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Post-Pubertal Teratoma of the Testis Masquerading as a Cystadenoma in a Young Male: Is High Inguinal Orchidectomy the Way to Go?

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Abstract: Postpubertal teratoma of the testis is a nonseminomatous germ cell tumor (NSGCT) composed of mature and/or immature tissues derived from all three germ layers (ectoderm, mesoderm, and endoderm). Unlike prepubertal teratomas, which are benign, postpubertal teratomas are malignant with a high risk of metastasis. We report a case of a post-pubertal testicular teratoma in a young male initially misdiagnosed as a benign cystadenoma on imaging. Despite radiologic ambiguity, high inguinal orchidectomy was performed, revealing a mature teratoma with malignant potential. This case highlights the diagnostic challenges of testicular masses and reinforces the role of high inguinal orchidectomy as the definitive diagnostic and therapeutic approach, particularly in lesions with uncertain malignant potential in post-pubertal patients.

Keywords: *Testicle; Post-Pubertal Teratoma; Cystadenoma; High Inguinal Orchidectomy; Radiological Misdiagnosis.*

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I. INTRODUCTION

Testicular masses in young males present a diagnostic challenge due to overlapping clinical and radiological features of benign and malignant lesions [1,2]. While cystadenoma of the testis is a rare benign neoplasm typically arising from the rete testis or epididymal structures, [3,4] teratomas-especially in post-pubertal males-carry malignant potential regardless of histologic maturity [1,2]. Imaging modalities such as ultrasonography and MRI may suggest benign cystic lesions; however, they are not always definitive in differentiating between benign and malignant tumors [5,6,7,8]. In such scenarios, a high index of suspicion must be maintained, and management should favour oncological safety. High inguinal orchidectomy remains the gold standard for both diagnosis and treatment of potentially malignant intratesticular tumors [9,10]. We present a case of a young male with a testicular mass radiologically diagnosed as a cystadenoma, which on histopathological examination revealed a post-pubertal teratoma. This report underscores the importance of surgical intervention even in seemingly benign lesions in this age group.

II. CASE PRESENTATION

A 29-year-old male patient presented in urology out patients department with complain of swelling in left scrotal region for two months. As per the history given by the patient, he was apparently alright two months back when he noticed a swelling in his left scrotal region which was insidious in onset, gradually progressive in size, had no relieving or aggravating factors, associated with voiding symptoms like intermittent stream, terminal dribbling, hesitancy, slow stream, splaying and straining. Not associated with pain, nausea, vomiting, haematuria, fever or any storage symptoms. The patient had no previous history of any chronic illness, no history of any past surgical/radio therapeutical intervention, no history of any long-term drug use or blood transfusions. Patient was vegetarian by diet, bowel habits were normal, appetite was normal, sleep cycle was normal, no history of any addictions. There was no significant family history, patient belonged to low-socioeconomic strata as per modified kuppuswamy scale. There was no history of any allergy to drugs or common allergens.

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On examination, a left sided scrotal swelling of size 12 x 8 cm seen with penis deviated towards right side, meatal opening is visualized with no pigmentation, scarring or excoriation, scrotal rugosities decreased on left side on comparison to the right side, no cough impulse seen, no local rise of temperature, no tenderness present, right sided testis is palpable, getting above the swelling is possible, swelling is firm in consistency, surface is smooth, skin over the swelling is pinchable, swelling is non reducible, non-fluctuant and not translucent against light in a dark room. Left sided spermatic cord is hard in consistency, Inguinal lymph nodes non palpable, pre-aortic and para-aortic lymph nodes cannot be assessed by palpation.

