muscle, and perineural spaces. It abutted the vas deferens but did not invade. The neoplasm had a biphasic appearance and was composed of spindled and epithelioid cells. Mitotic figures were abundant. Immunostaining showed expression of calretinin and positivity for multikeratins in the epithelioid areas, confirming the diagnosis of spermatic cord malignant mesothelioma. These tumors are usually diagnosed at advanced stages and have a poor prognosis. Radical excision is the primary therapy in localized disease cases. Spermatic cord malignant mesotheliomas show recurrence rates of up to 57% within 2 years. The most important prognostic indicator is the age of the patient.**

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## INTRODUCTION

Malignant mesothelioma (MM) is an uncommon aggressive neoplasm that develops from cells of the mesothelium, the protective lining that covers many internal organs in the body. The most common sites of MM include: pleura (~75%), peritoneum (~10-20%), pericardium (~1%), and scrotum. MM of the paratesticular region is extraordinarily rare.<sup>1</sup> The purpose of this study was to report a rare case of spermatic cord MM and to describe the clinical features, the histopathological findings, and the difficulties encountered in diagnosing this tumor.

## CASE REPORT

A 66-year-old man with a history of asbestos exposure presented with a 3-month history of an enlarging mass in the left inguinal area, associated with left groin and left testicle pain triggered by straining and physical exertion. On physical examination, the mass was poorly mobile, non-reducible, and mildly tender to firm palpation.

Pelvic X-rays, a computer tomography scan, and a positron emission tomography (PET) scan revealed a left inguinal hernia and a 3 x 5 cm oval-shaped mass in the left inguinal

canal with adjacent fat stranding (**Figure 1**); one enlarged left pelvic lymph node (1.2 cm) was identified on PET scan, which was worrisome for metastasis. Ultrasound showed a left inguinal heterogeneous soft tissue mass measuring up to 4.2 cm with internal blood flow. Other positive radiological findings included: multiple non-acute bilateral rib fractures, multiple cystic lesions in the liver suggestive of hepatic cysts, multiple simple cysts in the bilateral kidneys, multiple lipomas in the right paraspinal muscles and the right gluteus minimus muscle. No significant pleura or peritoneal lesions were identified on radiology.

Diagnostic laparoscopy, left radical orchiectomy and left pelvic lymphadenectomy were performed. Grossly, the mass was 9 x 5 x 5 cm, firm, fusiform-shaped, pink-tan, and surrounded by an ill-defined tan capsule with a thickness ranging from 0.2-1.0 cm. Sectioning of the mass revealed tan cut surfaces with variegated yellow, pale and hemorrhagic areas (**Figure 2 gross**).

Microscopic sections showed a high grade malignant neoplasm that was comprised of spindled and epithelioid cells (**Figures 3 & 4**), infiltrating through fat and muscle fibers, and abutting the vas deferens without invasion (**Figure 5**). Perineural invasion, focal necrosis (20%) and increased

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mitotic figures (~25 mitoses per 10 high power field) were present. This tumor focally invaded the outer walls of blood vessels. The surgical margins were free of tumor and none of

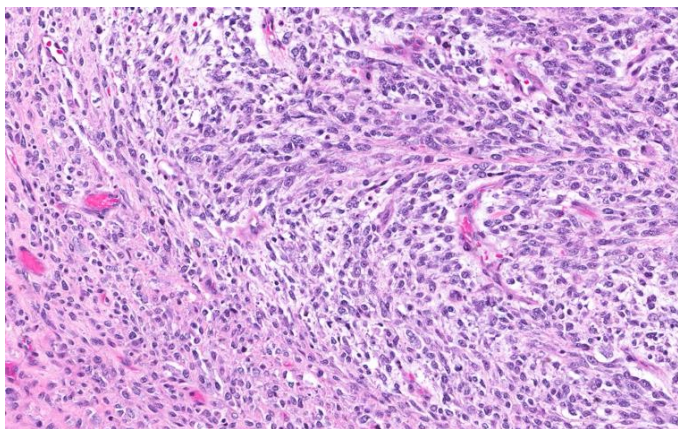
the sixteen pelvic lymph nodes excised were positive for tumor involvement. Diagnostic laparoscopy was also negative and no intraperitoneal involvement was identified.



