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Primary scrotal lipoma in a pediatric patient: a case report with current literature review

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Abstract

Backgrounds Primary scrotal lipomas are benign fatty tumors that develop from adipocytes of the scrotum. The exact cause of their development is unknown. They are typically painless and may exhibit symptoms of heaviness and discomfort.

Case presentation A 9-year-old boy presented with a painless scrotal mass that had been present since birth. The mass was located in the left hemiscrotum. Ultrasound showed an enlarged left testicle with an abnormal outline and heterogeneous texture. Magnetic resonance imaging demonstrated a mass arising from the left hemiscrotum with no invasion of the testis. Under general anesthesia and through a scrotal incision, the mass was excised. Histopathological examination revealed a lipoma.

Conclusion Primary scrotal lipomas are benign lesions with an unclear pathogenesis. They are very uncommon in the pediatric age group. Ultrasound is the first-line modality for diagnosing lipomas; however, it may provide ambiguity. MRI provides a more accurate assessment of the mass. Surgical excision of the mass is the standard treatment for primary scrotal lipomas.

Keywords Scrotum, Liposarcoma, Intrascrotal swelling, Paratesticular mass

1 Backgrounds

Lipomas are benign mesenchymal tumors that are composed of lobules of mature adipocytes. They are the most common mesenchymal soft-tissue tumors with a very rare tendency (1%) of malignant transformation [1–3]. The prevalence of lipoma is 2.1 per 1000 patients [4]. Lipomas can develop in any part of the body, and their pathogenesis is still unclear, but they may be associated with trauma resulting in the release of cytokines that stimulate the maturation of adipocytes [5]. Generally, the scrotal lipomas originate from the adipose tissue of the spermatic cord. Afterward, they either grow toward the scrotum or keep developing inside the spermatic cord [6]. Intrascrotal lipomas are classified into 3 categories according to their origin: (1) scrotal lipomas, (2) spermatic cord and tunica vaginalis lipoma, and (3) primary scrotal lipoma [7]. Scrotal lipomas are the most common type in this classification and are major indications in 22% of inguinal repair surgeries [8]. Primary scrotal lipomas are rare entities, usually asymptomatic and painless that may cause scrotal fullness. In rare instances, they

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cause minimal pain and become disabling due to their size [2, 5, 9–11].

Here, we describe a case of primary scrotal lipoma in a pediatric patient and provide a literature review of similar cases (Table 1).

Table 1 The reported cases of primary scrotal lipoma since 1979

Year	First author	Patient age (year)	Size of the mass (cm)	Origin of the mass	Clinical manifestations	Side of the mass	Management	Type of incision
2009	Kim [14]	1 month old	3×1.5	Scrotal wall	Painless and swelling growing in size	Midline (pendulous mass)	Resection	Scrotal/resection of the pendulous mass
2023	Gemilang [9]	2	6.3×5.2×5.7	Scrotal wall	Painless and swelling growing in size	Midline	Debulking and scroto-plasty	Scrotal
1979	Fujimura [7]	19	6.5×6×5	Scrotal wall	Painless	Right	Excision	Scrotal
2016	Fabiani [11]	22	3×2	Scrotal wall	Painless at first, then became painful	Left	Excision	Scrotal
2021	Seidu [15]	28	21×7×9	Scrotal wall	Painless and swelling growing in size	Right	Excision	Scrotal
2017	Srivastava [16]	29	15×10	Scrotal wall	Painless and swelling growing in size	Left	Excision	Scrotal
2023	Mwambo [10]	40	7×10	Scrotal wall	on and off pain, swelling growing in size	Left	Resection	Scrotal
2018	Zarami [2]	42	60×40×20	Scrotal wall	Heavy, dragging sensation, disabling, hinders sexual activity	Right	Mass Dissected	Lazy S-Shaped incision from groin to mid-thigh
2019	Rkik [17]	42	8	Scrotal wall	Moderate pain	Right	Excision	Scrotal
2017	Naregal [3]	45	4.2×1.6	Scrotal wall	Painless and swelling growing in size	Left	Excised	Scrotal
2020	Vignot [18]	46	17×11×6	Scrotal wall	Discomfort and dysesthetic, swelling growing in size	Left	Resection	Scrotal
2021	Zheng [19]	47	Right side: 9.9×4.5 Left side: 10.8×5.6	Scrotal wall	Painless and swelling growing in size	Bilateral	Resection	Scrotal
2023	Dung [20]	47	NA	Scrotal wall	Disabling and hinders sexual activity, rapid increase in size	Bilateral	Dissected	Scrotal
2017	Creta [6]	54	8×10×12	Scrotal wall	Swelling, discomfort	Midline	Resection	Scrotal
2019	Ladumor [8]	63	8.8×4.9×3.1	Scrotal wall	Recurrent swelling, swelling increasing in size	Right	Resection	NA
2013	Kaplanoglu [21]	64	10×9×5	Scrotal wall	Painless and swelling growing in size	Left	Dissected	NA
2019	Berevoescu [22]	64	10×8.1×8	Scrotal wall	Painless, fast-growing in size	Right	Excision	Scrotal
2000	Szmigielski [23]	67	17×16×11	Scrotal wall	Painless, swelling	Bilateral	Excision	NA

