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CASE REPORT

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A clinical case of acute scrotal syndrome on the background of primary scrotal lipoma and literature review

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Abstract

Background Primary scrotal lipomas are exceptionally uncommon entities within the scrotal sac frequently occur in younger males under 40. It usually painless and found incidentally during imaging. They are generally categorized based on their site of origin.

Case presentation A 36-year-old man presented with an acute onset of severe left scrotal pain at midnight. Clinical examination revealed two scrotal masses in the left hemiscrotum associated with excruciating tenderness on palpation and loss of cremasteric reflex. Ultrasonography showed a well-defined, oval-shaped, isoechoic lesion underlying the median raphe of scrotum alongside bilateral normal testes. Given the intensity of unexplained pain despite high dose of analgesia, urgent scrotal exploration was done. Intra-operatively, a yellowish, firm mass was identified at the upper pole of the left main testis which was excised. Histopathological examination revealed a primary scrotal lipoma with no necrotic area seen.

Conclusions Ultrasound is typically the first-line imaging technique to exclude more sinister pathology. The atypical presentation of excruciating pain mimicking testicular torsion in our case complicates the diagnostic process. Scrotal lipoma can be and should be excised as the standard treatment albeit found incidentally.

Keywords Primary scrotal lipoma, Testicular torsion, Scrotal mass, Polyorchidism, Case report

1 Background

Primary scrotal lipomas are exceptionally uncommon entities within the scrotal sac, usually painless and found incidentally during imaging or inguinal hernia repair [1, 2]. They can clinically mimic polyorchidism, particularly when located near the testes, as in this case. This anomaly frequently presents diagnostic challenges due to its potential for misinterpretation as malignancy or other scrotal masses. Scrotal lipomas, a benign entity within the differential of scrotal masses, vary by their anatomical origin and are generally categorized based on their site of origin: (a) posterior to spermatic cord (scrotal lipomas); (b) from the spermatic cord (spermatic cord and tunica vaginalis lipomas); and (c) from the dartos tunica of the scrotum (primary scrotal lipomas) [3]. Primary scrotal lipomas are relatively uncommon compared to other scrotal masses, with an incidence more frequent in younger males under 40. Clinically, it is often asymptomatic, presenting as painless, mobile, soft masses within the scrotum and are typically identified incidentally during routine examinations or imaging studies for unrelated concerns. Using PubMed as the search engine, there was only 1 case report presented with painful scrotum in the literature [4]. Herein, we discuss a case of primary scrotal lipoma masquerading as testicular torsion due to its

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uncommon presentation, highlighting the diagnostic quandary and management considerations.

2 Case presentation

A 36-year-old married male chronic smoker with a diagnosis of polyorchidism from a previous institution, presented with an acute onset of severe left scrotal pain at midnight. He reported intermittent dull, aching pain in the same region over the past three years, with no associated fever, urinary symptoms, or gastrointestinal disturbances. Clinical examination revealed two scrotal masses in the left hemiscrotum (Fig. 1), associated with excruciating tenderness on palpation. The mass appeared to be originating from scrotum, with palpation able to get above it. There were neither inguinal masses nor cough impulse present. There was also loss of cremasteric reflex, and no evidence of fluctuance, transillumination, or notable overlying skin changes. Laboratory analyses, including inflammatory markers, renal function, and urinalysis, were unremarkable. Further review of records from the previous institution revealed normal levels of serum alpha-fetoprotein (AFP), lactate dehydrogenase (LDH), and beta-human chorionic gonadotropin (β-HCG), reducing the suspicion of a germ cell tumor. Urgent ultrasonography was performed to rule out testicular torsion. Both testes were normal in size, echogenicity, and vascularity (Fig. 2a, b). There was no evidence of spermatic cord twisting. A mild left hydrocele was noted, along with a well-defined, oval-shaped, isoechoic lesion underlying the median raphe of scrotum measuring 1.1 cm × 2.3 cm × 4.5 cm with mild intralesional vascularity (Fig. 2c). This was initially interpreted as a possible supernumerary testis due to its isoechoic characteristics. Given the intensity of unexplained pain and despite high dose of analgesia, a decision was made for urgent scrotal exploration. Intra-operatively, a yellowish, firm mass was identified at the upper pole of the left main testis, associated with reactive serous fluid. This mass, presumed to represent the supernumerary testis has its own feeding vessels (Fig. 3a–c), was excised and its feeding vascular stalk ligated. While the remaining testes were viable and healthy, orchidopexy was done to prevent possible future torsion. Patient has an uncomplicated postoperative recovery and was discharged with analgesia and antibiotics the following day. Histopathological examination (HPE) revealed mature adipocytes interspersed with capillary-sized vessels, with no testicular tissue, area of necrosis or malignant cell seen (Fig. 4a–c). A final diagnosis of primary scrotal lipoma was established. The patient continued to do well in subsequent follow-ups.

