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Inflammatory myofibroblastic tumour of cervix: Uncommon pathology in an unlikely location – A literature review

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ABSTRACT

Background: Inflammatory myofibroblastic tumours (IMTs) of the uterine cervix are extremely rare, benign mesenchymal neoplasms, characterized by the proliferation of myofibroblasts within an inflammatory background. IMTs most commonly occur in the lungs and abdomen, and their occurrence in the female genital tract, particularly the uterine cervix, is exceedingly rare. The optimal management of these tumours remains under investigation due to the limited number of reported cases.

Objectives: This literature review aims to provide an overview of the clinical presentation, diagnostic challenges and management strategies of uterine cervical IMTs. This review focuses on the roles of histopathology, immunohistochemistry (IHC) and molecular analysis in diagnosing these tumours, and discusses treatment outcomes and follow-up strategies.

Methods: A comprehensive review of the literature was conducted using PubMed, Google Scholar and other relevant databases. Relevant case reports and studies published between 2000 and 2024 were included. The primary outcomes assessed were clinical presentation, diagnostic features, treatment modalities and recurrence/metastasis rates.

Results: Eleven reports of IMTs of the uterine cervix were identified in the literature search, and six of these were included in this review. Clinical presentation primarily includes abnormal uterine bleeding (AUB), often with symptoms of menorrhagia and dysmenorrhoea. Imaging studies and histopathological examination play key roles in diagnosis, with IHC markers such as smooth muscle actin, desmin and anaplastic lymphoma kinase (ALK)-1 being used frequently. Surgical resection remains the mainstay of treatment, with some cases also benefiting from targeted therapy for recurrent or metastatic disease.

Conclusion: IMTs of the uterine cervix are rare but are increasingly recognized in clinical practice. They are typically benign with a low risk of malignancy, although local recurrence is possible, especially in cases of incomplete resection. Diagnosis relies heavily on histopathological and molecular analysis, with ALK gene rearrangements being an important molecular finding. While surgical excision remains the primary treatment, ongoing research into targeted therapies, including ALK inhibitors, offers promising avenues for management. This review emphasizes the need for long-term follow-up given the potential for recurrence.

1. Introduction

Inflammatory myofibroblastic tumours (IMTs) are rare soft tissue neoplasms that primarily affect the lungs, abdominal soft tissues and, less commonly, the uterine cervix. Characterized by the proliferation of myofibroblastic spindle cells along with a prominent inflammatory infiltrate, IMTs present unique diagnostic and therapeutic challenges. Although IMTs are classified as neoplastic diseases, their biological behaviour is considered intermediate, with a low risk of recurrence and metastasis compared with more aggressive sarcomas. However, local recurrence and rare metastases underline the importance of close monitoring and follow-up, especially in atypical locations such as the uterine cervix.

The aim of this review is to summarize and synthesize the clinical

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presentation, diagnostic methods, management strategies and outcomes of IMTs in the uterine cervix, based on current literature. Given the rarity of these tumours in the cervix, a comprehensive understanding of their pathophysiology and treatment options is essential for clinicians involved in the management of abnormal uterine bleeding (AUB) and other gynaecological conditions.

2. Methods

A comprehensive search of the available literature was performed using electronic databases such as PubMed, Scopus and Google Scholar.

Studies published from 2000 to 2024, including case reports, clinicopathological studies and literature reviews, were considered. In total, 11 publications were identified in the literature search.

The primary inclusion criterion was the presence of IMTs in the uterine cervix. Studies reporting clinical presentation, diagnostic evaluation, histopathological findings, management strategies and patient outcomes were included in this review.

No formal meta-analysis was conducted, and a qualitative synthesis of the findings from individual studies was performed. The following steps were followed:

- study selection: studies focusing on IMTs in the uterine cervix were included, regardless of study design (case report, case series, etc.);
- data extraction: key details such as clinical presentation, diagnostic techniques, immunohistochemistry (IHC) findings, treatment modalities and follow-up outcomes were extracted; and
- synthesis: a narrative synthesis of the findings was provided, highlighting patterns in clinical presentation, diagnostic methods and treatment approaches.