2 Case presentation

2.1 Patient information

A 9-year-old boy presented with a left scrotal mass that had been present since birth (Fig. 1). His mother noticed a progressive enlargement of the mass during the past 6 months. Past medical and past surgical histories for genital disorders were both negative.

2.2 Clinical findings

Inspection of the testicles and scrotum revealed a normal skin color of the scrotum. The left hemiscrotum was slightly larger and hung lower than the right. Upon palpation, there was a regular non-tense swelling below the left testicle. Inguinal examination was normal with no evidence of lymphadenopathy. Cremasteric reflux was positive.

2.3 Diagnostic assessment

Blood investigations showed normal complete blood count (CBC), renal function test, glucose, B-HCG, and alpha-fetoprotein (AFP). The lactate dehydrogenase level was 244 IU/L (Reference Range: 126–220). C-reactive protein level was 11.32 mg/L (should be $\leq$6.2 mg/L). Scrotal ultrasound (U/S) revealed an enlarged left testicle (5×2 cm) with an abnormal outline and heterogeneous texture. Magnetic resonance imaging (MRI) of the pelvis and scrotum revealed an extratesticular lesion that was arising from the left side scrotum without evidence of invasion or extension to the adjacent testicle (Fig. 2). The lesion measured 6.5×4.5×2 cm. It was hyperintense on T1 and T2 weighted imaging, suppressed on fat suppression sequence, and showed no suspicious post-contrast enhancement. Both testicles were normal in size, shape, and signal intensity with no obvious testicular lesion.

