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Case Report

An anomalous seminoma arising from an undescended testis: A case study and literature review

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ABSTRACT

Undescended testes, while common, are not without their risks. Although orchiopexy is typically recommended around 12 months of age to mitigate the risk of testicular tumors and infertility, some cases present unique challenges. Take for instance the case we recently encountered: a patient presented with and intra-abdominal mass and changes of torsion stemming from a right testicular seminoma in the abdomen. While intra-abdominal testicular seminomas have been documented, instances of Torsion and hemorrhagic shock due to tumor rupture are exceptionally rare. This underscores the importance of ongoing monitoring and awareness of potential complications, even after corrective procedures like orchiopexy.

1. Introduction

An Undescended Testies has a 10% chances of developing cancer, with an intra-abdominal testicle having the Highest risk. Cryptorchidism, a condition characterized by undescended testes, is relatively common in male infants, affecting approx 30% of premature male infants and 15 to 3% of full-term male infants.[1] If left untreated, cryptorchidism can increase the risk of infertility and testicular cancer.[2,3] Testicular germ cell tumors, particularly Seminoma

emerges as the most prevalent carcinoma of the testicle in the fourth decade of life, constituting approximately 60% to 65% of germ cell neoplasms. Notably, compared to non-seminomatous germ cell tumors (NSGCTs), seminomas are often identified in patients at an earlier age.[4] Individuals with a history of germ cell tumors are at an increased risk of developing a second testicular malignancy, with the incidence estimated at 2% to 3%.Histopathological evaluation of seminomas has led to the identification of three main types: classic, anaplastic, and spermatocytic. These classifications aid in understanding the nature and behaviour of the tumor. In this report, we present a case of seminoma arising in an undescended testis, manifesting as a palpable painful mass in the lower abdomen. The patient complained of lower abdominal pain persisting for approximately one year, which intensified over the past seven days and was accompanied by nausea.

2. Case Presentation

A 33 Years old male patient with average built and height came to surgery department with chief complains of progressive swelling and pain in the lower abdomen more on the right side since one year on and off increased since last week associated with nausea.

History of bilateral undescended testis since birth.

During clinical assessment, a mass was observed in the hypogastric region, specifically in the right paramedian location. The mass elicited slight tenderness upon palpation.

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Examination revealed an empty scrotal sac, with the right testis and epididymis not palpable. The patient was recommended to undergo pertinent investigations for further evaluation.

The ultrasound revealed a well-defined iso-hyperechoic solid mass measuring 82 x 72 x 68 mm in the pelvic region posterior to the urinary bladder. Multiple hypo-anechoic areas indicative of necrosis were also observed within the mass, with no evidence of calcification. Additionally, a left retractile/undescended testis was identified in the left inguinal region. Color Doppler imaging showed minimal peripheral vascularity within the lesion. The remainder of the abdominal organs appeared normal. Scrotal ultrasound failed to visualize both testes within the scrotal sac.

A CT scan revealed a large, well-defined encapsulated, homogenously enhancing solid lesion measuring 82 x 72 x 68 mm in the pelvic region posterior to the urinary bladder. The possibility of a neoplastic etiology originating from the right testicle was considered, and histopathological correlation was recommended. No evidence of abdominal lymphadenopathy was observed (Figure 1 a and b)

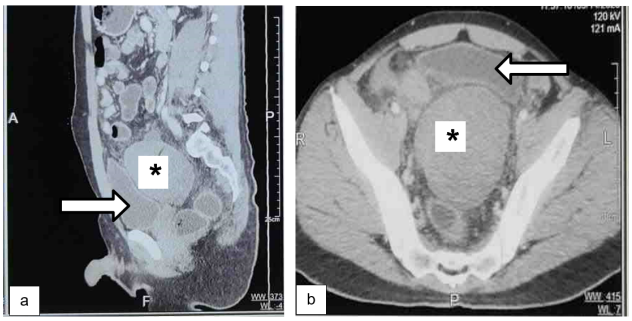

Figure 1: Coronal (**a**) and axial (**b**) section of plain CT abdomen showing well-defined lobulated solid soft tissue mass (asterisk) in the hypogastric region in the supra-vesical area (urinary bladder marked by white arrow)

In biochemical investigation, levels of B-HCG and alpha-fetoprotein were within the normal range, while a high level of LDH correlated with a high tumor burden. All other hematological and biochemical investigations, including complete blood count, coagulation profile, liver function test, and renal function tests, yielded normal results. Subsequently, the patient underwent surgery, during which resection of the mass was performed.

