

Uterine Lipoleiomyoma: A Case Series of Five Patients from a Tertiary Care Centre

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ABSTRACT

Uterine lipoleiomyoma is a rare benign variant of uterine leiomyoma characterised by an admixture of mature adipose tissue and smooth muscle cells, with a reported incidence ranging from 0.03% to 0.2%. It predominantly affects postmenopausal women and is most commonly located in the uterine corpus. We report a case series of five patients with uterine lipoleiomyoma: two cases identified prospectively during a one-year audit of hysterectomy specimens, and three additional cases retrieved from institutional records that broaden the observed clinicopathological spectrum. Patients ranged in age from 49 to 70 years (mean 57.4 years) and presented with pelvic pain or heaviness, abnormal uterine bleeding, urinary frequency, or progressive abdominal distension. Tumour location included the uterine corpus (intramural, submucosal, and subserosal) and, in one case, the cervical stroma; tumour size ranged up to 14 × 12 × 10 cm, consistent with the rare 'giant' variant. One perimenopausal patient with a submucosal tumour was managed by fertility-sparing myomectomy; the remaining four underwent hysterectomy with bilateral salpingo-oophorectomy. Gross examination in all cases revealed well-circumscribed, yellow to yellow-white masses with a whorled cut surface. Histopathological examination demonstrated the characteristic admixture of mature adipocytes and benign smooth muscle bundles without cytological atypia, lipoblasts, or necrosis in every case, with hyaline, myxoid, or dystrophic calcific change noted focally in three cases. All patients had an uneventful postoperative course. This series illustrates the diverse ages, tumour locations, and management strategies encountered in uterine lipoleiomyoma and reinforces the importance of recognising this entity to avoid diagnostic confusion with other adipocytic tumours of the uterus.

Keywords: Lipoleiomyoma; uterine leiomyoma; adipocytes; hysterectomy; myomectomy; cervical lipoleiomyoma; giant lipoleiomyoma; histopathology; postmenopausal

INTRODUCTION

Uterine lipoleiomyoma is a benign fatty tumor of the uterus with an overall incidence reported between 0.03% and 0.2%, comprising approximately 0.35% of uterine myomatous tumors [1]. It is considered a

variant of uterine leiomyoma with a similar clinical course, and is most commonly identified in postmenopausal patients between the ages of 45 and 70 years [1,2]. The aetiology of lipoleiomyoma remains incompletely understood. Proposed

pathogenetic mechanisms include metaplastic transformation of smooth muscle cells into adipocytes, fatty degeneration, iatrogenic introduction of fat into the myometrium, and differentiation of undifferentiated mesenchymal cells. An association with metabolic conditions such as diabetes mellitus, hyperlipidaemia, and hypothyroidism has also been reported [5].

Uterine lipoleiomyoma is most commonly located in the uterine corpus, although cervical, ovarian, and retroperitoneal locations have also been documented [3].

The tumor is typically asymptomatic; however, symptomatic patients may present with abnormal uterine bleeding, pelvic discomfort, palpable pelvic mass, or urinary symptoms, mirroring the clinical presentation of conventional leiomyomas [4].

Imaging modalities including ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) may suggest the diagnosis; however, histopathological examination remains essential for definitive diagnosis [9].

The differential diagnosis includes mature cystic teratoma, pure lipoma, angiomyolipoma, atypical lipomatous tumor, and liposarcoma, making accurate pathological characterization critical [3].

Therefore, we present an expanded case series of five patients with uterine lipoleiomyoma, with emphasis on clinicopathological features, differential diagnosis, and management.

MATERIALS AND METHODS

A retrospective case series study was conducted in the Department of Pathology at a tertiary care centre over a period of two years. During this period, 512 hysterectomy specimens were received and subjected to histopathological examination. Among these, 225 cases were diagnosed as uterine leiomyomas, of which 2 cases were identified as uterine lipoleiomyoma.

