النادي الطبي

GENITOURINARY SYSTEM

SUBJECT : Pathology

LEC NO. : Summary lec 9 (male 2)

DONE BY : Ahmad Shadfan & Aya Odeh

وَقُل رَّبِّ زِدْنِي عِلْمًا

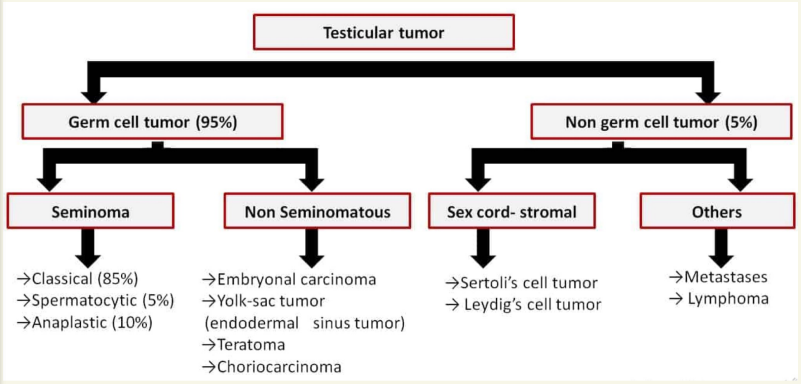
Testis

Neoplasm

Testicular tumors are the primary cause of painless testicular enlargement, most commonly affecting men aged 20-34. In adults, 95% of testicular tumors arise from germ cells and are malignant, while Sertoli or Leydig cell tumors (sex cord/stromal tumors) are rare and typically benign. Cryptorchidism increases the risk of cancer in both the undescended and contralateral descended testis, and intersex syndromes also elevate the risk. The incidence of testicular tumors is higher in whites than in blacks, with an increasing trend in Caucasian populations. Cytogenetic studies have revealed various abnormalities in testicular germ cell tumors, with the most common being an **isochromosome of the short arm of chromosome 12**, although their role in cancer development remains unclear.

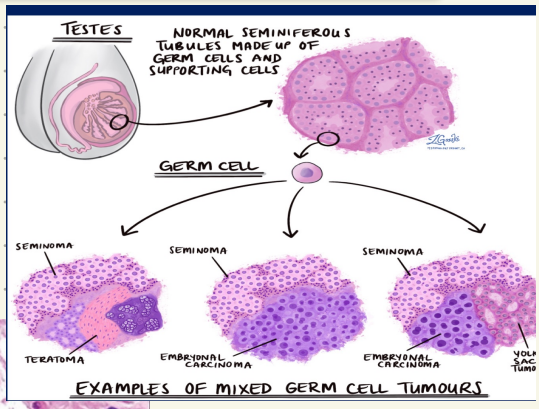
Under the widely used WHO classification in the US, testicular germ cell tumors are categorized into two main groups based on histologic patterns.

The first category comprises tumors with a single histologic pattern, which represent 60% of cases. This includes seminoma and non-seminomatous tumors such as embryonal carcinoma, yolk sac tumor, choriocarcinoma, and teratomas, including both mature and immature types, with the potential for malignant transformation of somatic elements.

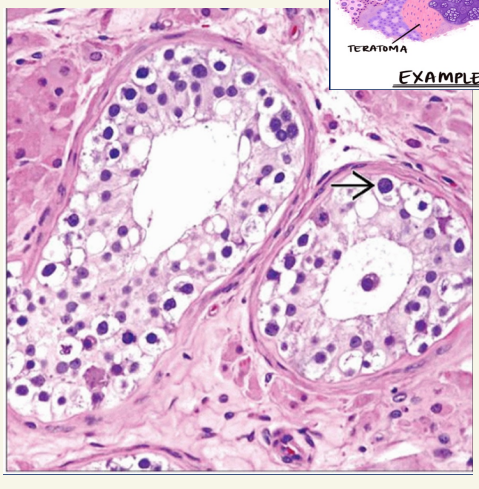


The classification of tumors with more than one histologic pattern, accounting for 40% of cases, is based on the premise that testicular germ cell tumors originate from primitive cells with diverse differentiation potential. These cells can differentiate along gonadal lines, leading to seminomas, or transform into a totipotential cell population, giving rise to non-seminomatous germ cell tumors. Within this population, cells may remain undifferentiated to form embryonal carcinoma, differentiate along extra-embryonic lines to create yolk sac tumors and choriocarcinomas, or differentiate along somatic cell lines to produce teratomas.

Testicular germ cell tumors (TGCTs) have diverse characteristics and often originate from an intratubular precursor cell known as germ cell neoplasia in situ (GCNIS), which has the potential to differentiate into various embryonic and extraembryonic lineages.