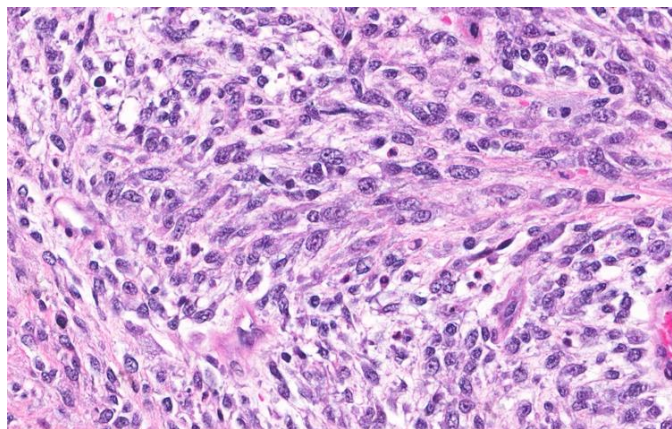
**Figure 1.** CT showed a 3 x 5 cm oval-shaped mass in the left inguinal canal with adjacent fat stranding.



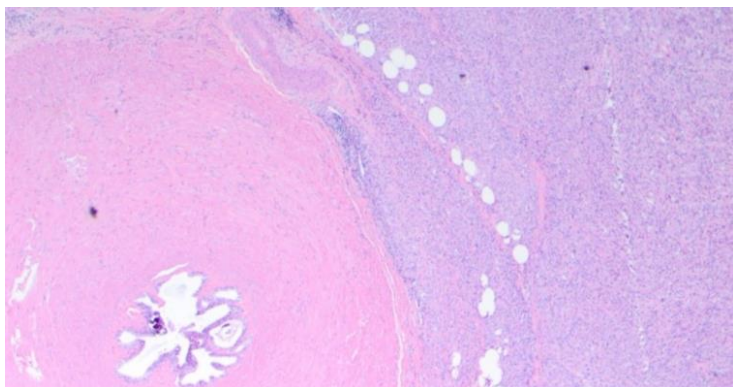
**Figure 2.** A 9 x 5 x 5 cm, firm, pink-tan tumor surrounded by an ill-defined tan capsule.



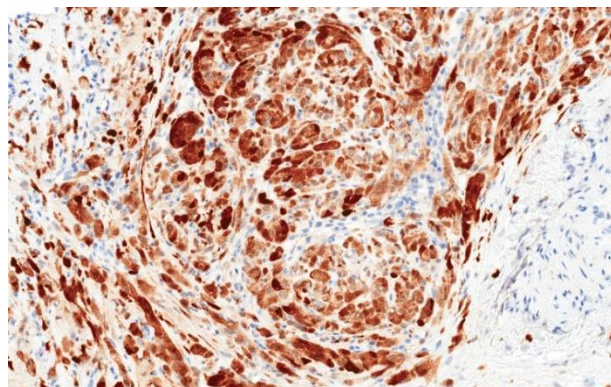
**Figure 3.** Spindled and epithelioid tumor cells infiltrated through fat and muscle fibers. Perineural invasion, focal necrosis (20%) and increased mitotic figures were present (original magnification x 10).



**Figure 4.** Higher power view of spindled and epithelioid tumor cells infiltrating through fat and muscle fibers. Perineural invasion, focal necrosis (20%) and increased mitotic figures were present (original magnification x 40).



**Figure 5.** Tumor cells abutted the vas deferens without invasion.



**Figure 6.** Tumor cells were positive for Calretinin immunostain.

Immunohistochemical stains demonstrated strong and diffuse positivity for calretinin (**Figure 6**). Positivity was also present for multi-keratin in the epithelioid areas. The tumor was non-reactive for desmin, HMB-45, S100, MelanA, CD31 and CD34.

After the surgery, patient received adjuvant chemotherapy but follow-up imaging studies revealed multiple lesions in pelvis and abdominal wall. Later, this patient developed worsening pain and eventually passed away two months after the surgery due to multiple metastases.

## DISCUSSION

The earliest mention of a possible mesothelioma case was made in 1767 by Joseph Lieutaud, the founder of pathologic anatomy in France in a study of 3,000 autopsies where he found two cases of “pleural tumors”. The term *mesothelioma* was first coined by Adami in 1908, but it was Klemper and Rabin who first fully defined the epithelial and fibrous types of mesothelioma. Since Wagner and colleagues demonstrated

a high incidence of mesothelioma among asbestos workers in the Cape Province of South Africa in 1960, increased attention has been given to this tumor.<sup>2</sup>

Currently, the incidence of mesothelioma ranges from about 7 to 40 per 1,000,000 in industrialized Western nations, depending upon the amount of asbestos exposure.<sup>3</sup> Other possible inciting causes include Simian Monkey virus 40, non-asbestos fiber erionite, therapeutic radiation, and prombage therapy.<sup>4</sup> Mesothelioma is more common in males, increasing with age, but can appear at any age, in either gender.