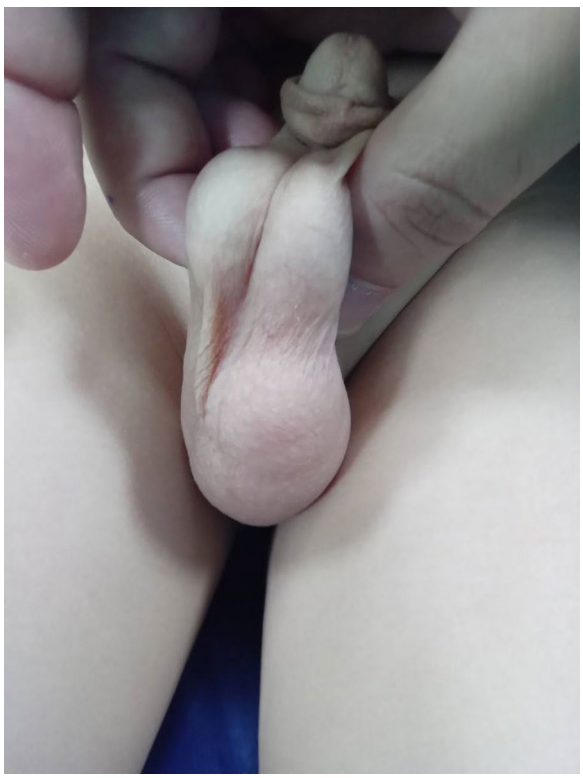

Fig. 1 The appearance of testes upon inspection of the scrotum

2.4 Therapeutic intervention and follow-up

Under general anesthesia, a left inguinal incision was done. The cord was identified and the testicle was brought out from the incision. No hernial sac was seen. The mass could not be excised from the inguinal incision. Therefore, a scrotal incision was made (Fig. 3). The mass was about 8 cm at the base of the scrotum and was excised.

Histopathological examination showed a well-defined capsulated mass composed of lobules of mature fatty tissue which was consistent with a lipoma (Fig. 4). The postoperative period was uneventful and follow-up was done using scrotal U/S. The patient is doing well.

3 Discussion

Primary scrotal lipomas are benign mesenchymal neoplasms that originate from adipose tissue in the scrotal wall [6]. Intrascrotal lipomas are classified into 3 categories according to their origin: (1) Scrotal lipomas originate from the adipocytes of the spermatic cord and develop toward the scrotum, (2) spermatic cord and tunica vaginalis lipoma originate and develop within the spermatic cord, and (3) for primary scrotal lipoma, the origin of this type is the scrotal wall [7]. According to Fujimura's classification, our case was classified as a primary scrotal lipoma.

The majority of testicular tumors are malignant while tumors of the structures around the testes are mostly benign, including lipomas. The cause of lipomas remains unclear but in younger patients, the cause is thought to be congenital [12].

A thorough search of the literature was conducted on Google Scholar and PubMed/Medline using the phrase "scrotal lipoma". Reports without full text, cases before the existence of Fujimura's classification, and those published in predatory journals [13, 14] were excluded. Only cases of primary scrotal lipomas were included. To date, 18 cases of primary scrotal lipomas have been recorded. The age range of patients with primary scrotal lipoma was 1 month to 67 years old [2, 3, 6–11, 15–23]. The mean age was 40 years and the median age was 43.5 years. An equal number of right and left primary scrotal lipomas have been recorded: 6/18, 33% on the right [2, 7, 8, 16, 18, 23] and 6/18, 33% on the left [3, 10,