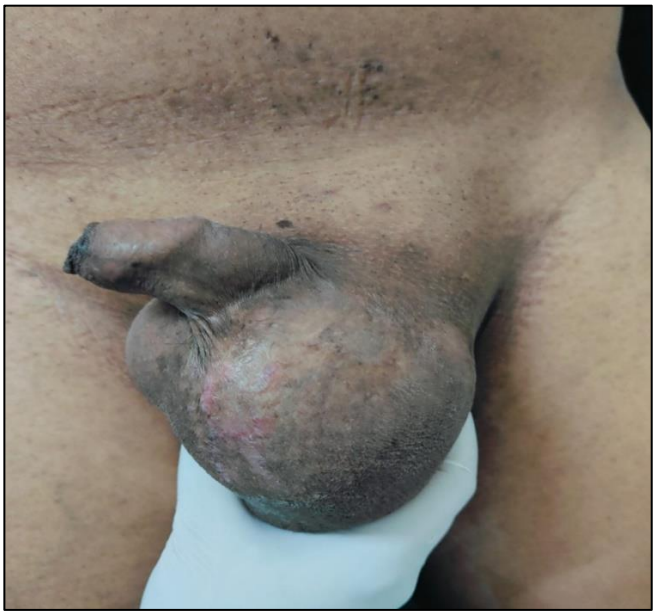

Fig 1 Left Sided Scrotal Swelling 12x8 cm Visible

Table 1 Patient Belonged to Low-Socioeconomic Strata

INVESTIGATIONS	PATIENT'S PARAMETERS	REFERENCE VALUES
HAEMOGLOBIN	16.9 g/dL	13-17 g/dL
TOTAL LEUKOCYTE COUNT	7.1 X 10^9 /L	4.0-11.0 x 10^9/L
TOTAL PLATELET COUNT	388 X 10^9 /L	150-450 X 10^9/L
URINE MICROSCOPY-		
ALBUMIN	ABSENT	ABSENT
GLUCOSE	ABSENT	ABSENT
KETONE	ABSENT	ABSENT
PUS CELLS	2-3/hpf	2-4/hpf
RBC's	ABSENT	ABSENT
EPITHELIAL CELLS	1-2/hpf	0-5/hpf
CRYSTAL	ABSENT	ABSENT
CASTS	ABSENT	ABSENT
BACTERIA	ABSENT	ABSENT
FUNGUS	ABSENT	ABSENT
AMORPHOUS MATERIAL	ABSENT	ABSENT
RANDOM BLOOD SUGAR	96 mg/dL	80-130 mg/dL
UREA	21 mg/dL	13-45 mg/dL
CREATININE	0.92 mg/dL	0.55-1.30 mg/dL
SODIUM	141 m.mol/L	135-145 m.mol/L
POTASSIUM	4.2 m.mol/L	3.5-5.0 m.mol/L
TOTAL BILIRUBIN	0.25 mg/dL	0.2-1.0 mg/dL
DIRECT BILIRUBIN	0.10 mg/dL	0.0-0.2 mg/dL
INDIRECT BILIRUBIN	0.15 mg/dL	0.1-0.9 mg/dL
SERUM GLUTAMIC OXALOACETIC TRANSAMINASE	15 U/L	15-37 U/L
SERUM GLUTAMIC PYRUVIC TRANSAMINASE	13 U/L	12-78 U/L
TOTAL PROTEIN	6.6 g/dL	6.4-8.2 g/dL
ALBUMIN	3.6 g/dL	3.1-5.0 g/dL
ALKALALINE PHOSPHATASE	52 U/L	46-116 U/L
BETA-HUMAN CHORIONIC GONADOTROPIN	1.01 mIU/L	<1.4 mIU/L
ALPHA FETO PROTEIN	13.91 ng/mL	<7.2 ng/mL
SERUM LACTATE DEHYDROGENASE	198.1 U/L	130-250 U/L

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High resolution ultrasonography of the scrotum revealed- multiple small anechoic cystic lesions in left testicular parenchyma with no vascularity on colour doppler differentials include- left sided tubular ectasia of rete- testis and cystadenoma of rete testis.