In addition, three further cases of uterine lipoleiomyoma diagnosed at our institution outside this one-year audit window were

retrieved from departmental records and were included in the present series to illustrate a wider range of clinicopathological presentations of this entity. All five cases were evaluated using the methodology described below.

All specimens underwent systematic gross examination. Parameters documented included tumor size, number, location, external appearance, cut surface and relationship to the surrounding myometrium. Representative tissue sections were sampled from each tumor, including its periphery.

Tissue samples were fixed in 10% neutral buffered formalin, routinely processed, and embedded in paraffin wax. Sections were cut at 4–5 µm thickness and stained with haematoxylin and eosin (H&E). Histopathological evaluation assessed the proportion and distribution of mature adipose tissue and smooth muscle bundles, the presence of degenerative changes, nuclear atypia, mitotic activity, coagulative tumor cell necrosis, and lipoblasts to establish the diagnosis and exclude other uterine lipomatous lesions [13].

Histopathological findings were correlated with clinical, radiological, and intraoperative data. Written informed consent for publication was obtained from all patients, and the study was conducted according to the institutional ethics committee guidelines.

CASE REPORTS

Case 1

A 60-year-old woman (P3L3) presented with a history of lower abdominal pain and pelvic discomfort. She was postmenopausal and denied any history of postmenopausal bleeding or constitutional symptoms. Abdominal examination revealed a palpable pelvic mass. Preoperative ultrasound and CT demonstrated a fat-containing uterine mass, and total abdominal hysterectomy with bilateral salpingo-oophorectomy was performed.

Gross Examination

The hysterectomy specimen comprised the uterus with cervix and separately received

bilateral adnexa. Serial sectioning of the specimen revealed a well-circumscribed intramural nodule measuring 7×5 cm with a characteristic yellow-white whorled cut

surface; soft yellow fatty areas were admixed within firm white fasciculated zones (Figure 1).



Figure 1. Gross photograph of the hysterectomy specimen demonstrating an intramural nodule with a yellow-white whorled cut surface and interspersed fatty areas.

Histopathological Examination

Microscopic examination of the largest nodule revealed a benign mesenchymal neoplasm composed of intersecting fascicles of bland, spindle-shaped smooth muscle cells admixed with abundant mature adipose tissue. The spindle cells exhibited elongated

cigar-shaped nuclei with eosinophilic cell cytoplasm. No nuclear atypia, coagulative tumor cell necrosis, lipoblasts, or significantly increased mitotic activity were identified. The histological features were diagnostic of lipoleiomyoma (Figure 2).

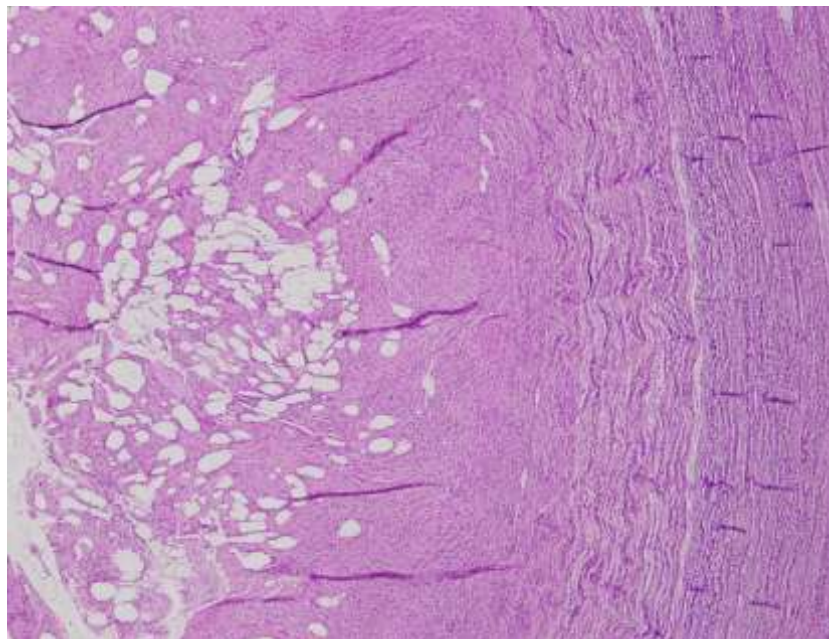


Figure 2. Photomicrograph showing lipoleiomyoma composed of intersecting smooth muscle bundles admixed with mature adipocytes, with compressed uterine myometrium at the periphery (H&E X 40).

