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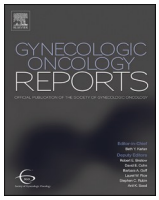

Case report

Atypical vulvar lipoma – A case report and literature review

Sadhvi Batra [a], Lindsey Nguy [a], Daniela Moino [a], Atousa Ordobazari [b], Mian M Shahzad [a,c,*]

[a] Department of Gynecologic Oncology, H. Lee Moffitt Cancer Center, 12902 USF Magnolia Drive, Tampa, FL 33612, United States
[b] Department of Pathology, H. Lee Moffitt Cancer Center, 12902 USF Magnolia Drive, Tampa, FL 33612, United States
[c] Department of Oncologic Sciences, Morsani School of Medicine, University of South Florida, Tampa, FL 33612, United States

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ABSTRACT

Atypical spindle cell lipomatous tumors of the vulva are rare masses. We report a case of atypical spindle cell lipoma of the vulva and provide a succinct review of the current understanding of these benign masses. Specifically, this report describes a case of a 20-year-old nulligravid female who presented for evaluation of a labial mass that had been growing for one year. A pelvic MRI revealed a 7 cm fatty growth. The vulvar mass was surgically resected. This case report describes the pathologic staining pattern for these masses and reviews characteristics of these benign tumors such that they are not mistaken for malignancy.

1. Introduction

Mesenchymal tumors are considered among the most difficult neoplasms to diagnose, given their rarity and complexity. Many of the histologic types are rarely seen (some as low as 0.1/100,000 cases) even at high-volume cancer centers (Bahadır et al., 2018). In addition, the technical processes of analyzing these tumors are complex and require a combination of immunohistochemistry, conventional microscopy, and state-of-the-art molecular genetic technology. Arriving at the correct diagnosis of malignant soft tissue tumors can also be challenging. These tumors frequently do not follow the typical criteria of malignancy. For example, the clinicopathologic characteristics of high mitotic activity and rapid growth that usually indicate malignancy can be seen in benign mesenchymal conditions (Sbaraglia et al., 2021). The 2020 World Health Organization (WHO) classification of soft tissue and bone tumors updated several tumor classifications, including that for adipocytic (lipomatous) tumors, thereby potentially improving the standardization of diagnosis (Ahlawat and Fayad, 2020; Sbaraglia et al., 2021).

Atypical spindle cell lipomatous tumors of the vulva are rare masses. Most of the cases describing lipomatous tumors of the vulva have been characterized as liposarcoma with descriptions in case reports and series prior to 2000. Furthermore, only one other case report of atypical spindle cell lipomatous tumor in the vulva has been reported by Reis-Filho et al. (2002). Here, we report an additional rare case of benign atypical spindle cell lipomatous tumor of the vulva and provide a comprehensive and updated review of current understanding of these benign masses.

2. Case

A 20-year-old, nulligravid female presented for evaluation of a large left labial mass. Patient reports she noted the growth one year prior to presentation and stated initially the mass was small but rapidly enlarged over the course of 6 months. Patient reported she had some discomfort with wearing tight fitting clothing but denied any significant pain, discharge or discoloration. She reported no changes to mass with menses. On physical exam, an 8.5 cm × 3.5 cm × 5 cm soft tissue mass was noted in the left labia. The mass was mobile, nontender, and extended towards the inguinal canal. Posteriorly, the mass extended down to approximately 2 to 3 cm from the perineal body ending at around 4:00. Medially, the clitoris was located approximately 2 cm from the mass. The urethra and anus were not involved. No vaginal extension was noted. A pelvic MRI with contrast revealed a 7.3 cm × 2.8 cm × 7.3 cm fatty mass within the left labia majora with faint contrast enhancement concerning for atypical lipomatous tumor (Fig. 1). A previously taken biopsy showed atypical spindle cell lipomatous tumor. After careful counseling, patient agreed to undergo surgical resection of left vulvar mass with a wide local incision.