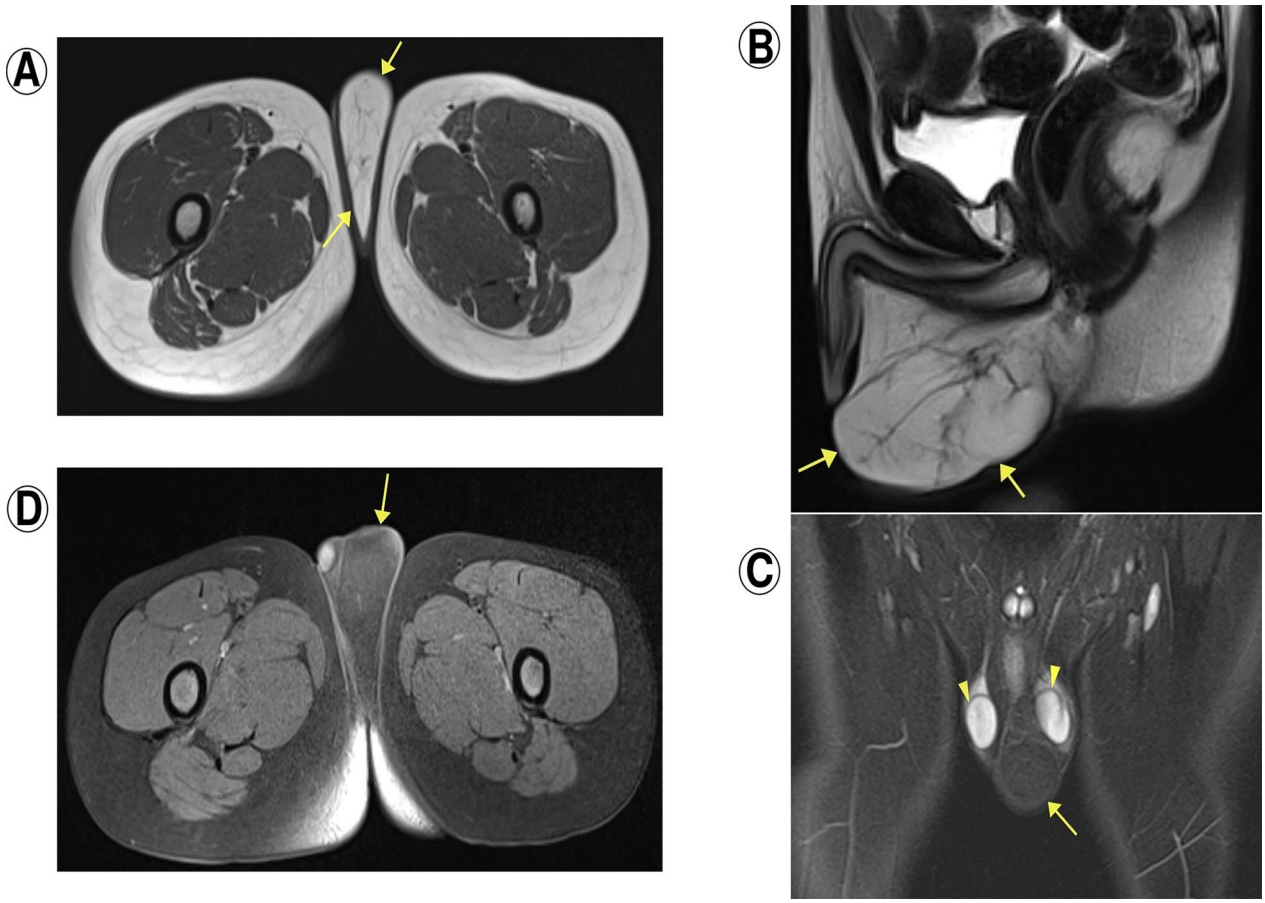

Fig. 2 **A** Axial T1WI showed hyperintense signal intensity mass, **B** sagittal T2WI showed hyperintense signal intensity mass, **C** STIR showed hypointense mass within scrotal sac (arrow), the lesion is in contact but separable from testicles (arrowhead), **D** post-contrast fat suppression T1WI showed a hypointense signal mass, no appreciable post-contrast enhancement

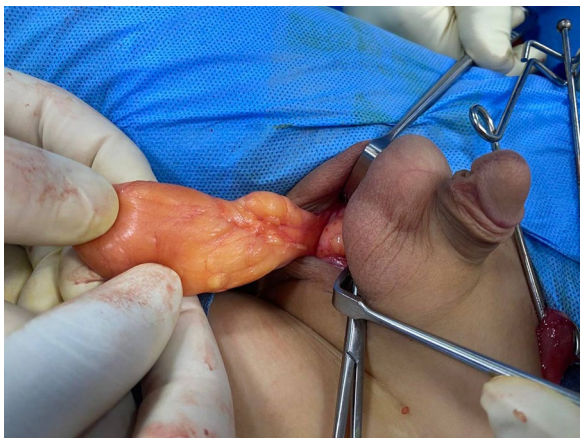

Fig. 3 Intraoperative excision of the mass through a scrotal incision

11, 17, 19, 22]. Only 3 cases of bilateral scrotal lipoma have been recorded (3/18, 16.67%) [20, 21]. There were three cases of midline scrotal lipomas (3/18, 16.67%) with one of them being a pendulous mass [6, 9, 15]. Out of the 18 cases, only 2 of them were of pediatric age [9, 15]. Our case was the third case of scrotal lipoma in the pediatric age group. Zarami et al. reported the largest case of primary scrotal lipoma in an adult measuring 60 × 40 × 12 cm and weighing 38.4 kg [2]. Among the pediatric age group, the mass in our case was the largest, measuring 6.5 × 4.5 × 2 cm. Most of the patients with primary scrotal lipoma did not have pain and reported only discomfort and swelling that had been growing in size. Three patients reported the presence of pain [10, 11, 18], one complained of dysesthesia [19], two reported the mass being disabling [2, 20], and two reported the mass hindering sexual activity [2, 20].