Case 2

A 53-year-old postmenopausal woman (P3L3) presented with a 6-month history of abnormal uterine bleeding and lower abdominal pain. Clinical examination and preoperative imaging were consistent with a uterine mass with fatty component, and the patient underwent total abdominal

hysterectomy with bilateral salpingo-oophorectomy.

Gross Examination

The hysterectomy specimen comprised the uterus with separately received bilateral adnexa. Cut section of the uterus revealed a single yellowish-white, firm, whorled intramural lesion measuring 8 × 8 cm (Figure 3).



Figure 3. Gross photograph of the uterus showing a single intramural nodule with a yellow-white whorled cut surface.

Histopathological Examination

Histopathological examination revealed an admixture of benign smooth muscle cells and mature adipocytes, consistent with lipoleiomyoma. Associated hyaline

degeneration was also noted. No cytological atypia, lipoblasts, tumor cell necrosis, or significantly increased mitotic activity were identified (Figure 4).

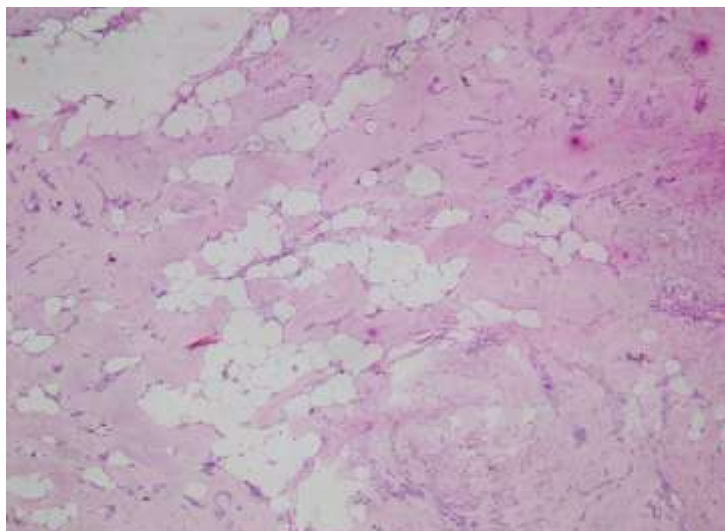


Figure 4. Photomicrograph showing lipoleiomyoma with associated hyaline degeneration (H&E X 40).

Case 3

A 49-year-old perimenopausal woman (P2L2) presented with a four-month history of heavy menstrual bleeding and dysmenorrhoea. Ultrasound revealed a submucosal uterine mass of mixed echogenicity, and MRI showed a lesion following fat signal on T1- and T2-weighted sequences with loss of signal on fat-saturated images. Given her wish for uterine preservation, she underwent abdominal myomectomy.

Gross Examination

The excised nodule measured 5×4 cm, was well-encapsulated, and showed a soft,

yellow, greasy cut surface admixed with firmer, white, whorled areas.

Histopathological Examination

Sections demonstrated an admixture of mature adipocytes and interlacing fascicles of smooth muscle with bland, elongated nuclei, along with focal myxoid change in the smooth muscle component. No cytological atypia, lipoblasts, or increased mitoses were seen. She recovered well and remained asymptomatic on follow-up — illustrating that although lipoleiomyoma typically occurs in postmenopausal women, it may occasionally present earlier and can be managed with fertility-sparing surgery.