During resection, the mass was found to be well-delineated and encapsulated without involvement of the bulbospongiosus muscle medially and extending anteriorly towards the adductor longus tendon, superior to the pubic symphysis and extending into the left inguinal

* Corresponding author at: Department of Gynecologic Oncology, H. Lee Moffitt Cancer Center, 12902 Magnolia Drive, CSB GYN-1, Tampa, FL 33612, United States.
E-mail address: mian.shahzad@Moffitt.org (M.M. Shahzad).

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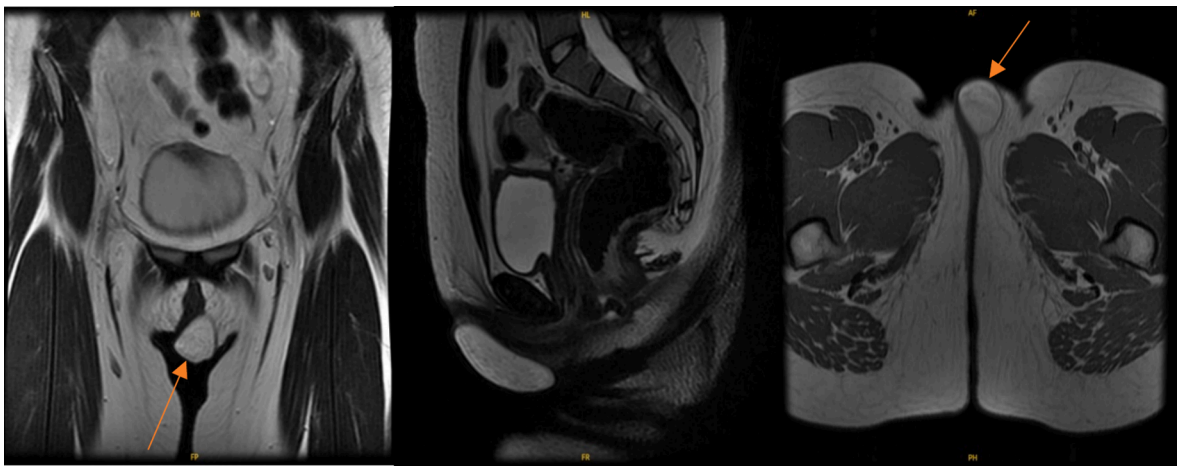

Fig. 1. MRI of Pelvis showing faintly contrast enhancing lipomatous mass along the left labia majora.