Fig. 1 Clinical appearance of the external genitalia and the testes, presenting as "three testes"

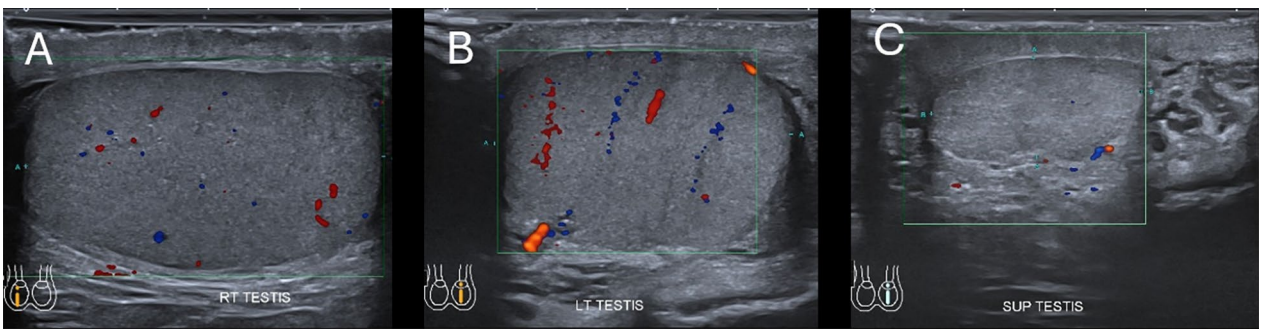

Fig. 2 Ultrasound of the scrotum demonstrates bilaterally normal-sized testes with preserved echogenicity and vascularity (**a**, **b**). An oval, well-defined, isoechoic lesion is noted beneath the median raphe (**c**), measuring 1.1 cm × 2.3 cm × 4.5 cm, which presumably interpreted as supernumerary testis

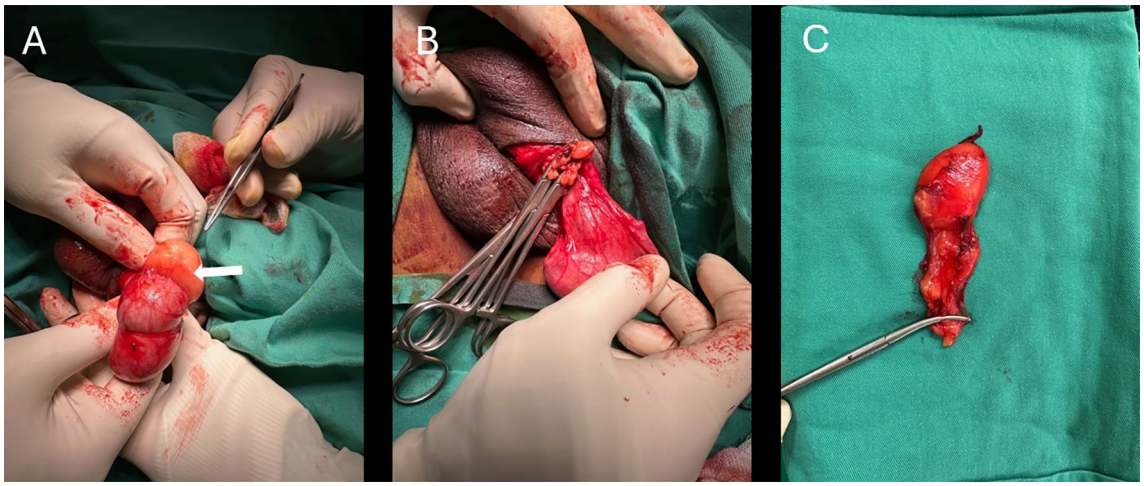

Fig. 3 Intraoperative findings reveal a yellowish, firm mass located at the upper pole of the left main testis (white arrow in **a**), associated with reactive fluidandindependent feeding vessels. The mass, weighing 190 g, was excised and ligated near its vascular stalk (**b**, **c**)