3. Clinical presentation

IMTs in the uterine cervix are rare, with most cases presenting in women aged between 19 and 60 years. Symptoms are often non-specific and can overlap with other gynaecological conditions, making diagnosis challenging. The most common symptom is AUB, which may include menorrhagia or postmenopausal bleeding, as noted in the study patient. Other symptoms include pelvic pain, pressure or an enlarged uterus, often mistaken for fibroids or other more common gynaecological conditions. In this review, most patients with uterine IMTs reported AUB as the primary complaint. Other less common presentations included pelvic mass, chronic cervicitis and, in some cases, incidental findings during routine gynaecological examinations or imaging studies.

The case patient was a 37-year-old female (para 2, living 2), with two previous normal vaginal deliveries and no history of tubal ligation. She presented with a 1½-year history of heavy menstrual bleeding (menorrhagia) and dysmenorrhoea. Her menstrual cycles were frequent, occurring every 20 days, with bleeding lasting 8–10 days, with increased flow from day 4 to day 8, during which she used four to five pads per day.

She also reported passing clots, excessive vaginal discharge, and experiencing an overall lack of energy. There were no associated symptoms of lower abdominal pain, urinary or bowel disturbances, or itching. The patient had no significant past medical or surgical history.

On examination, she appeared moderately built and afebrile, with mild pallor but no signs of jaundice, cyanosis, lymphadenopathy or weight loss. Breast and thyroid examinations were unremarkable. On abdominal examination, mild tenderness was noted in the lower abdomen, but no other significant findings were present. A per-speculum examination revealed chronic cervicitis, and liquid-based cytology was performed. The bilateral adnexa were free. Given her presentation with AUB, the patient was initially managed with cyclical progesterone, but did not experience symptom relief.

4. Diagnostic methods

The diagnosis of IMTs in the uterine cervix requires a combination of clinical, imaging and histopathological evaluations. Imaging modalities, such as ultrasonography and magnetic resonance imaging (MRI), are useful in identifying the mass and assessing its relationship with surrounding structures. On ultrasound, IMTs typically appear as well-circumscribed, solid or slightly lobulated masses, with variable echogenicity depending on the degree of cellularity and inflammation (Fig. 1).

MRI can provide more detailed information, showing masses with variable signal intensities on T1- and T2-weighted images, and sometimes showing heterogeneous contrast enhancement.

Definitive diagnosis is based on histopathological examination and IHC. The hallmark of IMTs is the presence of spindle-shaped myofibroblasts embedded in a background of inflammatory cells, including lymphocytes, plasma cells and eosinophils. In some cases, necrosis or cystic degeneration may be observed. On IHC, IMTs typically express smooth muscle actin, vimentin and desmin. The identification of anaplastic lymphoma kinase (ALK) rearrangements is a critical molecular marker, present in approximately 50 % of cases, especially younger patients.

Histopathological features of IMTs in the cervix include: spindle-shaped myofibroblasts in a fascicular pattern; mixed inflammatory infiltrate of lymphocytes, plasma cells and eosinophils; and negative for mitotic activity, atypia or necrosis in most cases (Figs. 2–4).

5. Management

Surgical resection remains the primary treatment for uterine IMTs. The choice of surgery depends on tumour size, location, and whether there are any signs of local invasion or recurrence. In most cases, total hysterectomy (with or without salpingectomy) is performed, particularly when the tumour is large or symptomatic, as in the study patient.

Laparoscopic surgery has been shown to be safe and effective for managing IMTs in the cervix, as it allows less invasive access and quicker recovery.

In cases of recurrence, surgical re-excision is often required, and adjuvant therapy may be considered if the tumour exhibits more aggressive histological features (e.g. higher mitotic activity or atypia). Targeted therapies with ALK inhibitors (e.g. crizotinib) have shown promise in cases with ALK gene rearrangements, especially for recurrent or metastatic tumours.

The study patient underwent total laparoscopic hysterectomy with bilateral salpingectomy, and had an uneventful recovery. There were no signs of recurrence on follow-up.