While it has been reported that primary scrotal lipomas occur in boys and younger men [9, 15, 17, 23], our review showed that the majority of the cases (12/18, 66.67%) were 40 or older. Recurrence of scrotal lipoma was reported after 2 years in a 63-year-old man [8].

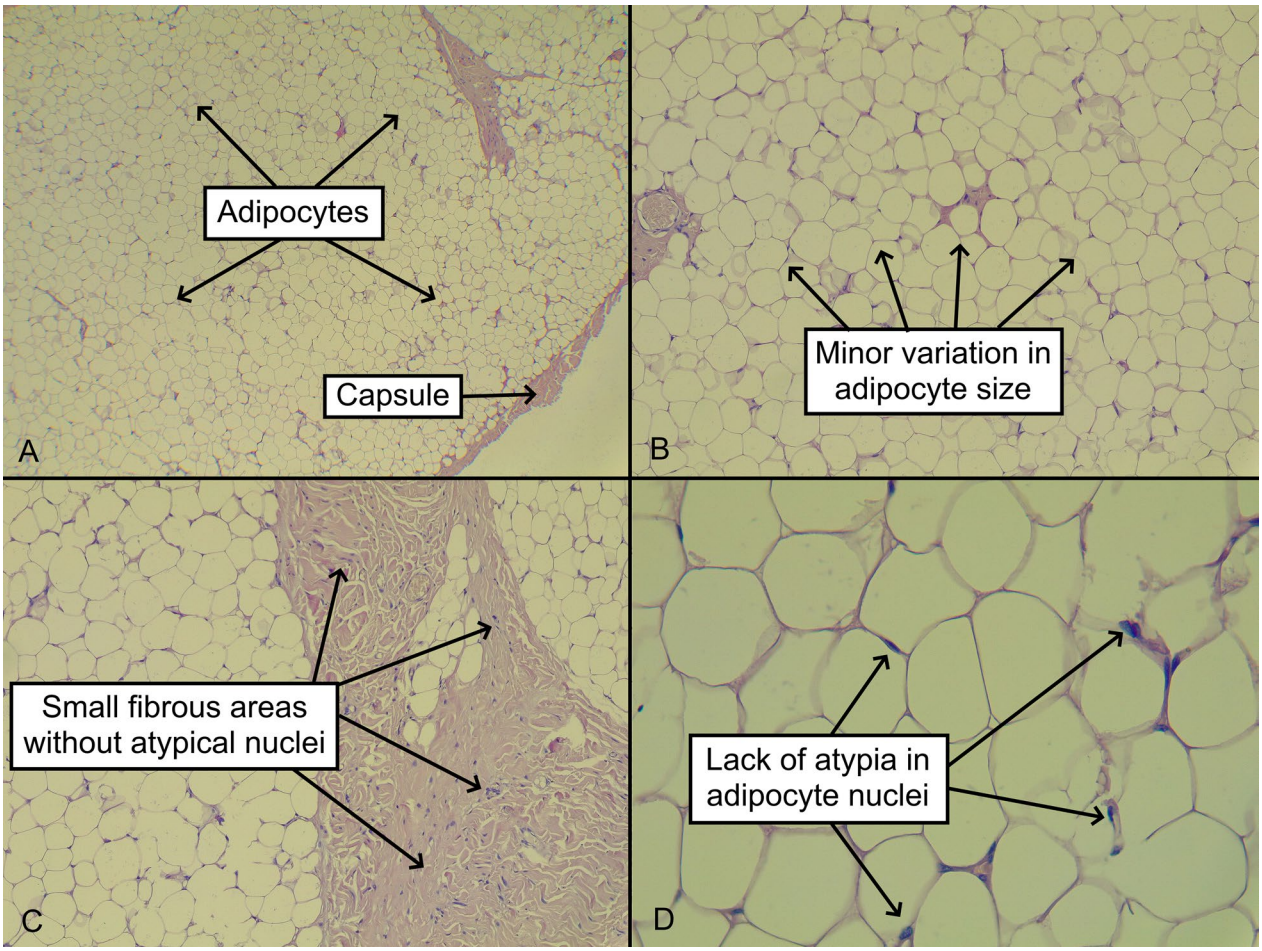

Fig. 4 **A** The lesion has a thin fibrous capsule and is composed of sheets of mature adipocytes. **B** The adipocytes do not show significant variation in cell size. **C** There are small, scattered fibrous areas without atypical, hyperchromatic nuclei. **D** The adipocyte nuclei are bland and small with fine chromatin. [Hematoxylin and eosin; 40 × (**A**), 100 × (**B**, **C**), and 400 × (**D**) magnification]

The first-line modality used for scrotal lesions is the U/S scan because it is widely available, cheap, and does not have any risk of radiation or ionization [8]. U/S scans can reveal the nature of the lesion and show if the lesion is intratesticular or extratesticular [17]. On U/S, lipomas appear as distinct hypoechoic masses. U/S is limited by its inability to differentiate a lipoma from a liposarcoma [8]. While the advantages of U/S have been highlighted, in our case, the U/S examination only revealed an enlarged testicle with an irregular shape and a heterogeneous texture. It did not provide specific characteristics or features for a definitive diagnosis of the condition. MRI is more capable of differentiating a benign mass from a malignant tumor [19]. Lipomas appear as hyperintense masses on the T1 and T2 weighted images. A mass that appears fatty, homogenous, and well-encapsulated is suggestive of lipoma. Nonetheless, well-developed lipomas may appear heterogeneous due to other non-fat components like muscle fibers and blood vessels. MRI may also be misleading in differentiating between lipoma and low-grade liposarcoma. This will result in confusion and make the diagnosis more challenging [8, 12]. The presence of post-gadolinium enhancement of the mass is suggestive of a liposarcoma rather than a lipoma [9, 20]. Excision of the mass through a scrotal incision