

# Mixed Germ Cell Tumor with Predominate Choriocarcinoma in Testicle

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## Abstract:

Testicular germ cell tumors (GCT) cause approximately 10% of all cancer deaths in men 15 – 34 years old and are a histologically diverse category of neoplasms that consist of a mixed cell type in 40-45% of cases. Choriocarcinoma is the rarest and most highly malignant subtype of GCT and can present with diffuse metastasis at the time of diagnosis. It is found as the only cellular subtype in less than 1% of all GCTs and is found as a component in only 8-10% of mixed GCTs. Here, a case of mixed GST comprised of >95% choriocarcinoma presents as a painless testicular growth with lung and lymphatic metastasis. The patient's prognosis and treatment are dependent not only tumor invasion, but on proper identification of each histological subtype. The pathologists' assistant's care in selecting sections is vital.

## Background:

Testicular tumors are a histologically diverse set of neoplasms that can be divided into those that are derived from germ cells and those derived from sex-cord stroma.<sup>1</sup> Germ cell tumors (GCT), the more common and more often malignant of the two categories, can be further divided into seminomatous and non-seminomatous.

The cellular composition of the tumor is homogenous in 40% of germ cell tumors, but the remaining 60% contain a mixture of seminomatous and non-seminomatous lineages.<sup>1,2</sup> Correct histological identification and proportions of each specific cell type is important for accurate prognosis and proper treatment, as each type carries its own risk of malignant potential, with choriocarcinomas being the most aggressively metastatic.<sup>2,3</sup> Immunohistochemical stains and serum markers (alpha feta protein [AFP] with yolk sac tumors and  $\beta$ -human chorionic gonadotropin [ $\beta$ -hCG] with choriocarcinomas) can be useful in diagnosis.

Microscopically, choriocarcinoma is comprised of syncytiotrophoblasts and cytotrophoblasts that occasionally organize to form a villous structure similar to those found in placentas.<sup>7</sup> This attempt at recapitulation of placental tissue correlates to its gross appearance of red-brown, hemorrhagic, friable tissue.<sup>2</sup>

## Case Report:

A 28-year-old male presents to the emergency room with an increase in right testicular swelling and pain after a fall down the stairs a week prior. Previously, he had noticed a painless enlargement in the same testicle over the past month and had been experiencing back pain. He had no other significant medical history and denied shortness of breath, night sweats, or weight loss. An ultrasound showed a solid, heterogeneous mass measuring 5.8 x 9.8 X 7.2 cm on the right testicle with the contralateral testicle appearing normal. The patient then underwent a CT with contrast of the chest, abdomen, and pelvis. This revealed multiple bilateral lung nodules showing central hypodensity, suggestive of necrosis, with possible pleural involvement measuring up to 14 x 8 x 14 cm. Retroperitoneal soft tissue masses with a mass effect on the inferior vena cava, multiple soft tissue nodules at the mesenteric root, and masses along the left renal vein were also observed. All other organs were unremarkable and no other pathologic lymph nodes were noted. Pre-orchidectomy serum tumor marker values were  $\beta$ -hCG: > 400,000 mIU/mL, AFP: 672.2 ng/mL, lactate dehydrogenase (LDH): 1516 IU/L (140-280 normal range). A right radical orchidectomy was performed.

## Results:



Figure 1. Bivalved testicle showing red-brown, spongy mass displacing the normal testicular parenchyma

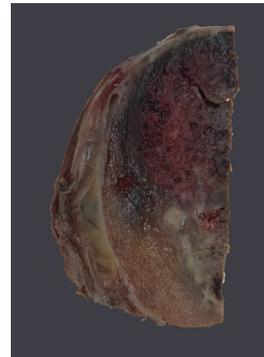


Figure 2. Cut section of testicle showing approach of mass to tunica albuginea and relationship to normal tissue.

**Gross Description:** "The specimen is received in formalin, labeled 'right testes mass' and consists of a 12.5 x 7.5 x 6.0 cm radical orchidectomy specimen weighing 273.0 g overall. The tunica vaginalis is loosely adherent to the tunica albuginea which is white, thickened and opaque.

The specimen is bivalved to reveal a 4.2 x 2.8 x 1.5 cm testicle distorted by an adjacent 8.6 x 6.0 x 4.8 cm well defined, lobulated, red-brown and spongy mass. The mass approaches the tunica albuginea to within 0.1 cm by does not involve it grossly. It comes to within 2.5 cm of the spermatic cord margin and does not grossly involve the testicular hilum. Further sectioning of the mass reveals variegated yellow red to red-brown cut surfaces. No additional masses or lesions are identified. The uninvolved testicle is pale tan-pink and strings with ease.

The spermatic cord measures 1.8 cm in length with an average diameter of 1.5 cm. The margin is unremarkable. A 1.0 cm in greatest dimension possible epididymis is identified. Sectioning reveals unremarkable cut surfaces.

## Methodology:

The gross examination was performed following standard procedures and fixation in 10% buffered formalin. Sections were submitted for microscopic examination in accordance with CAP guidelines for Mixed Germ Cell Tumor of the testis.

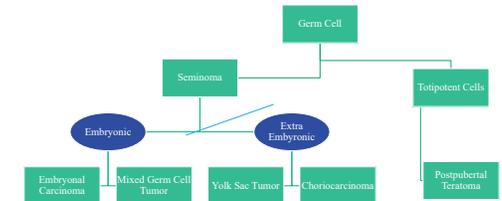
## Discussion:

Multiple sections of the submitted testis showed extensive hemorrhagic and necrotic tumor with very little viable tissue. The tumor predominately (>95%) consisted of intimately admixed syncytiotrophoblasts and cytotrophoblasts with a minor component showing a pattern of a yolk sac tumor. IHC stains were strongly positive for  $\beta$ -hCG and minimally focally positive for AFP. This led to the final diagnosis of non-seminomatous germ cell tumor consisting of choriocarcinoma and yolk sac tumor (also known as a mixed germ cell tumor).<sup>5</sup> The tumor was staged as a pT2 as it was limited to the testes but showed lymphovascular invasion. Regional lymph nodes were not able to be assessed and metastasis results were not available.

While gross appearance is important in diagnosis, IHC stains are imperative in all GCTs to confirm the proportion and composition of the specific histological subtypes. Choriocarcinomas stain positive for  $\beta$ -hCG, SALL4, GATA3,  $\alpha$ -inhibin, and human placental lactogen and yolk sac tumors stain positively for AFP.<sup>2,5</sup> As choriocarcinoma is an aggressive subtype of GCTs with an unfavorable prognosis, it is important to identify even a small proportion of it within a tumor.<sup>3</sup>

When submitting tissue for histological examination, it is important to sample any tissue that appears grossly distinct as it can be indicative of differing subtypes of neoplasm.<sup>5</sup> Lymphovascular invasion is especially important to visualize in determining possible metastasis, so it is important for the PA to plan their sections to demonstrate the lymphatics than run parallel to the tunica albuginea.<sup>5</sup> Grossly examining the tumor's invasion of the notch between the epididymis and the spermatic cord is the determining factor between a pT2 and pT3 classification, reiterating the importance of the PA's gross examination of tumor invasion.<sup>5</sup>

## Flow Chart of Testicular Tumors Origins



## References:

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