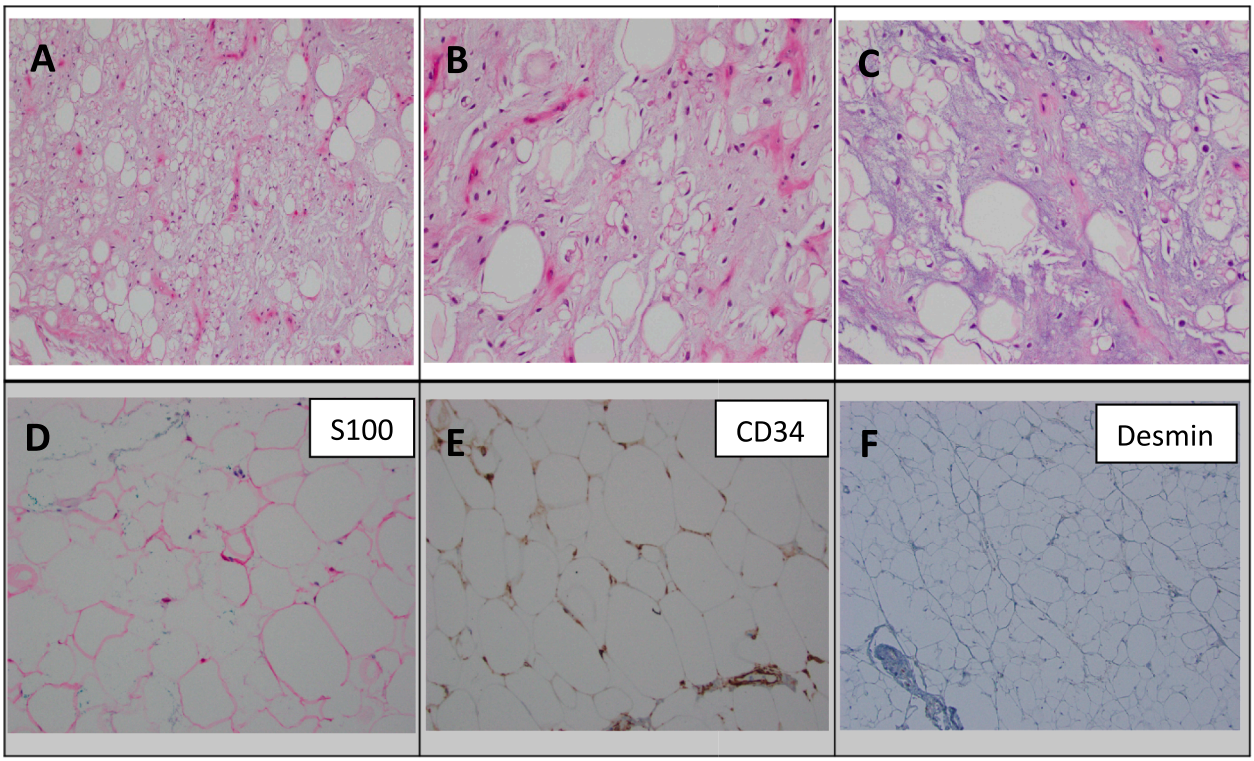

Fig. 2. Histologic and immunohistochemical features of Atypical spindle cell lipomatous tumor- benign lipogenic neoplasm composed of predominant mature lipocytes varying in size and shape (A) with lipoblast and spindle cells with mild cytologic atypia (nuclear hyperchromasia) (B) adipocytes with nuclear atypia and myxoid stroma (C) atypical spindle cell lipomatous tumor cells with immunoreactivity for S100 and CD34 (D, E) and negative immunostain for Desmin (F), respectively.

canal.

Pathology revealed atypical spindle cell lipomatous tumor, 7.2 cm in greatest dimension without evidence of malignancy. Histologically, the tumor was dominated by mature adipocytes showing variation in cell size and shape but minimal cytologic atypia admixed with occasional foci of spindle cells. No tumor necrosis or increase in mitosis was identified. Immunohistochemistry staining demonstrated multifocal staining for CD34, and S100 with retained Rb1 expression (normal). PLAG and Desmin were negative and FISH assay did not identify MDM2/CDK4 amplification (Fig. 2).

3. Discussion

Differential diagnosis of benign adipocytic vulvar masses includes atypical spindle cell lipomatous tumor, pleomorphic atypical lipomatous tumor, lipoma, lipoblastoma, angiolipoma, hibernoma, chondroid lipoma. Malignant adipocytic vulvar masses are thought to be well-differentiated liposarcoma, dedifferentiated liposarcoma, myxoid liposarcoma, pleomorphic and myxoid pleomorphic liposarcoma (Sbaraglia et al., 2021).

Atypical spindle cell lipomatous tumors were previously known as spindle cell liposarcoma, and regarded as a well-differentiated liposarcoma. However, it was since re-labeled in the WHO 2020 classification due to its histopathologic features of an atypical spindle cell

Table 1
Case Reports of Atypical Spindle Cell Lipomatous Tumors.

