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MIXED GERM CELL TUMOR OF THE TESTIS IN A YOUNG ADULT: A CASE REPORT OF YOLK SAC TUMOR AND EMBRYONAL CARCINOMA

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Abstract:

Background: Mixed germ cell tumors (MGCTs) of the testis are rare neoplasms comprising two or more germ cell tumor components. They represent approximately 32–54% of all testicular germ cell tumors, with yolk sac tumor (YST) and embryonal carcinoma (EC) being among the most common admixtures.

Case Presentation**:** We report a 36-year-old male presenting with a six-month history of painless right testicular swelling. Serological workup including HIV, HBsAg, and HCV was negative, and all tumor markers (AFP, beta-hCG, LDH) were within normal limits. Right radical inguino-orchidectomy was performed. Gross examination revealed a firm testicular mass with whorled, nodular cut surface. Histopathological examination confirmed a mixed germ cell tumor comprising 77% yolk sac tumor and 23% embryonal carcinoma components.

Conclusion**:** This case highlights the diagnostic importance of thorough gross and microscopic examination in testicular tumors, even in the setting of normal tumor markers. Accurate component-wise histopathological characterization is essential for appropriate staging and subsequent oncological management**.**

Index Terms **- Mixed germ cell tumor; Yolk sac tumor; Embryonal carcinoma; Testicular neoplasm; Inguino-orchidectomy; Histopathology.**

I. INTRODUCTION

Testicular germ cell tumors (TGCTs) are the most common malignancy in males between 15 and 40 years of age, accounting for approximately 1–2% of all male malignancies worldwide. They are broadly classified into seminomatous and non-seminomatous germ cell tumors (NSGCTs). Within the NSGCT category, mixed germ cell tumors—defined as tumors containing two or more histologically distinct germ cell tumor components—represent a significant proportion, with reported incidences ranging from 32% to 54% of all TGCTs.[1]

The most commonly encountered components in mixed GCTs include embryonal carcinoma (EC), yolk sac tumor (YST), teratoma, choriocarcinoma, and seminoma in varying combinations.[2] The clinical behavior and prognosis depend not only on the dominant component but also on the relative proportions and presence of aggressive elements such as embryonal carcinoma.[3]

Serum tumor markers—alpha-fetoprotein (AFP), beta-human chorionic gonadotropin (beta-hCG), and lactate dehydrogenase (LDH)—are important adjuncts in the diagnosis and staging of TGCTs. However, normal marker levels do not exclude malignancy, as demonstrated in this case. This report presents a 36-year-old male with a mixed germ cell tumor of the right testis composed predominantly of yolk sac tumor (77%) and embryonal carcinoma (23%), with normal tumor markers, reinforcing the primacy of histopathological evaluation.[4]

CASE REPORT

II CLINICAL HISTORY

A 36-year-old male presented to the surgical outpatient department with a six-month history of gradually progressive, painless swelling of the right testis. There was no associated fever, trauma, urinary symptoms, or constitutional complaints. The patient had no significant past medical or family history of malignancy. He was a non-smoker and non-alcoholic. Physical examination revealed a hard, non-tender, irregular swelling of the right testis measuring approximately 5 x 4 cm, with loss of testicular sensation. The contralateral testis was unremarkable. Transillumination test was negative.

III INVESTIGATIONS

Scrotal ultrasonography demonstrated a heterogeneous, hypoechoic right testicular mass with internal vascularity on Doppler examination, suggestive of a testicular neoplasm. Serology for HIV, HBsAg, and HCV was negative. Serum tumor markers—AFP, beta-hCG, and LDH—were all within normal reference ranges. Routine hematological and biochemical investigations were unremarkable. Chest X-ray and contrast-enhanced CT scan of the abdomen and pelvis showed no evidence of lymphadenopathy or distant metastasis.