has been the treatment of choice for primary scrotal lipomas. Zarami et al. used a lazy S-incision from the groin to the mid-thigh to excise the mass due to its large size [2]. In our case, given the ambiguity of the U/S findings and the size of the mass, we opted for a combined inguinal and scrotal approach to eliminate any suspicion and ensure easy access to the mass.

Histopathological examination is essential for the definitive diagnosis of a scrotal lipoma and to accurately differentiate it from a liposarcoma. In lipoma, it usually reveals well-differentiated, mature, and uniform adipocytes [5], while in liposarcoma it would reveal abnormal mitosis and cellular atypia [19].

4 Conclusion

Primary scrotal lipomas are benign lesions with an unclear pathogenesis. They are very uncommon in the pediatric age group. U/S is the first-line modality for diagnosing lipomas; however, it may provide ambiguity. MRI provides a more accurate assessment of the mass. Surgical excision of the mass is the standard treatment for primary scrotal lipomas.

Abbreviations

CBC	Complete blood count
B-HCG	Beta human chorionic gonadotropin
AFP	Alpha-fetoprotein
MRI	Magnetic resonance imaging
U/S	Ultrasound

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Author contributions

"SH" and "RB" are the surgeons who performed the operation and gave final approval of the manuscript. "FK" gave major contribution of the idea and final approval of the manuscript. "NH" and "BA" contributed to writing the manuscript and gave final approval of the manuscript. "EA", "WS", "AA", "ZN", and "DA" helped in critical revision and gave final approval of the manuscript. "RA" and "RR" helped in the revision of the manuscript and in the processing of the figures.

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Ethics approval and consent to participate

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Consent for publication

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Competing interests

The authors declare that they have no competing interests.

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