On gross examination of the cut specimen, the mass reveal a well-circumscribed nodular appearance with evidence of hemorrhage. Microscopic examination revealed extensive areas of hemorrhage and necrosis, indicative of infarction. The nodules consisted of polygonal cells with distinct cell borders, nuclei have a flat edge giving a squared off appearance, vesicular chromatin, prominent eosinophilic nucleoli, and a moderate amount of vacuolated cytoplasm arranged in sheets and trabeculae. Thin fibrous

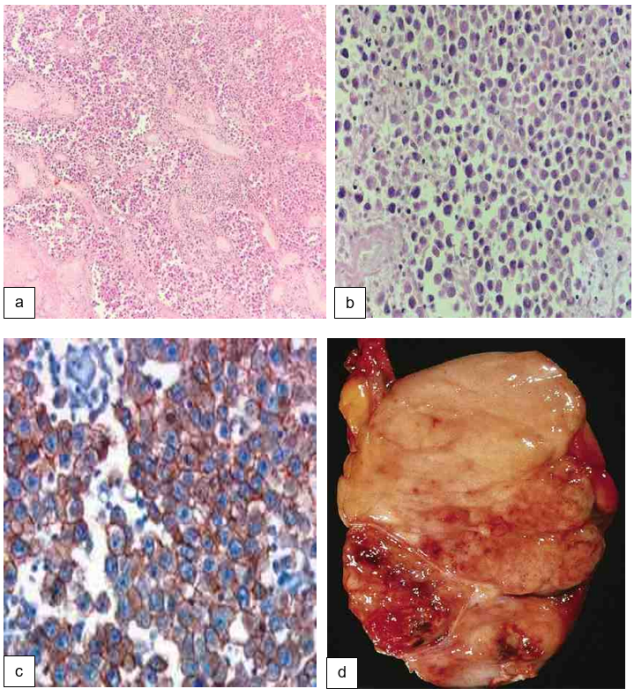

Figure 2: (**a** and **b**) Tumor cells with large cells are arranged in sheets, with finely vacuolated cytoplasm, and nuclei with distinct nucleoli of the tumor cells are round. Infiltration of lymphoplasmacytic cells is observed in stroma (hematoxylin and eosin stain, X 20 and X 100) (**c**) Strong immunostaining for CD117, showing a membranous pattern in a seminoma.(Immunohistochemistry stain X 400) (**d**) Gross image of cut surface of seminoma with haemorrhage

bands separated the nodules, with interspersed perivascular aggregates of lymphocytes and extensive haemorrhage and necrosis within the stroma. No evidence of lymphovascular invasion or other germ cell tumor components was observed. Additionally, the epididymis and vas deferens seen in the cut section were uninvolved by the tumor. These findings were consistent with classical seminoma with evidence of torsion. (Figure 2 a and b)

On immunohistochemistry, tumor cells expressed CD-117 (Figure 2 c).

In postoperative period the patient recovered well. After surgery for undescended testis seminoma, LDH levels are normalized and after discharge present referred to oncology of further management.

3. Discussion

Testicular germ cell tumor is an important testicular neoplasm. The evolution of germ cell testicular tumors is thought to start with abnormalities that occur during the development and migration of germ cells. Various factors have been identified as potential predisposing factors for testicular germ cell tumors, including a presence in the

family, undescended testis, small- sized atrophic testis, hypospadias, oligospermia, testicular dysgenesis syndrome, and exposure to estrogen from external sources during the antenatal period. Cowden syndrome, a hereditary condition, has also been a risk factor for developing testicular germ cell tumors.[5]

In the embryo, at the stage of the bilaminar disk, gonocytes, or primitive germ cells, can be determined at the age of two weeks of gestation. Following extensive migration, primitive germ cells occupy the parenchyma of the testis and convert into mature sex cell progenitors during Puberty. Primitive germ cells may be deposited along the migration pathway during this process, potentially leading to arrested primitive germ cell development and subsequent germ cell neoplasm in situ (GCNIS) proliferation. Pubertal activation of the hypothalamic-pituitary- gonadal axis can trigger this proliferation, which may result in the occurrence of extragonadal germ cell tumors. In 2016, the classification for germ cell tumors was revised by the World Health Organization (WHO) to include a new term for the precursor lesion: germ cell neoplasm in situ (GCNIS). These tumors encompass a spectrum of histologic types, categorized into GCNIS-related and non-GCNIS-related based on genetic characteristics. Seminomas, choriocarcinomas, embryonal carcinomas, and teratomas are among the GCNIS-related tumors, while spermatocytic tumors and prepubertal teratomas fall into the non-GCNIS category.