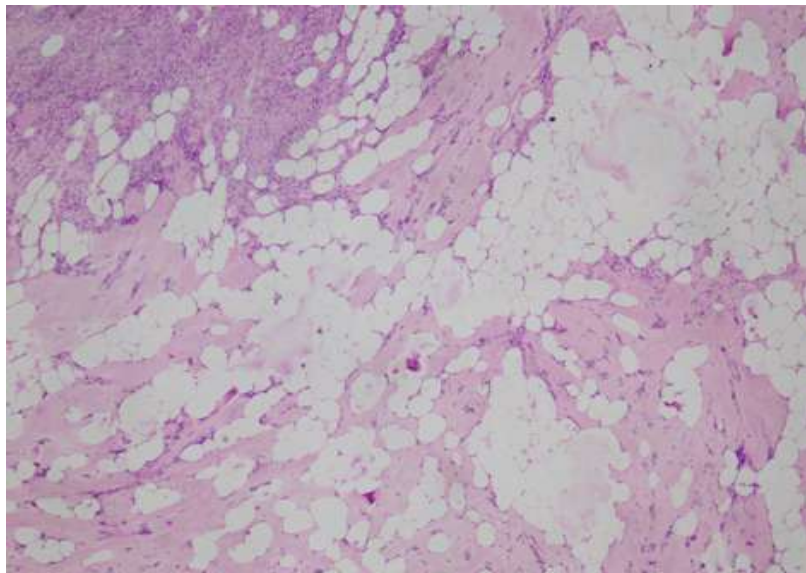


Figure 5. Photomicrograph showing lipoleiomyoma composed of intersecting smooth muscle bundles admixed with mature adipocytes (H&E 100X)

Case 4

A 55-year-old postmenopausal woman (P3L2) presented with urinary frequency and a sensation of pelvic fullness. Speculum examination showed the cervix displaced anteriorly by a firm mass. Ultrasound and MRI localised a fat-containing lesion within the cervical stroma. She underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy.

Gross Examination

The cervix showed a well-circumscribed intramural nodule measuring 4×3.5 cm

within the stroma, with a yellow-white, focally glistening cut surface.

Histopathological Examination

Microscopy revealed mature adipose tissue admixed with bundles of bland smooth muscle cells, with compression of adjacent cervical stroma at the periphery. No atypia, lipoblasts, or necrosis were seen, confirming lipoleiomyoma arising in the cervix — an uncommon location for this tumour. She had an uneventful recovery.

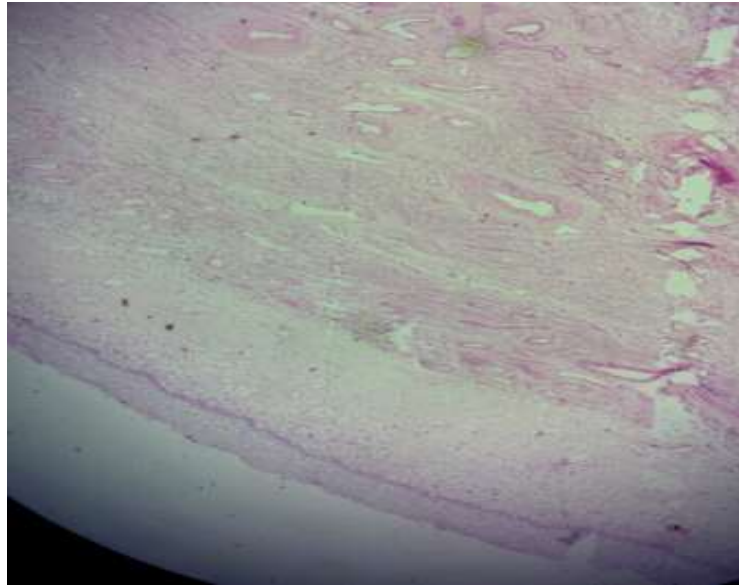


Figure 6. Photomicrograph showing ectocervical lining and presence of tumour composed of intersecting smooth muscle bundles admixed with mature adipocytes (H&E 100X)

Case 5

A 70-year-old postmenopausal woman (P6L5) presented with progressive abdominal distension over one year and a palpable mass reaching the umbilicus, without bleeding or pain. Ultrasound and CT showed a large, predominantly fat-density pelvi-abdominal mass measuring approximately 15 cm. She underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy.