IV. RESULTS AND DISCUSSION

Mixed germ cell tumors of the testis constitute a heterogeneous group of neoplasms and represent a diagnostic challenge owing to their variable histological composition. According to the 2016 WHO Classification of Tumors of the Urinary System and Male Genital Organs, MGCTs are defined as tumors containing more than one histological germ cell tumor type, with each component present in a quantity sufficient for histological recognition.[5]

The combination of YST and EC, as demonstrated in the present case, is one of the more frequently encountered admixtures in the NSGCT category. YST, also known as endodermal sinus tumor, is characterized by its diverse histological patterns (reticular, solid, endodermal sinus, polyvesicular vitelline, and glandular), of which the reticular/microcystic pattern is the most common. EC, on the other hand, is among the most aggressive GCT components and is considered a significant adverse prognostic factor. Its presence, even as a minor component, influences staging decisions and may warrant adjuvant chemotherapy.[6]

A noteworthy feature of this case was the absence of elevated tumor markers. AFP, which is classically elevated in YST (particularly in pediatric cases), and beta-hCG, typically elevated in EC and choriocarcinoma, were both within normal limits.[7] While serum AFP is elevated in approximately 60–70% of YST-containing tumors, normal levels have been reported and are not sufficiently sensitive to exclude YST. This underscores the critical importance of histopathological examination as the gold standard for diagnosis.

The age of presentation (36 years) is consistent with the peak incidence of NSGCTs, which predominantly affect males in the third and fourth decades of life. The insidious onset and absence of pain in this patient resulted in a six-month diagnostic delay, emphasizing the need for clinician awareness and timely scrotal ultrasound for any testicular mass.

Radical inguino-orchidectomy remains the cornerstone of both diagnosis and initial treatment for all testicular tumors, regardless of the suspected histological type. Trans-scrotal biopsy or orchidectomy is contraindicated due to the risk of altering lymphatic drainage patterns and upstaging the tumor. Accurate pathological staging—particularly the assessment of lymphovascular invasion, rete testis involvement, and surgical margin status—is imperative for determining subsequent management.[8]

Given the pT1 stage (organ-confined tumor with no lymphovascular invasion) and normal post-operative tumor markers, surveillance represents an acceptable management strategy. However, the presence of EC as a component mandates close monitoring, as EC-predominant tumors have a higher propensity for occult retroperitoneal nodal metastasis. Retroperitoneal lymph node dissection (RPLND) or adjuvant BEP (bleomycin, etoposide, cisplatin) chemotherapy may be considered in patients with high-risk features or patient preference.[9]

The present case reinforces several key teaching points: the importance of radical inguinal approach for orchidectomy, the diagnostic primacy of histopathology over tumor markers, the need for precise component-wise quantification in MGCTs, and the necessity for multidisciplinary management with individualized surveillance protocols.[10

OPERATIVE FINDINGS AND PROCEDURE

Based on clinical and radiological findings, a right radical inguino-orchidectomy was performed under spinal anesthesia via the inguinal approach, with high ligation of the spermatic cord at the internal inguinal ring. Intraoperatively, the testis was enlarged with intact tunica vaginalis. The spermatic cord appeared grossly uninvolved.

Gross Pathological Findings

The orchidectomy specimen was received fresh and measured 8 x 5 x 4 cm. The external surface showed an intact tunica albuginea. On serial sectioning, a well-defined firm mass was identified within the testicular parenchyma measuring 4.5 x 3.5 cm. The cut surface exhibited a heterogeneous appearance with whorled, nodular areas displaying tan-brown to yellowish discoloration. No areas of frank hemorrhage or necrosis were grossly evident. The epididymis and spermatic cord margin appeared uninvolved macroscopically.