Author, Year, Journal	Patient features	Location	Histology	Immunohistochemistry	Follow Up
Bahadır et al., 2018, Pathology International	13 men, 7 women Average age: 57.5	12 tumors arose in the subcutaneous tissue, 8 cases were located in the deep soft tissues: leg (5 cases), arm (3), neck (3), groin (2) abdomen (2), scalp (2), back (1), thigh (1), and cheek (1)	Margins ill-defined Atypical spindle cells set in a fibrous or myxoid stroma Variable amount of adipocytic component with variation in adipocyte size and nuclear atypia Frequent univacuolated or multivacuolated lipoblasts	Spindle-shaped tumor cells in all cases stained positive for CD34. Negative for Desmin, SMA, MDM2, CDK4, S100, and Rb1. Four cases tested by FISH did not show MDM2 amplification.	Follow up for 16 patients- Average time follow up 32.25 months. All patients are living with no recurrence or metastasis.
Mariño-Enriquez et al., 2017, The American journal of surgical pathology	140 men, 92 women Average age: 54	147 cases in the limbs and limb girdles (63 %), mainly in the hands and feet	Margins ill-defined Proliferation of atypical spindle cells set in a fibrous or myxoid stroma Adipocytic component showing variation in size and scattered nuclear atypia	Spindle cells expressed CD34 (64 %), S100 protein (40 %) and desmin (23 %). Expression of Rb was lost in 57 % of cases. FISH amplification for *MDM2* was consistently negative.	Average of 4 years (range, 1 mo to 20 y) Local recurrence- 12 % of patients between 6 months to 17 years after resection 87 % of patients alive with no evidence of recurrence or metastatic disease.
Reis-Filho et al., 2002, Journal of cutaneous pathology	56 yo female	Left labia majora	Non-capsulated Admixed scattered islands of mature adipocytic cells with marked variation in cell and nuclear sizes Small mono-bi-or multivacuolated lipoblasts with indented atypical nuclei	Adipocytic cells reactive for S100 and cytoplasmic positivity for vimentin. Spindle cells reactive for vimentin and CD34. Desmin negative.	Despite the compromised surgical margins, no further treatment. The patient remained free of disease for a follow-up period of 8 months.
Memon et al., 2021, Human Pathology	59 yo male	Gastric cardia	Un-encapsulated, poorly circumscribed lesion. Mixture of atypical spindle cells, adipocytes, rare lipoblasts, and pleomorphic/multinucleated cellsSpindle cells with cytonuclear atypia, pale eosinophilic cytoplasm, and ill-defined cellular borders The adipocytes were mature appearing with variations in size and shape	Diffuse membranous staining of CD34.Loss of nuclear expression of Retinoblastoma protein (Rb) stain with preserved expression in the adjacent inflammatory cells. S-100 protein stain is negative for tumor cells.	No evidence of recurrence at 12 month follow up.

tumor containing fluctuating numbers of lipoblasts (Sbaraglia et al., 2021).

By histopathologic evaluation, atypical spindle cells have an ill-defined border and vaguely lobular architecture with low-moderate cellularity containing atypical spindle cell proliferation (atypical features include nuclear hyperchromasia, pleomorphism without necrosis, and sparse mitosis) and predominant mature adipocytic component with scattered lipoblasts. Myxoid to collagenous stroma may be present. No amplification of MDM2 or CDK4 genes are identified in this tumor and loss of Rb protein expression by immunohistochemistry is identified in more than 50 % of cases (Antonescu et al., 2020).

The differential diagnosis of atypical spindle cell tumor by histopathologic examination includes spindle cell/pleomorphic lipoma (mostly seen in the superficial neck, back or shoulder) and atypical lipomatous tumor/well-differentiated liposarcoma and low grade dedifferentiated liposarcoma (both commonly seen in the retroperitoneum) (Sugita et al., 2022). The spindle cell/pleomorphic lipomas show spindle cell proliferation without nuclear atypia or pleomorphic lipoblasts with characteristic “ropey” collagen bundles. With utilization of immunohistochemistry, they show a consistent loss of nuclear Rb expression. Atypical lipomatous tumor/well-differentiated liposarcoma lack a well-developed spindle cell component. These lesions co-express MDM2 and CDK4 by immunohistochemistry and MDM2 amplification by FISH. Lastly, low-grade dedifferentiated liposarcoma is characterized by the presence of high-grade zones. The lesion shows co-expression of MDM2 and CDK4 by immunohistochemistry and MDM2 amplification by FISH (Lindberg, 2023).