Gross Examination

A large subserosal, pedunculated nodule measuring $14 \times 12 \times 10$ cm was identified, with a bosselated external surface and a yellow-tan, focally gritty cut surface.

Histopathological Examination

Sections showed an admixture of mature adipose tissue and benign smooth muscle bundles. No cytological atypia, lipoblasts, or tumour necrosis were identified, and mitotic activity was not increased — consistent with a lipoleiomyoma. Her postoperative recovery was uneventful.

RESULTS

Over the study period of one year, 512 hysterectomy specimens were examined. Of these, 225 cases (43.95%) were diagnosed as uterine leiomyomas. Among the

leiomyomas, hyaline degeneration was the most frequent degenerative change, observed in 50 cases (22.22%), followed by red degeneration in 12 cases (5.33%), calcific degeneration in 8 cases (3.56%), myxoid degeneration in 7 cases (3.11%), and cystic degeneration in 5 cases (2.22%).

Uterine lipoleiomyoma was identified in 2 cases (0.89% of leiomyomas; 0.39% of all hysterectomy specimens) during this audit, confirming the rarity of this histological variant. Both audit-period patients were postmenopausal women aged 53 and 60 years (mean: 56.5 years). Tumor sizes were 7×5 cm and 8×8 cm respectively, and both tumours were intramural. The distribution of leiomyoma subtypes and degenerative changes identified during the audit is summarised in Table 1.

The three additional cases included in this series (Cases 3–5) were diagnosed at our institution outside the audit period and were not part of the incidence calculation above. Collectively, these three patients ranged in age from 49 to 70 years, tumour size ranged from 4×3.5 cm to $14 \times 12 \times 10$ cm, and tumour location included the submucosum, cervical stroma, and subserosum. One patient (Case 3) was perimenopausal and was managed by fertility-sparing myomectomy; the remaining two underwent hysterectomy with bilateral salpingo-oophorectomy.

Across all five cases in the present series, patient age ranged from 49 to 70 years (mean 57.4 years). Tumour location was intramural in two cases, and submucosal, cervical, and subserosal-pedunculated in one case each. Associated degenerative change was

identified in three of the five cases — hyaline degeneration (Case 2), myxoid change (Case 3), and dystrophic calcification (Case 5). The clinicopathological features of all five cases are summarised in Table 2.

Table 1. Distribution of degenerative changes and lipoleiomyoma among uterine leiomyomas identified during the one-year audit (n = 225)

Histopathological diagnosis	Number of cases (n)	Percentage of leiomyoma (%)
Conventional leiomyoma	141	62.67
Hyaline degeneration	50	22.22
Red degeneration	12	5.33
Calcific degeneration	8	3.56
Myxoid degeneration	7	3.11
Cystic degeneration	5	2.22
Lipoleiomyoma	2	0.89
Total	225	100.00

Table 2. Summary of clinicopathological features of the five cases of uterine lipoleiomyoma in the present series

Case	Age	Menopausal status	Presentation	Location / size	Management	Key histology
1	60	Postmenopausal	Lower abdominal pain, pelvic discomfort	Intramural, corpus; 7 × 5 cm	TAH + BSO	No atypia, no lipoblasts
2	53	Postmenopausal	Abnormal uterine bleeding, abdominal pain	Intramural, corpus; 8 × 8 cm	TAH + BSO	Hyaline degeneration
3	49	Perimenopausal	Menorrhagia, dysmenorrhoea	Submucosal; 5 × 4 cm	Abdominal myomectomy	Focal myxoid change
4	55	Postmenopausal	Urinary frequency, pelvic fullness	Cervical stroma; 4 × 3.5 cm	TAH + BSO	No atypia
5	70	Postmenopausal	Progressive abdominal distension	Subserosal, pedunculated; 14 × 12 × 10 cm	TAH + BSO	Dystrophic calcification, no atypia

DISCUSSION

Uterine lipoleiomyoma is a rare benign variant of leiomyoma, with a reported incidence of 0.03% to 0.2% [1]. During the one-year audit component of the present study, lipoleiomyoma constituted 0.89% of all leiomyomas and 0.39% of hysterectomy specimens, which is consistent with the frequency reported in the literature.