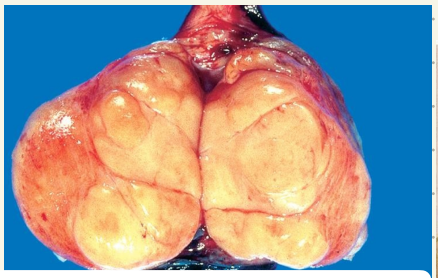


Intratubular germ cell neoplasia (IGCN) shows enlarged nuclei, prominent nucleoli, and clear cytoplasm in seminiferous tubules, displacing Sertoli cells. Young adult testicular germ cell tumors arise from germ cell neoplasia in situ (GCNIS), originating from immature germ cells failing to differentiate.

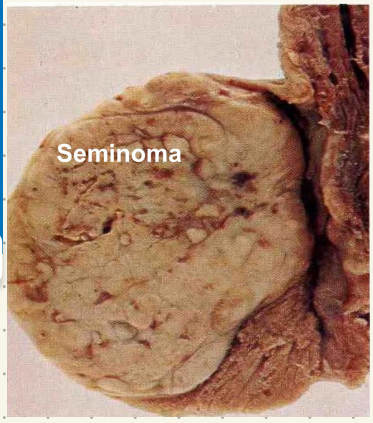


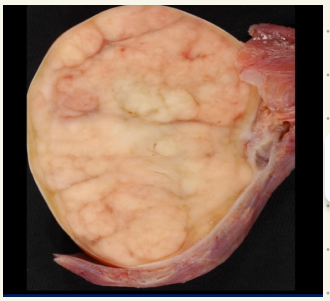
Seminomas Classic

Seminomas represent 50% of testicular germ cell tumors and resemble ovarian dysgerminomas and CNS germinomas histologically. Grossly, they appear as large, soft, well-demarcated, gray-white tumors with a potato-like shape, typically confined within the testis by the tunica albuginea. While large seminomas may contain areas of coagulation necrosis, hemorrhage suggests the presence of a non-seminomatous germ cell component within the tumor.



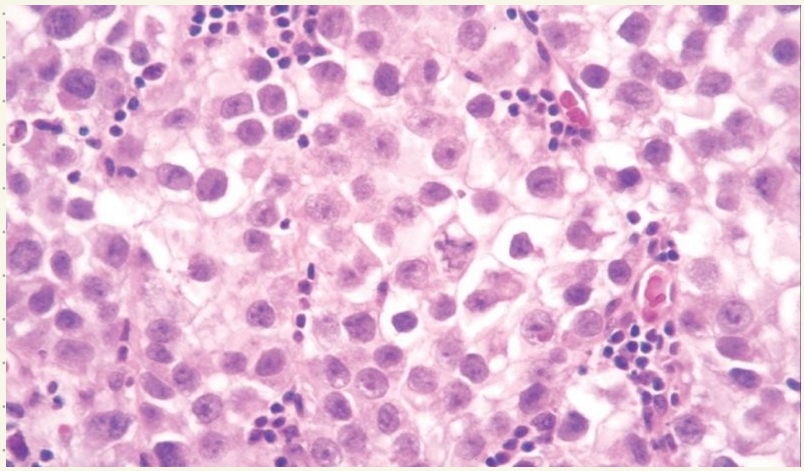
Well circumscribed, pale, fleshy, homogenous mass.





A lobulated, pale- grey opaque tumor of the testis, which is firm &"potato "looking on section.

Histologically, seminomas consist of large, uniform cells with distinct borders, clear cytoplasm rich in glycogen, and round nuclei with prominent nucleoli. They are arranged in small lobules with fibrous septa infiltrated by lymphocytes. A granulomatous inflammatory reaction may occur. In about 25% of cases, seminoma cells stain positively for human chorionic gonadotropin (hCG), resembling syncytiotrophoblasts, which may lead to elevated serum hCG levels in some patients.