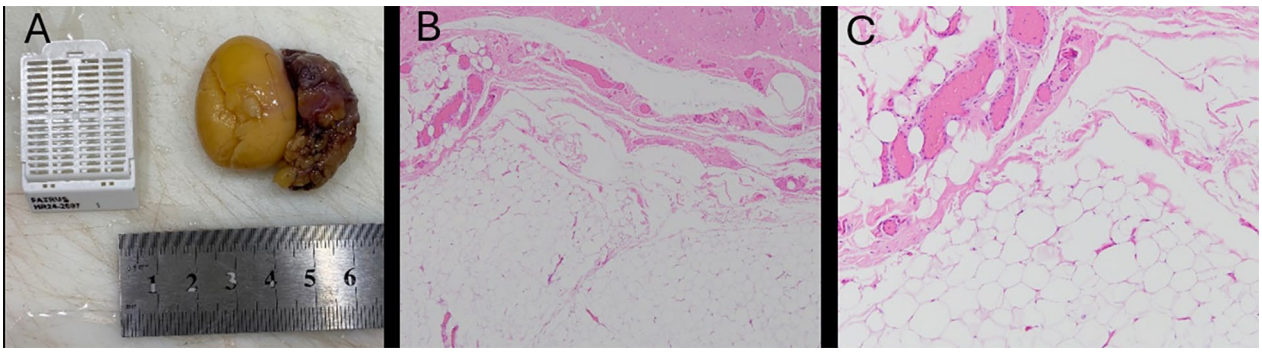

Fig. 4 Gross specimen (**a**) and histopathological examination (**b**, **c**) of the lesion reveal mature, uniform adipocytes traversed by fibrous septa containing clusters of capillary sized vessels. No testicular tissue is present. The final diagnosis is primary scrotal lipoma

3 Discussion

Though largely benign, larger lipomas can present diagnostic challenges, sometimes causing a sensation of fullness or discomfort, and may even exceed 15 cm in diameter, leading to diagnostic confusion with conditions such as hydroceles, varicoceles, or malignancies [5]. Differentiating primary scrotal lipomas from malignant lipomas, such as liposarcomas or testicular malignancy, is critical for appropriate management, and imaging modalities play a vital role in this process. Surgical approach differs, especially in the case of testicular cancer, which would have warranted an inguinal approach. Ultrasound (USG) is typically the first-line imaging technique, as primary scrotal lipomas often appear as well-defined, hyperechoic, homogeneous masses that are distinct from the testes. In contrast, malignant liposarcomas may exhibit irregular borders, heterogeneous echogenicity, and possible infiltration into surrounding tissues, with Doppler imaging revealing increased vascularity, a sign that is generally absent in benign lipomas [6]. Magnetic resonance imaging (MRI) further assists in this differentiation; benign lipomas usually show high signal intensity on T1 and T2-weighted images, consistent with fatty tissue. Liposarcomas, however, tend to have irregular margins and heterogeneous signals due to necrotic or myxoid changes within the tumor, helping distinguish them from the benign counterparts [7]. Computed tomography (CT) also provides useful details, particularly for assessing lymph node involvement or distant metastasis, which are more common in malignancies. CT imaging of benign lipomas typically shows well-circumscribed, homogenous fat density, whereas liposarcomas appear more complex with soft tissue density components [8]. Although cross sectional imaging are valuable in distinguishing benign from malignant scrotal lesions, but their use in non-emergency settings is limited by

cost, accessibility, and radiation exposure as in the case of CT. MRI, though highly effective, is expensive and less accessible, while CT exposes patients to ionizing radiation, which is particularly concerning as the testes is a radiation-sensitive organ, making it less ideal for frequent follow-ups. In contrast, ultrasound remains the first-line imaging modality due to its affordability, availability, and absence of radiation. However, the use of CT and MRI is less appropriate in emergency settings, such as in our index case. Given the severity of pain mimicking a possible testicular torsion, this necessitates urgent surgical exploration despite negative USG findings. Since the USG has excluded the possibility of testicular malignancy, surgical exploration via the scrotal incision was performed.