The tumor predominantly affects postmenopausal women, typically between the ages of 45 and 70 years. The pathogenesis is believed to be multifactorial, with proposed mechanisms including metaplastic transformation of smooth muscle cells into adipocytes, fatty degeneration, and differentiation of undifferentiated

mesenchymal cells. Oestrogen deficiency following menopausal transition may facilitate adipogenic metaplasia [2,5]. An association with metabolic comorbidities such as diabetes mellitus, hyperlipidaemia, and hypothyroidism has also been reported [5]. While the tumour predominantly affects postmenopausal women, Case 3 in the present series, occurring in a 49-year-old perimenopausal woman, illustrates that onset may occasionally precede the usual age range.

Lipomatous uterine tumors can be classified into three groups: pure lipomas, tumors with an additional mesodermal component (including lipoleiomyoma, angioliomyoma, and fibromyolipoma) and liposarcoma [6].

Accurate classification requires careful histological evaluation. In all five cases reported here, the admixture of mature adipocytes and smooth muscle fascicles without cytological atypia, lipoblasts, or increased mitotic activity was diagnostic of lipoleiomyoma.

Leiomyomas are prone to various degenerative changes as they enlarge and outgrow their blood supply. These include hyaline, myxoid, calcific, cystic, and red degeneration [7]. In the audit component of the present series, hyaline degeneration was the most common degenerative change (22.22%), consistent with previously published data [8]. Hyaline degeneration in Case 2 further illustrates the overlap between conventional leiomyoma and its lipomatous variant, an overlap that was also reflected in the additional cases: myxoid change in Case 3 and dystrophic calcification in Case 5.

Radiological evaluation plays an important supportive role. Lipoleiomyoma typically appears as a well-defined, homogeneously hyperechoic lesion on ultrasound. CT demonstrates fat density within the lesion, while MRI is the modality of choice due to its multiplanar capability and superior ability to characterize the fat component, typically exhibiting signal intensity identical to subcutaneous fat with signal drop on fat-suppressed sequences [9,10]. This appearance was well demonstrated in Case 3, where MRI of the submucosal lesion showed fat signal on both T1- and T2-weighted sequences with loss of signal on fat-suppressed images, a pattern considered diagnostic of a lipomatous tumour.

The differential diagnosis of fat-containing pelvic tumors encompasses a spectrum of benign and malignant lesions. The key distinguishing features are summarized in Table 3. Mature cystic teratoma arises from germ cells and contains tissues from all three germ cell layers. Pure lipoma consists exclusively of mature adipocytes without a smooth muscle component. Angiomyolipoma contains a vascular component and expresses HMB-45 and Melan-A on immunohistochemistry.

Atypical lipomatous tumor and liposarcoma, the most important malignant differentials, are characterized by cytological atypia, lipoblasts, and MDM2/CDK4 amplification [3].

Although the uterine corpus is by far the most frequent site, cervical involvement is distinctly uncommon and has been documented only sporadically [3]. Case 4 in the present series, a lipoleiomyoma arising within the cervical stroma and displacing the cervix anteriorly, adds to this limited literature and highlights the need to consider this diagnosis even outside the corpus. Similarly, so-called 'giant' lipoleiomyomas exceeding 10 cm are rarely reported [6]. Case 5, measuring 14 × 12 × 10 cm with a bosselated subserosal, pedunculated configuration and foci of dystrophic calcification, represents such a giant variant and illustrates that considerable tumour bulk does not preclude a benign course, provided the histological criteria for malignancy are absent.