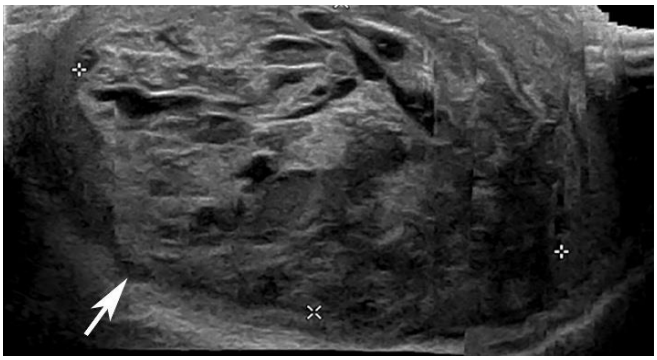

Fig 2 An Ill-Defined Heterogeneously Mixed Echogenic Mass (Arrow) with Scattered Anechoic Areas Representing Cystic Changes

Ultrasonography of abdomen and pelvis revealed no significant abnormality. Following the initial radiological investigations, MRI pelvis and scrotum was advised which revealed- T2 bright signal intensity mass lesion with internal septations at the left testis suggestive of? Cystadenoma of the rete-testis.

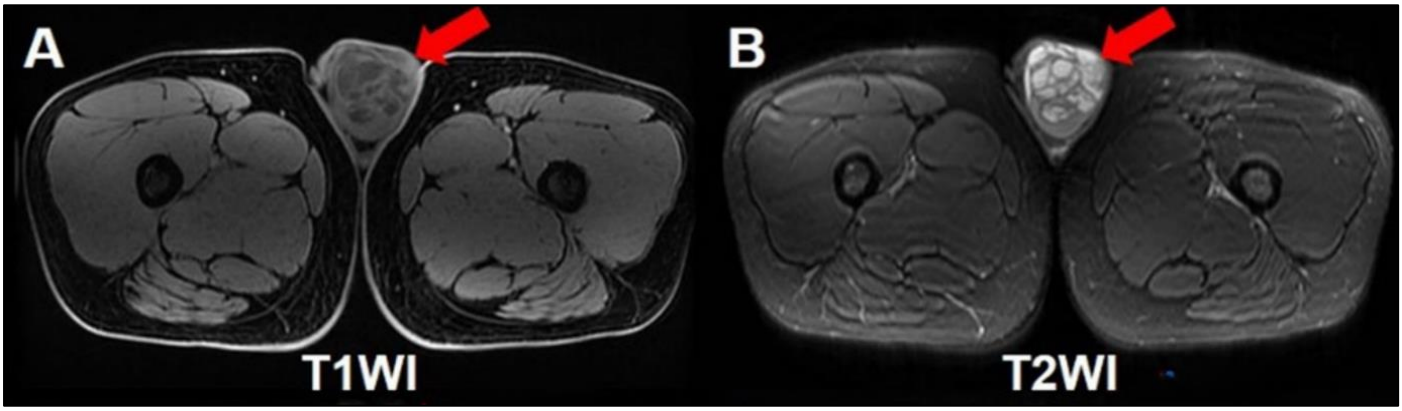

Fig 3 Left Testicular Mass Contained Both Solid and Cystic Components, and it Exhibited Low Signal Intensity on T1WI Transverse Image (A), and High Signal Intensity on T2WI Transverse Image (B)

High inguinal orchidectomy was planned for the patient following the initial work-ups due to inconsistencies of radiological and hematological investigations. Following the left sided high inguinal orchidectomy, the excised specimen of testicular tumor was sent for histopathological examination to further plan the management strategy for the patient.