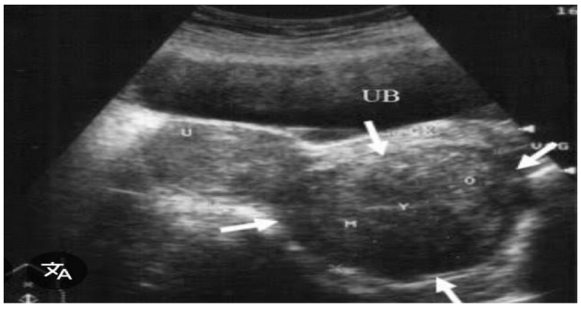

Fig. 1. Ultrasonography of the abdomen and pelvis of the study patient, revealing a bulky uterus with endometrial thickness of 8 mm, and a well-defined solid, hypo-echoic area in the lower posterior wall of the uterus towards the left side, extending up to the endometrial layer with anterior endometrial displacement.

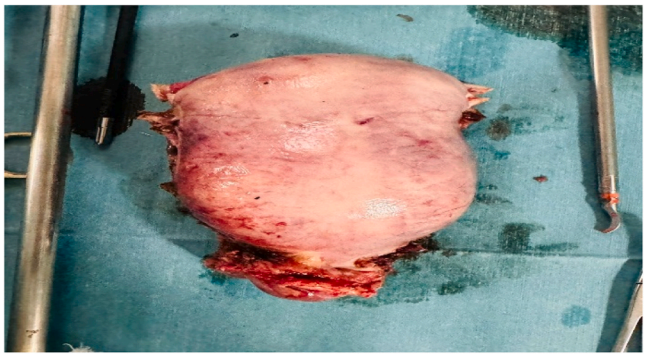

Fig. 2. Gross specimen.

6. Prognosis and follow-up

IMTs of the uterine cervix generally have low malignant potential, with recurrence rates reported to be low when the tumours are excised completely. However, incomplete excision can lead to local recurrence, which typically manifests as a pelvic mass or persistent bleeding. Rare cases of metastasis have been documented, with tumours spreading to regional lymph nodes, the lungs or distant soft tissue areas. Metastasis is more likely in tumours with aggressive histological features.

Given the possibility of recurrence or metastasis, long-term follow-up is recommended for all patients after surgical treatment. Follow-up generally involves regular pelvic examinations and imaging (ultrasound or MRI), particularly in patients with positive ALK gene rearrangements, for whom targeted therapies may be appropriate.

7. Discussion

IMTs of the uterine cervix present a diagnostic challenge due to their rarity and non-specific clinical presentation. While most cases are benign, recurrence and metastasis remain of concern, particularly in patients with incomplete resection or aggressive histopathological features. The role of molecular markers such as ALK rearrangements is increasingly recognized, and may offer new avenues for targeted therapies, especially for recurrent or metastatic cases.

In the case of the study patient, the clinical presentation was typical of IMT, and the patient underwent successful treatment with complete recovery. This highlights the importance of a careful diagnostic work-up to differentiate IMTs from other – more common – causes of abnormal bleeding, such as fibroids or malignancies.

The study patient shared several common features with other reported cases of IMTs of the uterine cervix (Table 1), such as presentation with AUB, including menorrhagia and dysmenorrhoea. Like other patients in the literature, the study patient presented with a bulky uterus