Lipoleiomyoma can co-occur with other gynaecological conditions, including endometrial malignancies, which should be excluded in symptomatic postmenopausal patients [11]. Unlike conventional leiomyomas which tend to regress after menopause, lipoleiomyoma have been reported to demonstrate continued growth postmenopausally, occasionally mimicking malignant behaviour clinically [12].

Surgical management is recommended for symptomatic lesions. Depending on patient age, reproductive status, and tumor characteristics, surgical options include myomectomy (abdominal, laparoscopic, or hysteroscopic) or hysterectomy with or without bilateral salpingo-oophorectomy [12]. In the present series, management was individualised accordingly: four patients underwent hysterectomy with bilateral salpingo-oophorectomy, while one perimenopausal patient (Case 3) with a submucosal tumour and a wish for uterine preservation was managed successfully by abdominal myomectomy — underscoring that fertility-sparing surgery remains a

reasonable option when the diagnosis is suspected preoperatively in a younger patient. All five patients in this series had an uneventful postoperative recovery.

Table 3. Differential diagnosis of lipoleiomyoma and other fat-containing pelvic tumors

Feature	Lipoleiomyoma	Mature Cystic Teratoma	Pure Lipoma	Angiomyolipoma	Atypical Lipomatous Tumor	Liposarcoma
Clinical	Peri-/postmenopausal; pelvic pain or incidental	Younger women; adnexal mass	Incidental	Rare; pelvic pain	Slowly enlarging mass	Progressively enlarging mass
Radiology	Fat-containing uterine lesion with signal drop on FS-MRI	Cystic lesion with fat $\pm$ calcification	Homogeneous fatty lesion	Fat with vascular component	Fatty lesion with thick septa	Heterogeneous infiltrative mass
Gross	Yellow-white whorled mass	Hair, sebum, cartilage or teeth	Soft encapsulated yellow mass	Yellow vascular mass	Lobulated yellow mass	Variegated mass with haemorrhage and necrosis
Microscopy	Mature adipocytes with benign smooth muscle fascicles	Mature tissues from three germ layers	Mature adipocytes only	Fat, thick-walled vessels, smooth muscle	Atypical adipocytes / stromal cells	Lipoblasts with marked atypia
Atypia / Lipoblasts	Absent	Absent	Absent	Absent	Mild atypia $\pm$ lipoblasts	Present
Mitosis / Necrosis	Absent	Absent	Absent	Low	Low	Increased; necrosis common
IHC	SMA, Desmin (+)	Variable	S-100 (+)	HMB-45, Melan-A (+)	MDM2, CDK4 (+)	MDM2, CDK4 (+)
Behaviour	Benign	Benign	Benign	Benign	Locally aggressive	Malignant

CONCLUSION

Uterine lipoleiomyoma is a rare but pathologically distinct benign variant of leiomyoma, characterised by an admixture of mature adipose tissue and smooth muscle cells in the absence of cytological atypia or significantly increased mitotic activity. In our one-year audit, lipoleiomyoma accounted for 0.89% of uterine leiomyomas. The present series of five cases further demonstrates the diverse ages, tumour locations - including the cervix - and sizes, up to a giant 14 $\times$ 12 $\times$ 10 cm subserosal variant, encountered in this entity, as well as the range of management options from fertility-sparing myomectomy to hysterectomy. Although imaging may suggest the diagnosis, definitive diagnosis requires histopathological examination. Awareness of this entity and its distinguishing features is essential to avoid diagnostic confusion with other adipocytic

tumours of the pelvis, particularly malignant lesions. Clinical follow-up is mandated given the potential for continued growth in the postmenopausal setting.

Declarations

Ethical Approval and Informed Consent:

Written informed consent was obtained from all five patients. The study was conducted according to the institutional ethics committee guidelines.

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Conflict of Interest: The authors declare no conflict of interest.

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