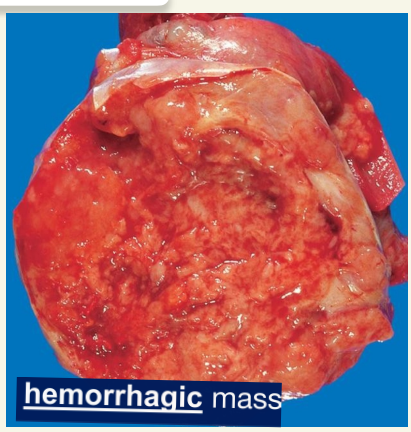


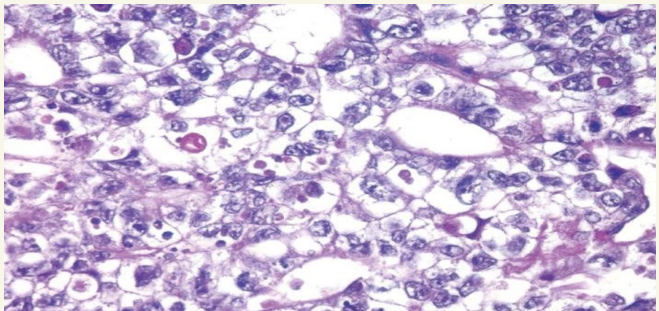
Spermatocytic seminoma

Spermatocytic seminoma, a rare form of seminoma, occurs in older patients and features a mix of tumor cells resembling secondary spermatocytes. Unlike classic seminoma, it **does not** associate with intratubular germ cell neoplasia and rarely metastasizes.

Embryonal carcinomas

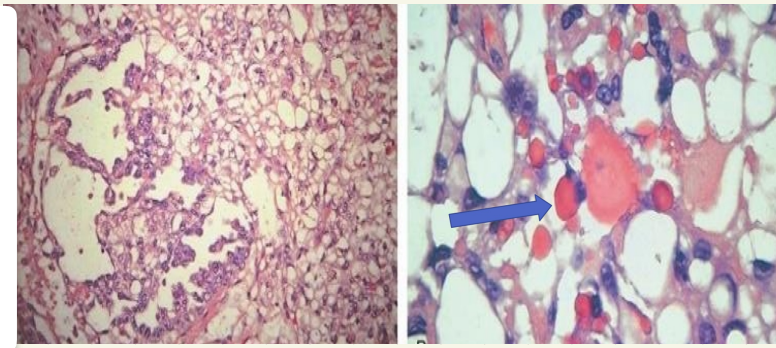
Embryonal carcinomas are highly malignant testicular tumors with ill-defined invasiveness, often containing hemorrhage and necrosis. They may invade the epididymis and spermatic cord. **Histologically**, they feature large, primitive-looking cells with basophilic cytoplasm and prominent nuclei. They may form solid sheets or glandular structures. Pure embryonal carcinomas are rare, making up only 2% to 3% of all testicular germ cell tumors.





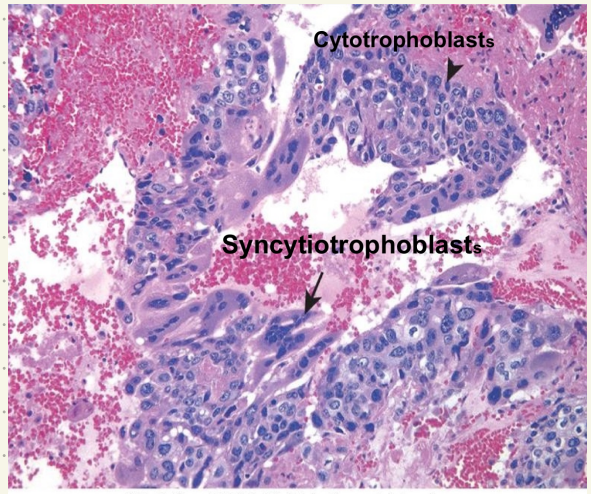
Yolk sac tumors

Yolk sac tumors, also known as endodermal sinus tumors, are the most common testicular cancer in children under 3 years old. In adults, they are often mixed with embryonal carcinoma. **Histologically**, they feature epithelial cells forming microcysts, sheets, glands, and papillae, with distinctive structures resembling primitive glomeruli called **Schiller-Duvall bodies**. They can be identified by the presence of α-fetoprotein (AFP) in tumor cells.