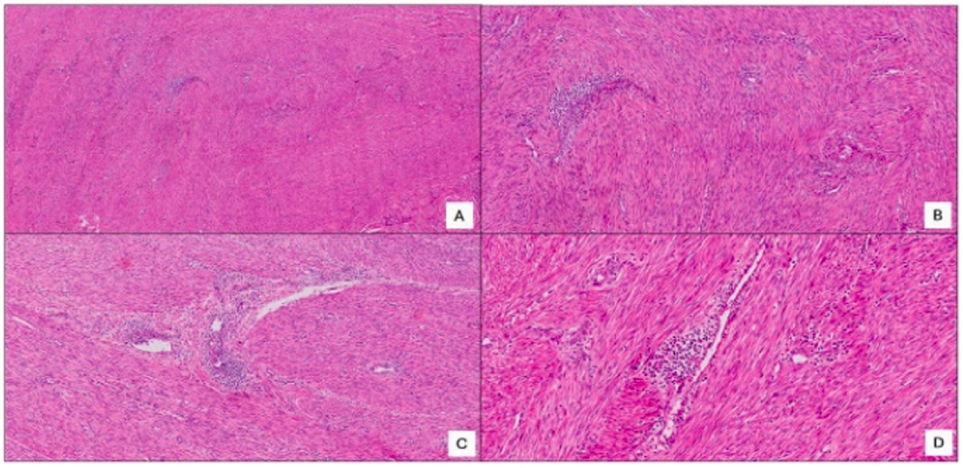

Fig. 3. Haematoxylin and eosin (H&E) stain of the study patient. A tumour composed of spindle-shaped cells arranged in intersecting fascicles, sheaths and storiform pattern at places (H&E X20). Sections also showed collections of mixed inflammatory infiltrate at many foci (H&E X40). High power showed spindle cells with elongated bland nuclei and inflammatory cells comprising of lymphocytes, plasma cells and a few eosinophils. No atypia, mitosis or necrosis was noted (H&E X100).

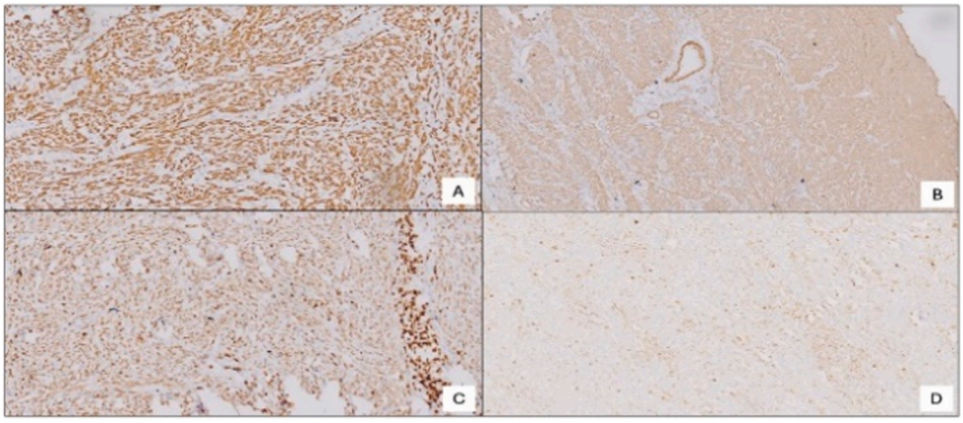

Fig. 4. Immunohistochemistry revealed tumour cells positive for (a) smooth muscle actin (X100), (b) desmin (X40), (c) BCL-2 (X100) and (d) anaplastic lymphoma kinase-1 (X40).

Table 1
Comparison of the study patient – a 37-year-old woman with abnormal uterine bleeding (AUB) and a 6-cm fibroid, treated with laparoscopic hysterectomy – with various studies on uterine inflammatory myofibroblastic tumours (IMTs). It highlights the importance of distinguishing between fibroids and IMTs, as well as the standard treatment of surgical excision, with follow-up indicating generally positive outcomes. The literature also emphasizes the potential for aggressive IMTs in some cases, warranting careful monitoring.