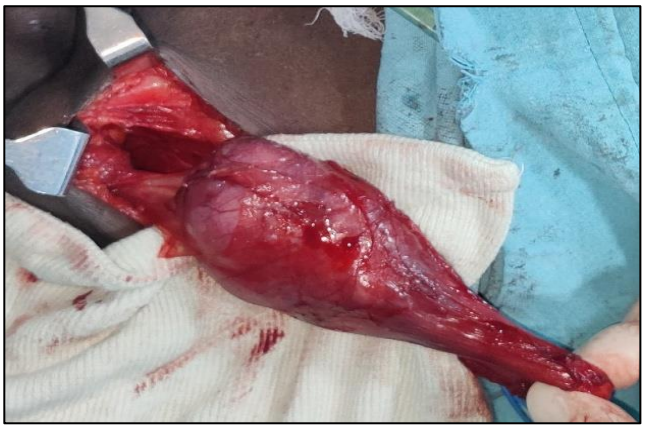

Fig 4 Bulky Testis Being Delivered Via the External Inguinal Ring

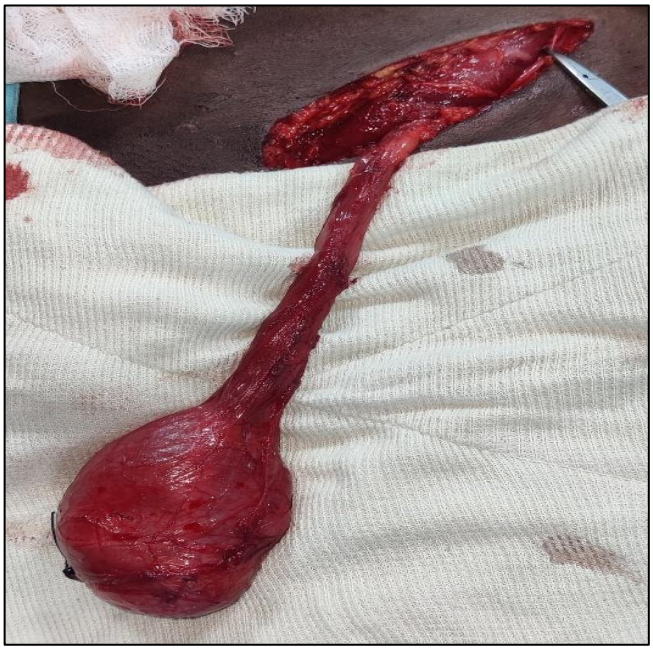

Fig 5 Fully Delivered Testis Visible with Thickened Spermatic Cord

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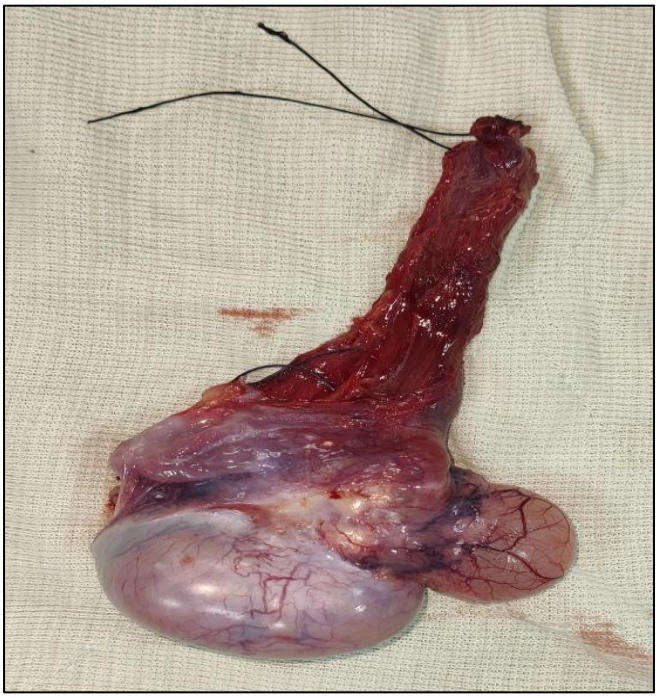

Fig 6 Excised Specimen of Testis with Spermatic Cord, Note the Heterogenicities Visible on Testicular Surface