Most common sites of MM include: *Pleural MM*, the most common type (75% of cases); *Peritoneal MM*, the second most common (~10 to 20% of cases); *Pericardial MM*, the less frequent type (~1% of cases); and *Paratesticular MM* (PTMM), extraordinarily rare, especially the spermatic cord variant. According to a report in 2013 by Meng et al, only 10 spermatic cord cases had been reported in the English literature.<sup>5</sup>

According to recently updated mesothelioma guidelines (the International Mesothelioma Interest Group [IMIG], 2012), MM may be broadly divided into three histologic types: epithelioid, sarcomatoid and mixed (biphasic). Each pattern may have secondary growth patterns.<sup>6</sup>

*Epithelioid MM* (~50% of cases) has the best prognosis, and may present with secondary patterns including, tubulopapillary, micropapillary, trabecular, acinar, adenomatoid, solid, clear cell, deciduoid, adenoid cystic, signet ring cell, small cell, rhabdoid and pleomorphic patterns.<sup>6</sup>

*Sarcomatoid MM* (16% of cases), is more aggressive and has secondary patterns including conventional spindle cell, desmoplastic, heterologous differentiation (osteosarcomatous, chondrosarcomatous, etc.), and lymphohistiocytoid patterns.<sup>6</sup>

Based on a literature review of 11 cases with spermatic cord MM (10 previously reported cases and this case), the patients ages range from 26 to 74 years with an average age of 49 years. Nine cases involved the left side and 2 involved the right. The most common initial presentation is a painless inguinal mass. Of the 6 cases with clinical information, only our case has a clear history of asbestos exposure. Of the 8 cases with defined tumor histologic subtypes, 5 had epithelioid morphology and 3 had mixed subtype.<sup>5</sup>

The diagnosis of MM should be based on evaluation of an adequate biopsy. Less important, but still helpful, are materials of exfoliative cytology or fine-needle aspiration. In all cases it is encouraged to correlate appropriate clinical, radiologic, and surgical findings.

The differential diagnosis of inguinal masses is extensive and includes mesothelioma, metastatic carcinoma, liposarcoma, leiomyosarcoma, rhabdomyosarcoma, malignant fibrous histiocytoma, lymphoma, melanoma, germ cell tumor, infection and others. Immunohistochemical staining plays an important role in characterizing and differentiating these tumors.<sup>6</sup>

*Calretinin*, a calcium binding protein structurally related to S100 and inhibin, is a very useful immunomarker and can be demonstrated in nearly all epithelioid mesotheliomas. This staining is often strong and diffuse, and stains both nuclei and cytoplasm.

*Cytokeratin 5 or 5/6*, marking intermediate-sized basic keratin, is expressed in 75% to 100% of MM.

Other potentially useful MM markers are: *WT-1* (Wilms tumor 1, ~70% to 95% of the mesotheliomas show nuclear positivity), *D2-40* (podoplanin, ~ 90% to 100% of mesotheliomas show membranous positivity) and *Mesothelin* (a cytoplasmic membrane glycoprotein found on surface of mesothelial cells and mesothelioma, 100% positive).<sup>6</sup>

Additional staining for desmin, HMB-45, S100, MelanA, CD31 and CD34 can help exclude other tumors.

Occasional florid reactive mesothelial proliferations may mimic mesothelioma due to their high cellularity, numerous mitotic figures, cytologic atypia, necrosis, formation of papillary groups, and entrapment of mesothelial cells within fibrosis mimicking invasion. Key features to help differentiate mesothelioma from reactive mesothelial hyperplasia include desmoplasia, dense cellularity, complex papillae, necrosis, minimal inflammation, expansile nodules, disorganized growth, and reactivity with epithelial membrane antigen (EMA), p53, glucose transporter 1 (GLUT-1), insulin-like growth factor II mRNA binding protein 3 (IMP3) immunostains.

Paratesticular MM is usually diagnosed at advanced stages and has a poor prognosis. Radical excision is the primary therapy in localized disease cases. Chemotherapy and radiotherapy show only minimal effectiveness. Spermatic cord MMs show recurrence rates of up to 57% within 2 years. In paratesticular MMs 30% of patients die after a median survival of 24 months and age of the patient appears to be the most important prognostic factor.<sup>6</sup>

## CONCLUSION

We present an exceptionally rare case of a spermatic cord MM, one variant of paratesticular MM. Due to its rarity, paratesticular MM may sometimes be confused with other types of malignant neoplasms, infections or inflammatory processes. Therefore, it is important to recognize its histopathological and immunohistochemical features, and be aware of the potential diagnostic pitfalls for timely diagnosis and therapy.

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## CONFLICT OF INTEREST

There are no conflicts of interest.

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None.

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