Germ cell tumours (GCT) of testes can be benign (teratomas) or malignant (seminoma and non-seminoma). While most germ cell tumors arise within the gonads, a small proportion manifests extragonadal regions such as the mediastinum, retroperitoneum, pineal gland and sacral area. Seminoma represents the predominant histologic type. There are three main types of seminoma as below

1. Classic seminomas feature uniform large cells with clear cytoplasm and centrally located nuclei, with positive markers PLAP, OCT3/4, and c-KIT, typically occurring in men aged 30-40 with a favorable prognosis.
2. Anaplastic seminomas show increased atypia and mitotic activity, also expressing PLAP, OCT3/4, and c-KIT, with a slightly worse prognosis due to higher atypia.
3. Spermatocytic seminomas occurring in men over 50, consist of three cell types, lack typical markers like PLAP and c-KIT, but express VASA, with a very good prognosis and rare metastasis.

Approximately 7-10% of testicular tumours develop in patients who have a history of cryptorchidism; seminoma is the most common form of tumour these patients have. However, 5-10% of testicular tumours occur in the contralateral, normally descended testis.[6] Orchiopexy does not alter the malignant potential of the cryptorchid testis; however, it facilitates examination and tumour detection.[7] The staging of testicular germ cell tumors is crucial for treatment planning. The extension of an undescended testis seminoma is classified into three clinical stages:

1. Stage I: Tumor confined to the testis with no metastasis.
2. Stage II: Cancer spread to retroperitoneal lymph nodes, subdivided by lymph node size (IIA: <2 cm, IIB: 2-5 cm, IIC: >5 cm).
3. Stage III: Cancer spread to distant lymph nodes or organs like lungs, liver, or bones, with consideration of serum tumor marker levels.

In this case, the tumor was categorized as Stage I classical seminoma without lymphovascular invasion, indicating localized disease with favorable prognostic indicators.

Cryptorchidism significantly raises seminoma risk, particularly if not corrected early. Regular exams and early orchiopexy reduce but do not eliminate cancer risk. Histopathologically, undescended testes show higher intratubular germ cell neoplasia and lymphovascular invasion, requiring vigilant management and possibly more aggressive treatment despite a generally similar prognosis to normally descended testes when detected early.

Prognostic factors for seminomas include age, tumor size, lymphovascular invasion, mitotic count, necrosis, and the presence of giant cells and tumor-infiltrating lymphocytes.

Computed tomography (CT) stands as the primary imaging modality for assessing retroperitoneal lymph nodes in testicular cancer. The retroperitoneal lymph nodes are a frequent site of metastasis due to their extensive lymphatic and venous drainage pathways. Per the National Comprehensive Cancer Network (NCCN) guidelines, if abdominal CT reveals retroperitoneal metastasis in seminoma cases, a chest CT should be conducted to evaluate thoracic lymphadenopathy and pulmonary metastasis. In instances where retroperitoneal lymph nodes are not visualized on CT, chest radiographs may suffice for staging purposes.[8] The clinical outcome of intra-abdominal undescended testicular seminoma following surgical excision is generally excellent, with high cure rates due to the tumor's responsiveness to treatment. Early-stage seminomas have an especially favorable prognosis when managed with orchiectomy and, if necessary, adjuvant therapies like radiotherapy or chemotherapy. Regular post-surgical surveillance is crucial to detect any recurrence early. While fertility is usually not significantly impacted by the removal of one testis, patients may consider sperm banking prior to treatment if concerned. Long-term follow-up is essential for monitoring recurrence and managing any late treatment effects.[9]

Chemotherapy is crucial in treating undescended testis seminoma, especially in advanced stages or when metastasis

is present. It serves as adjuvant therapy post-orchiectomy to prevent recurrence and as primary treatment for advanced disease, often using regimens like BEP (cisplatin, etoposide, and bleomycin). Seminomas are highly sensitive to chemotherapy, resulting in high cure rates. Chemotherapy is also used as salvage therapy for recurrent cases. Despite its effectiveness, chemotherapy can cause significant side effects, necessitating regular monitoring and supportive care.[9]

4. Conclusion

Undescended testis carries a significant risk of testicular tumors, making regular follow-up and surveillance essential for early detection and treatment. Diagnostic imaging tools such as ultrasound, CT scans, and MRI play crucial roles in the diagnosis and management of testicular tumors. These modalities aid in accurate assessment and guide appropriate treatment strategies, emphasizing the importance of thorough medical monitoring for individuals with cryptorchidism.

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None.

6. Conflict of Interest

None.

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