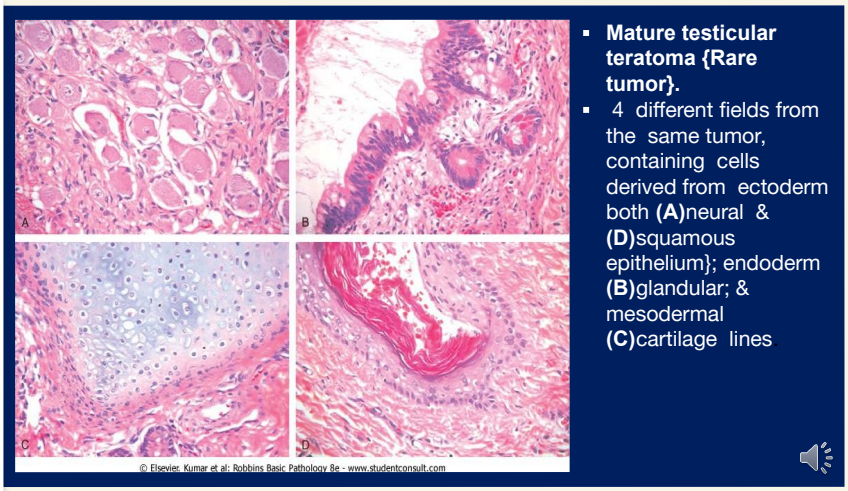
Choriocarcinomas

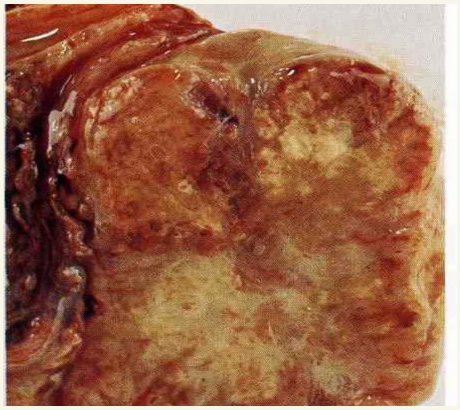
Choriocarcinomas stem from germ cells differentiating along trophoblastic lines. They appear small even with extensive metastases. Histologically, they feature cytotrophoblasts and syncytiotrophoblasts without placental villi. Immunohistochemical staining can detect hCG hormone mainly in syncytiotrophoblasts.



Teratomas

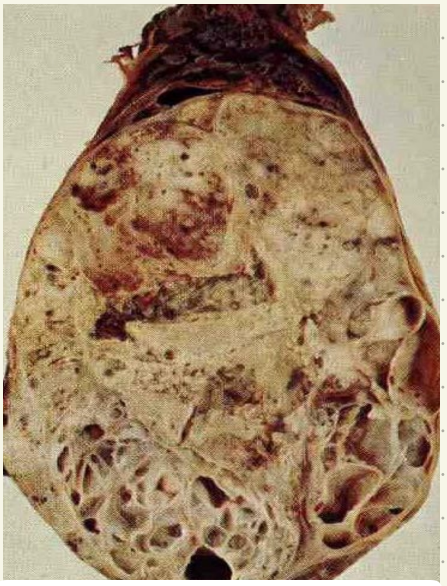
Teratomas represent differentiation of pluripotential neoplastic germ cells along somatic cell lines, forming firm masses containing cysts and cartilage areas on cut surfaces. Histologically, there are three major variants: mature teratomas containing fully differentiated tissues, immature teratomas with immature somatic elements resembling fetal tissue, and teratomas with somatic-type malignancies characterized by the development of frank malignancy in preexisting teratoma elements. While pure teratomas in prepubertal males are usually benign, all testicular teratomas in adults are considered malignant tumors due to the presence of other malignant germ cell elements and metastasis in 37% of cases.





Mixed germ cell tumors

Mixed germ cell tumors, making up 40% of testicular cases, can combine teratoma, embryonal carcinoma, and yolk sac tumors. They typically present as painless testicular enlargement, but some may have widespread metastases at diagnosis, even without a palpable testicular lesion. They are categorized as seminomas or non-seminomatous tumors.



seminomatous, yellowish-white solid element, with necrosis & hemorrhages in the upper 2/3 of tumor

Seminomas usually remain localized in the testis for a long time before diagnosis, often reaching a significant size. They commonly spread to lymph nodes in the iliac and para-aortic regions before hematogenous metastases occur. Nonseminomatous germ cell tumors tend to metastasize earlier, spreading to the liver and lungs via the bloodstream and lymphatics. Seminomas have a good prognosis due to their high sensitivity to radiation and chemotherapy.

Nonseminomatous germ cell tumors have generally poor prognosis, but platinum-based chemotherapy has shown improvement in some cases. Staging includes Stage I (confined to testis), Stage II (regional lymph node metastases), and Stage III (non-regional lymph node and/or distant organ metastases), with tumor marker assays being crucial for evaluation and staging.

(I) hCG, produced by neoplastic syncytiotrophoblastic cells, is consistently elevated in patients with choriocarcinoma. Germ cell tumors like seminoma may also produce hCG, with approximately 10% to 25% of seminomas showing elevated levels.

(II) α-fetoprotein (AFP) is a glycoprotein typically synthesized by the fetal yolk sac and various other fetal tissues.

1. Nonseminomatous germ cell tumors containing yolk sac elements often produce alpha-fetoprotein (AFP), a marker also elevated in hepatocellular carcinoma.
2. Unlike human chorionic gonadotropin (hCG), the presence of AFP is a reliable indicator of a nonseminomatous component in germ cell tumors, as yolk sac elements are absent in pure seminomas.
3. Most nonseminomatous tumors have elevated levels of both hCG and AFP. Serial measurements of hCG and AFP are valuable for primary diagnosis, staging, and monitoring patients with testicular germ cell tumors for persistence or recurrence after therapy.

مادة الميد لهون