A literature search was conducted using the following key words: atypical lipomatous tumors,” “vulvar lipomatous tumor,” and “vulvar soft tissue tumor” in search engines PubMed and Google Scholar. References of WHO article on classification systems were also reviewed in detail (Sbaraglia et al., 2021).

The search revealed that attempts have been made to characterize atypical spindle cell tumors. See Table 1. Bahadir et al. characterized 20 cases of atypical spindle cell/pleomorphic lipomatous tumors and noted similar findings to Marino-Enriquez et al. This analysis also noted a male predominance, late 50 s as age of presentation, extremities as the most common site of presentation (45 % of cases), and no risk of recurrence after undergoing excision. Varied histologic and morphologic appearances were seen, with only 2 cases that had similar morphologic findings to the 232 cases reported by Marino-Enriquez et al. On immunohistochemistry, presence of CD34 and absence of S-100, amplification of CDK4, MDM2, and Rb expression loss were consistent with diagnosis of atypical spindle cell lipomatous tumors for all cases. Two cases were noted in the groin, but exact location was not provided. All tumors were excised with tumor-free margins and no adjuvant treatment administered (Bahadır et al., 2018).

Of the studies reviewed, only one reported such a lipomatous mass occurring in the vulva. In this case study by Reis-Filho et al., the patient was followed for a period of 8 months during which there was no evidence of recurrence. Our patient presented similarly to the case described by Reis-Filho et al. and underwent primary surgical resection of vulvar mass. In addition, the vulvar lipoma in our case was substantially larger in size (8.5 cm as opposed to 1.8 cm in maximum diameter described by Reis-Filho et al.).

All cases presented in Table 1 characterize atypical spindle cell lipomatous tumors as ill-defined, non-encapsulated and evidence of nuclear atypia surrounded by adipocytes in varying shapes and sizes. Given these characteristics, it is possible to mischaracterize these masses as malignant tumors as they were previously classified prior to the

recent WHO update.

Atypical spindle cell lipomatous tumor is differentiated from well-differentiated liposarcoma and atypical lipomatous tumor by the lack of MDM2 and CDK4 amplification and loss of Rb expression by immunohistochemistry in more than 50 % of cases. In addition, histomorphology of atypical spindle neoplasm also contains variable adipocyte differentiation often with lipoblasts.

Atypical spindle cell lipomatous tumors are benign adipocytic tumors that have an indolent clinical course and are treated with surgical excision. Of the over 200 cases of atypical spindle cell lipomatous tumors reviewed, 17 cases were in the genital area with at least one known case in the vulva. A literature search for publications reporting atypical spindle cell lipomatous tumors in the vulva yielded no cases. A general query for atypical lipomatous tumors in the vulva produced scant results. Reis-Filho et al. noted a case of intradermal spindle cell lipoma of the vulva (Reis-Filho et al., 2002). Nucci and Fletcher (1998) described six cases of liposarcoma of the vulva. Intradermal spindle cell lipoma and liposarcoma are within the spectrum of atypical lipomatous tumors, but not of the specific spindle cell subtype that is being reported in our unique patient's case. Given the sparse reporting of atypical lipomatous spindle cell tumors in the vulva, this underscores the rarity of this tumor in the gynecologic tract.

The patient was seen 7 weeks postoperatively for a follow up. Her vulva was well healed from the radical excision without any signs of recurrence. She was otherwise doing well. In summary, this case presents a rare case of relatively large, atypical spindle cell lipomatous tumor of the vulva and provides an update to our current understanding of adipocytic tumors.

Consent statement

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

CRediT authorship contribution statement

Sadhvi Batra: Writing – review & editing, Writing – original draft, Visualization, Data curation, Conceptualization. **Lindsey Nguy:** Writing – review & editing, Validation, Resources, Conceptualization. **Daniela Moino:** Writing – review & editing, Visualization, Conceptualization. **Atousa Ordobazari:** Writing – review & editing, Resources, Data curation. **Mian M Shahzad:** Writing – review & editing, Visualization, Supervision, Resources, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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