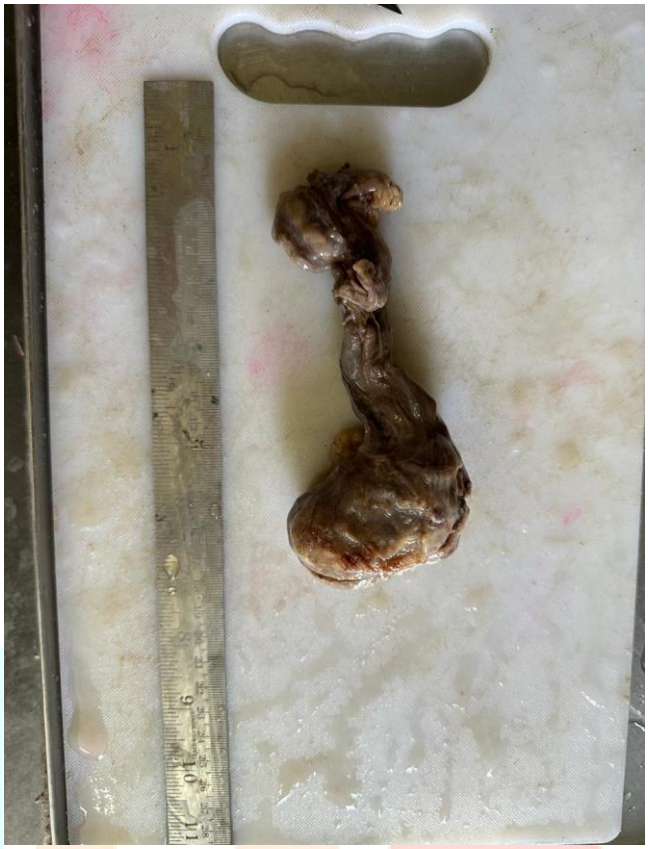

Figure 1: Gross specimen of right inguino-orchidectomy showing a firm testicular mass with irregular surface. Ruler indicates approximately 10 cm scale.

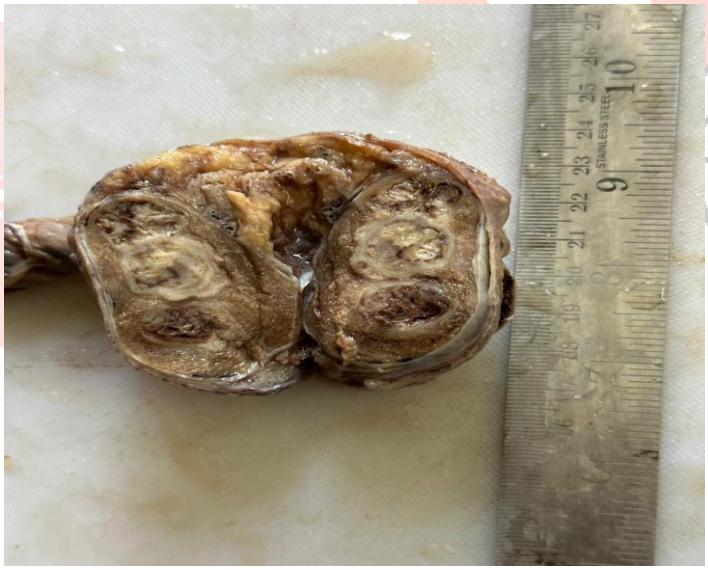

Figure 2: Cut surface of the testicular mass demonstrating heterogeneous whorled and nodular architecture with tan-brown to yellowish areas, consistent with mixed germ cell tumor morphology.

Histopathological Findings

Multiple representative sections were processed and stained with Hematoxylin and Eosin (H&E). Microscopic examination revealed two distinct neoplastic components:

Yolk Sac Tumor Component (77%): The predominant component showed classic reticular/microcystic pattern with anastomosing channels lined by flattened to cuboidal cells with clear to lightly eosinophilic cytoplasm and hyperchromatic nuclei. Areas of endodermal sinus pattern (Schiller-Duval bodies) were also identified, characterized by papillary cores with central vessels surrounded by neoplastic cells. The stroma was loose and myxoid.

Embryonal Carcinoma Component (23%): The minor component showed sheets and nests of large, pleomorphic cells with prominent nucleoli, coarse chromatin, and frequent mitotic figures including atypical forms. Areas of gland-like and papillary arrangements were also present. Focal tumor necrosis was noted within this component.

No lymphovascular invasion was identified in the sections examined. The tunica albuginea, rete testis, epididymis, and spermatic cord surgical margin were free of tumor involvement.