The histopathology reported specimen showing a tumor consisting of solid and cystic components. Cystic tissue showing ectodermal, mesodermal and endodermal components; intestinal epithelium, respiratory epithelium, cartilaginous tissue, sebaceous glands and hair follicles, transitional epithelium. Foci of loose spindle mesenchymal tissue also noted. Solid lesion of tumor showing round to oval cells present in sheets, glands and nodules. The tumor cells showing moderate to marked pleomorphism, high nuclear cytoplasmic ratio, vesicular chromatin, prominent nucleoli, and scant to moderate amphophilic cytoplasm. Frequent mitotic figures and foci of necrosis noted. Surrounding testicular parenchyma shows maturation arrest with few tubules showing peritubular hyalinization, basement membrane thickening, Sertoli cell hyperplasia and interstitial dystrophic calcification. Overall impression of Teratoma of post pubertal type (80%) and embryonal carcinoma (20%).

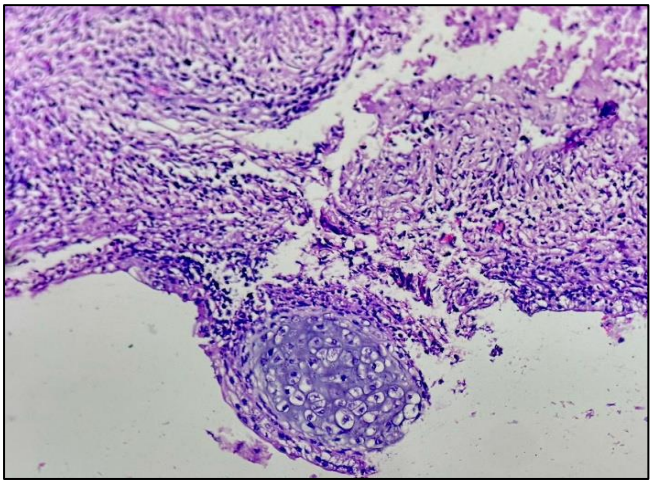

Fig 7 Teratoma Component Showing Mature Cartilaginous Tissue (H&E Stain, 20x)

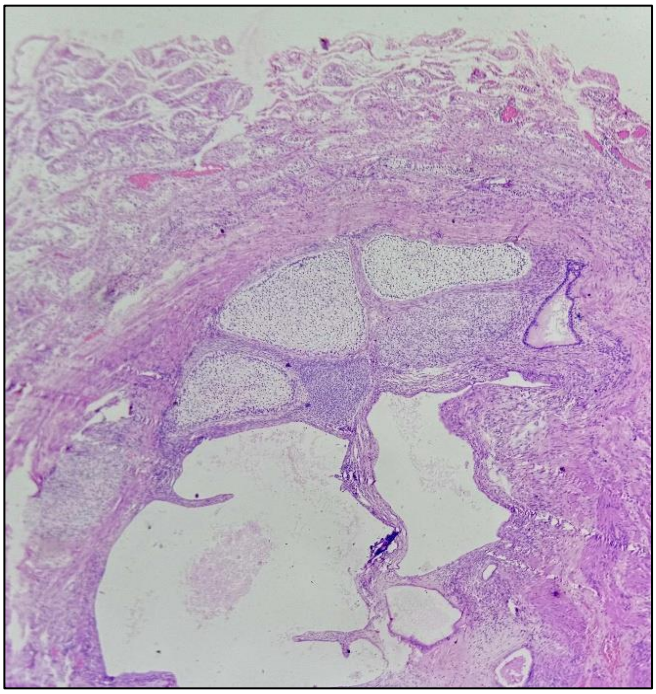

Fig 8 Cystic Tissue Showing Ectodermal, Mesodermal and Endodermal Components. (H&E Stain, 10x)

III. DISCUSSION

Male prepubertal teratomas are somewhat frequent, but post-pubertal teratomas are a unique clinical and pathological entity with significant therapeutic implications [1,2]. According to the World Health Organization classification of testicular germ cell tumors, post-pubertal teratomas are considered malignant, regardless of their histological maturity, because of their potential for metastasis and association with intratubular germ cell neoplasia [2,3]. This contrasts with prepubertal teratomas, which are usually benign [1]. The rete testis is an uncommon site of origin, and the occurrence of a teratoma in this location is extremely rare, with only isolated reports in the literature [7-9].