Necrosis of primary scrotal lipoma is extremely rare, with only a report of necrotic spermatic cord lipoma reported in literature, which was found incidentally during recurrent hernia repair [9]. Ischemia, necrosis, and mechanical compression in primary scrotal lipomas, however, have never been described in medical literature. There are interconnected pathological processes that contribute to the unusual presentation of pain in what was typically described as a benign and asymptomatic condition in previous literature. The pathogenesis of ischemia is primarily related to the tumor's size and anatomical location. As lipoma grows, it can exert pressure on surrounding blood vessels. This compromised vascular supply results in ischemia, particularly in larger lipomas where the central areas may receive inadequate blood flow, initiating cellular hypoxia [10]. Necrosis, which often follows ischemia, occurs when the oxygen deprivation in the affected tissue reaches a critical level, leading to irreversible cell damage. This necrosis alters the internal structure of the lipoma, creating a heterogeneous composition visible on imaging, with areas of liquid or necrotic tissue interspersed with viable adipose tissue. Necrosis not only contributes to pain, but also raises the potential for inflammatory responses and secondary infection, which can exacerbate symptoms and complicate diagnosis, often mimicking torsion or infection. Chronic mechanical compression can cause local discomfort, sensation of fullness, or even referred pain especially when associated with compression of adjacent nerves [11]. This may explain the chronicity of dull pain for the past three years in our patient. In cases of prolonged compression, the adjacent tissues may also exhibit reactive changes, such as fibrosis or edema possibly the cause of mild hydrocele in our index case. The most commonly affected nerve in these situations is the genitofemoral nerve, specifically its genital branch that supplies sensation to the scrotal skin and also provides motor innervation to the cremasteric muscle, which is involved in the elevation of the testes when the inner thigh is stroked [7]. Dysfunction of the cremasteric reflex in our index case is probably due to nerve involvement despite its small size. Beyond the genitofemoral nerve, other nerves supplying the scrotal area may also be affected, although less commonly. The ilioinguinal nerve that provides sensation to the upper scrotal skin and parts of the groin could also be compressed leading to similar symptoms.

Recognition of this rare condition is important. Involvement of spermatic cord structures may render surgical management difficult, ultimately result in orchidectomy [9]. Most primary scrotal lipoma, can be and should be excised as the standard treatment [1]. When left untreated, it may also continue to grow to an astonishing size, with largest reported as $60 \times 40 \times 12$ cm, weighing 38.4 kg [11]. Giant primary scrotal lipoma can also pose significant operative challenges when adhered to surrounding muscle, causing significant blood loss during dissection [10]. Malignant transformation is rare, and recurrence usually occurs in the infiltrative type of lipoma, and attributable to incomplete excision [12]. In cases of acute scrotum, the presence of typical clinical findings suggestive of testicular torsion usually prompt immediate surgical exploration, without the need for preoperative imaging. However, when an abnormal mass is identified, as in the present case, the standard protocol is modified to include imaging prior to surgery, particularly when the classic signs of torsion are absent. Despite the negative imaging results, the clinical presentation of acute scrotum in this case suggests a substantial risk, thereby justifying urgent surgical exploration to rule out testicular torsion. Nonetheless, ultrasound proved valuable in excluding testicular malignancy, thus aids in decision on surgical approach.

4 Conclusion

Primary scrotal lipomas are often indistinguishable from other testicular pathology, highlighting the necessity of imaging to support clinical decision-making. Its atypical presentation of pain further complicates the diagnostic process, as it is essential to exclude more sinister pathology such as torsion. Surgical exploration is warranted in acute scrotum with indeterminate imaging findings. Excision is the standard management for scrotal lipoma especially if symptomatic. This case contributes to the limited body of literature on primary scrotal lipomas, enhancing understanding of their presentation as well as management, and aims to inform clinical practice.

Abbreviations

AFP	Alpha-fetoprotein
LDH	Lactate dehydrogenase
β-HCG	Beta-human chorionic gonadotropin

HPE	Histopathological examination
USG	Ultrasound
MRI	Magnetic resonance imaging
CT	Computed tomography

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Author contributions
"MF" and "AS" are the surgeons who performed the operation and gave final approval of the manuscript. "RL" and "ST" gave major contribution of the idea and final approval of the manuscript. "RL" and "ST" contributed to writing the manuscript and gave final approval of the manuscript. "MF", "AS" and "AT", helped in critical revision and gave final approval of the manuscript. "MF", "AS", "RL" and "ST" helped in the revision of the manuscript and in the processing of the figures. "MA" and "AA" helped in retrieving the HPE images and gross specimen. All authors read and approved the final manuscript.

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Competing interests
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