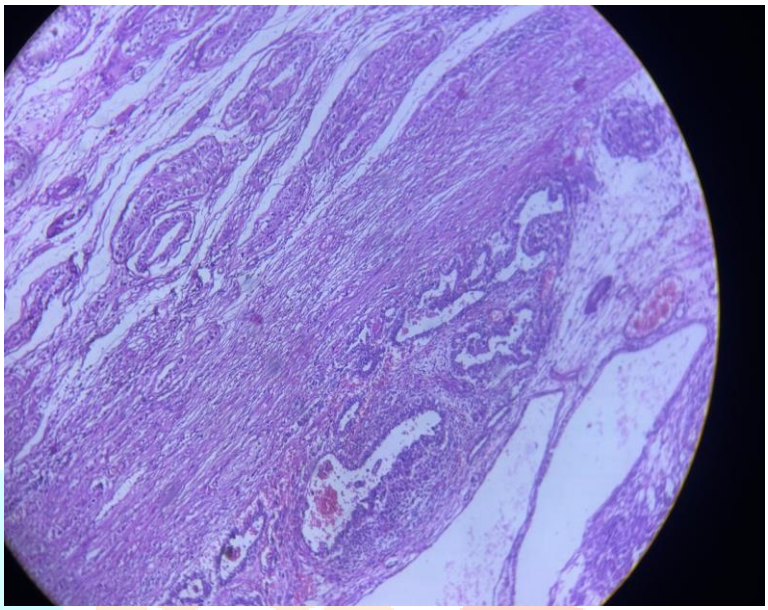

Figure 3: Photomicrograph (H&E, low power) showing the yolk sac tumor component with reticular/microcystic pattern, anastomosing channels lined by tumor cells, and loose myxoid stroma. Note the interspersed fibrous bands separating tumor lobules.

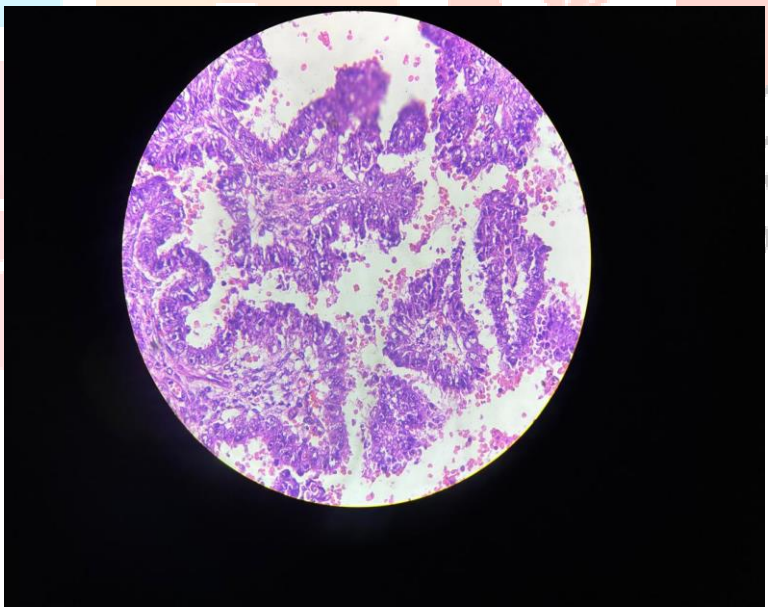

Figure 4: Photomicrograph (H&E, medium power) demonstrating the embryonal carcinoma component with sheets and papillary arrangements of large pleomorphic cells exhibiting prominent nucleoli, coarse chromatin, and brisk mitotic activity. Focal hemorrhage is noted in the background.

Final Diagnosis

Mixed Germ Cell Tumor of Right Testis — comprising Yolk Sac Tumor (77%) and Embryonal Carcinoma (23%). Pathological stage: pT1 (organ-confined, no lymphovascular invasion, negative surgical margins).

Post-operative Course

The patient's post-operative recovery was uneventful. The case was discussed in a multidisciplinary tumor board meeting. Given the pT1 stage and absence of lymphovascular invasion, close surveillance with serial tumor marker estimation and CT imaging was recommended. The patient was counseled regarding the nature of the diagnosis, the importance of compliance with follow-up, and semen cryopreservation for fertility preservation.

V. CONCLUSION

This case report describes a mixed germ cell tumor of the testis in a 36-year-old male, predominantly comprising yolk sac tumor (77%) with an embryonal carcinoma component (23%), presenting with normal serum tumor markers. The diagnosis was established on histopathological grounds following right radical inguino-orchidectomy. This case highlights the limitations of tumor markers as sole diagnostic tools and emphasizes the irreplaceable role of thorough gross and microscopic pathological evaluation in testicular tumors. Accurate histological subtyping and quantification of individual germ cell components remain essential for optimal oncological staging and individualized therapeutic decision-making

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