The present case was unusual in that the lesion closely resembled a cystadenoma on both radiological and intraoperative evaluation. The majority of individuals contend that cystic lesions of the testis and Para-testicular structures, such as cystadenomas, cystic dysplasia, and epidermoid cysts, are harmless [4-6]. This can present a diagnostic conundrum, especially in young males, where there is frequently discussion about how to strike a compromise between organ preservation and oncological safety. However, it is risky to rely only on imaging and intraoperative appearance because benign-looking testicular and Para-testicular tumors may have the potential to develop into cancer [3-8]. The most reliable method for making a conclusive diagnosis is still histopathological analysis [3]. High inguinal orchidectomy continues to be the standard surgical approach for intratesticular tumors, especially when malignancy cannot be excluded preoperatively [10]. Organ-sparing surgery is advocated in carefully selected scenarios, such as small, benign-appearing, and well-demarcated lesions, particularly in patients with a solitary testis or

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bilateral tumors [11]. However, this requires frozen-section confirmation of benign pathology, which may not always be reliable. In our case, the uncertainty of diagnosis and the malignant potential of post-pubertal teratoma justified a radical approach.

From an oncological perspective, post-pubertal teratomas are resistant to chemotherapy and radiotherapy, unlike other germ cell tumors [1,2]. Hence, complete surgical excision is essential to prevent recurrence and metastasis. Metastatic potential is not always predictable from histology alone, further reinforcing the need for a definitive surgical procedure [7,9]. Moreover, rare locations such as the rete testis highlight the importance of adhering to oncological principles rather than relying on presumptive intraoperative impressions.

This case underscores the need for vigilance in evaluating atypical testicular and Para-testicular masses. Even when clinical and radiological findings suggest a benign lesion, the possibility of malignant germ cell tumors should be considered, particularly in post-pubertal males. High inguinal orchidectomy remains the safest and most oncologically sound management strategy in such scenarios, balancing the risks of overtreatment against the consequences of undertreating a potentially malignant neoplasm.

IV. CONCLUSION

Regardless of histological maturity, post-pubertal teratomas are universally regarded as malignant, making them a distinct clinical entity from their prepubertal counterparts. Since they are very uncommon in the rete testis, this case is notable for both its odd origin and its misleading presentation that mimics a benign cystadenoma. These diagnostic conundrums emphasize how crucial it is to keep a high index of suspicion while assessing young men's testicular and Para testicular tumors. Because benign-looking tumors may nonetheless have the potential to become malignant, relying only on imaging or intraoperative perceptions can be deceptive.

In this context, high inguinal orchidectomy remains the gold standard of management. Frozen section analysis may not always offer conclusive assurance, but in extremely rare situations with obvious signs of benign pathology, organ-preserving surgery may be attempted. Complete surgical excision is the most effective method of preventing recurrence or metastasis because of the malignant potential of post-pubertal teratomas and their poor response to chemotherapy and radiation therapy. This instance highlights the importance of rigorously following oncological guidelines, even when dealing with lesions that appear to be benign. The difficulty for the surgeon is striking a balance between the need for oncological safety and the objective of organ preservation. In the end, patient education about the justification for drastic surgery is crucial to guaranteeing that the patient makes an informed choice.

In summary, post-pubertal teratomas of the rete testis, though rare, should always be managed with oncological vigilance. In the situation of ambiguous diagnosis, high inguinal orchidectomy is still the best course of action, protecting long-term results.

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