**Testis: Spermatocytic seminoma**

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### Identity

**Alias:** Spermatocytoma

**Note:** Spermatocytic seminoma is a rare testicular neoplasm derived from germ cells. It was first described by Masson in 1946. This tumour occurs exclusively in the testes, in relatively older men. There is no female (ovarian) equivalent.

### Classification

**Note**

Classification of germ cell tumours has not been adapted uniformly in the world. Two classifications most commonly used are the modified WHO classification and the British Testicular Panel (BTPP) classification. In addition Grigor proposed in 1993 a new classification based on biological features, and it was suggested in the AFIP Atlas of Tumor Pathology a modified classification of testicular and paratesticular tumours and tumour-like lesions. Spermatocytic seminoma is classified in these four systems as follows:

<table>
<thead>
<tr>
<th>Modified WHO Classification</th>
<th>BTPP Classification</th>
<th>AFIP Atlas of Tumor Pathology (Ulhight et al.)</th>
<th>Grigor's Modified Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spermatocytic Seminoma (a category of Tumors of One Histologic Type)</td>
<td>Spermatocytic Seminoma (a separate entity)</td>
<td>Spermatocytic Seminoma (variant with sarcomatous component) (a separate entity)</td>
<td>Spermatocytoma (a separate entity)</td>
</tr>
</tbody>
</table>

### Clinics and pathology

**Disease**

Spermatocytic seminoma has a relatively mild clinical course. Most patients present with a painless swelling of one testis, but in some cases tenderness was reported. Metastases are very rare and have been basically reported only in cases with sarcomatous transformation.

**Phenotype / cell stem origin**

The origin of spermatocytic seminoma from the germ cell lineage has been clearly demonstrated by a number of studies, however the cell of origin have been a matter of debate. The initial hypothesis suggested that the spermatocyte was the progenitor cell and the tumour might contain post-meiotic haploid cells. Subsequent studies failed to find haploid DNA values, thus arguing against a true meiotic-phase tumour.
Other hypotheses stipulated that spermatocytic seminoma might be a better differentiated variant of classical seminoma (composed of cells differentiating in the direction of spermatocytes but which have not yet reached this stage) or may originate from type B (dark) spermatogonia, which are committed to enter meiosis. Finally, some researchers suggested that spermatocytic seminoma might be derived from primordial germ cells or gonocytes. The current consensus, based on comparative studies of the phenotypes of spermatocytic seminoma, normal germ cells and other germ cell derived tumours, is that spermatocytic seminoma is derived from spermatogonia that are committed to enter meiosis but have not yet done so. Importantly, spermatocytic seminoma is not derived from carcinoma in situ (CIS), the gonocytes-like intratubular precursor lesion for germ cell tumours of adolescents and young adults (classical seminoma and non-seminoma).

**Etiology**

Aetiology of spermatocytic seminoma is unknown.

**Epidemiology**

Spermatocytic seminoma is rare and represents around 2-5% of seminomas. It occurs in patients at 45-80 years of age, and is extremely rare in young men under than 35. This is in contrast to the classical seminoma, which demonstrates the peak of age-specific incidence around 35 years of age.

**Cytology**

A characteristic feature of spermatocytic seminoma is the presence of three types of cells with different
nuclear size: large, small and intermediate. Some nuclei may exhibit a presence of nuclear thread-like chromatin.

**Pathology**

There is no specific marker for spermatocytic seminoma. Proteins/antigens that are highly expressed in spermatogonia (most of them also present in gonocytes and primary spermatocytes), such as SSX (synovial sarcoma on X chromosome), NSE (neuron-specific enolase), CHK2, MAGE-A4, NY-ESO-1, VASA are present in spermatocytic seminoma. Antigens expressed in embryonic germ cells but not in the normal adult testis, e.g. PLAP (placental-like alkaline phosphatase), TRA-1-60, or KIT are usually undetectable in spermatocytic seminoma. High expression of p53 protein in a subset of cells was demonstrated in approximately 80% of cases. Proteins highly abundant in post-meiotic spermatids, e.g. p19INK4d, are usually not present in spermatocytic seminoma. The expression of telomerase (the RNA component) in spermatocytic seminoma was found to be moderate: lower than in classical seminomas but higher than in mature teratomas.

**Treatment**

Spermatocytic seminoma is treated by surgery (orchiectomy).

**Evolution**

Some cases of spermatocytic seminoma may undergo sarcomatous transformation and spread outside the testis. An anaplastic variant was also described.

**Genetics**

**Note**

No specific germ-line chromosomal aberration or gene mutations were reported in patients with spermatocytic seminoma.

**Cytogenetics**

**Note**

Cytogenetic studies demonstrated variable ploidy of the different cell populations in spermatocytic seminoma, with prevalence of diploid and polyploid cells. No haploid values were found.

**Cytogenetics Molecular**

Only one molecular study of 4 spermatocytic seminomas was performed to date. A uniform gain of chromosome 9, and less consistent gains of chromosomes 1 and 20, and loss of chromosome 22 material were found by comparative genomic hybridisation.

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MAGE-A4 antigen is abundant in spermatocytic seminoma (visible in a lower part of the picture). Note that MAGE-A4 is also present in spermatogonia (visible in the upper part) (from Rajpert-De Meyts et al. Histopathology 2003).
References


Mostofi FK. Comparison of various clinical and pathological classifications of tumors of testes. Semin Oncol. 1979 Mar;6(1):26-30

Romanenko AM, Persisdkii IuV. [Ultrastructure and histogenesis of spermatocytic seminoma]. Vopr Onkol. 1983;29(7):60-6


Kraggerud SM, Berner A, Bryne M, Pettersen EO, Fossa SD. Spermatocytic seminoma as compared to classical seminoma: an immunohistochemical and DNA flow cytometric study. APMIS. 1999 Mar;107(3):297-302


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