Study/ reference	Study type	Population	Patient profile	IHC findings	Key findings	Treatment	Follow-up recurrence	Relevance to study patient
Study patient	Literature review	Six case studies/ research articles including one case study at the authors' centre	At the authors' centre: 37-year-old P2L2, heavy menstrual bleeding, dysmenorrhoea, bulky uterus with 6-cm fibroid	Positive for smooth muscle actin, desmin, BCL−2, ALK−1	AUB due to a 6-cm fibroid, treated with total laparoscopic hysterectomy	Total laparoscopic hysterectomy + salpingectomy	Uneventful recovery, symptom-free on follow-up	Highlights symptomatology, treatment failure with medical management, and successful surgical outcome. Comparative with five other studies, distinguishing between fibroids and IMTs
Haimes J.D. et al. [1]	Research article	Uterine IMTs	Not specified	Positive for ALK-1	Uterine IMTs frequently harbor ALK fusions with IGFBP5 and THBS1	Surgical excision is standard	Uneventful recovery, symptom-freeNo recurrence on follow-up	Molecular insight into IMTs and their ALK fusion proteins, important for diagnosis
Karpathiou et al. [2]	Case study	Multiple cases of uterine tumours	Not specified; includes diverse age groups	Not detailed	Discusses the pathology and clinical behaviour of uterine IMTs	Surgical excision in most cases	Follow-up details not specified	Provides context for differential diagnosis in cases of AUB
Devins et al. [3]	Research article	Case studies on uterine tumours	Variable; focus on metastatic cases	Not detailed	Examines morphology and metastatic behaviour of tumours mimicking leiomyomas	Variable; often surgical	Follow-up not discussed extensively	Relevant for understanding tumour presentation in patients with AUB
Jo and Fletcher [4]	WHO classification update	General soft tissue tumors	Various age groups	Not specified	Provides updated WHO classification for soft tissue tumors, including uterine IMTs	Surgical excision is standard	Not specified	Context for diagnosing and classifying IMTs within soft tissue tumor categories
Collins et al. [5]	Clinicopathological study	Nine cases of uterine neoplasms	Patients aged 19–60 years	Not specified	Reports aggressive behaviour in some tumours, emphasizing clinical outcomes	Surgical management with some cases requiring adjuvant therapy	Some recurrences noted; follow-up varied	Important for recognizing aggressive variants in similar presentations
Zhu et al. [6]	Review	Various populations	Mixed age range	Not detailed	Reviews features, treatment options and outcomes associated with tumours	Surgical excision is standard	Follow-up data limited	Supports understanding of tumour types and treatment implications
Durham et al. [7]	Case report & literature review	Locally advanced IMT	Not specified	Positive for ALK, CD68, SMA	Reported use of targeted therapy for locally advanced IMT	Targeted therapy	No recurrence on follow-up	Highlights the role of targeted therapy in managing advanced IMTs
Huang et al. [8]	Review article	Bladder IMTs	Various age groups	Not detailed	Reviews clinical features, treatment, and outcomes of IMTs in the bladder	Surgical excision	Not specified	Relevant for recognizing IMTs outside the uterus, aiding in diagnosis of AUB
Fletcher et al. [9]	WHO classification update	General soft tissue tumors	Various age groups	Not specified	Updated WHO classification for soft tissue tumors	Surgical excision is standardNot	Not specified	Provides context for diagnosing IMTs within the broader spectrum of soft tissue tumors
Karam et al. [10]	Case report & literature review	Kidney IMTs	Not specified	Positive for ALK, SMA	Reports on IMTs in the kidney, including diagnosis and management strategies	Surgical excision is standardNot	No recurrence on follow-up	Highlights the occurrence of IMTs outside the uterus and their management
Karakousis et al. [11]	Case report & literature review	Urinary bladder IMT	Not specified	Positive for ALK, SMA	Focuses on the diagnosis and treatment of IMTs in the bladder	Surgical excision	No recurrence on follow-up	Highlights the importance of distinguishing bladder IMTs from other neoplasms
Seethala et al. [12]	Clinicopathologic study	37 cases of IMTs	Various sites (including	Positive for ALK-1	Study demonstrates the prevalence of ALK expression in IMTs,	Surgical excision	Recurrences noted in some cases	Provides clinicopathologic

(*continued on next page*)

Table 1 (*continued*)

Study/ reference	Study type	Population	Patient profile	IHC findings	Key findings	Treatment	Follow-up recurrence	Relevance to study patient
			bladder, lung, and soft tissues)		across multiple sitesSurgical			data on the role of ALK in IMTs
Zhang et al. [14]	Case report & literature review	Uterine cervix IMT	29-year-old woman	Not specified	A rare case of IMT of the uterine cervix in a young woman	Surgical excision	No recurrence on follow-up	Highlights rare location of IMT and importance of recognizing it in young patients
Sung et al. [15]	Case report	Uterine cervix IMT	Not specified	Positive for ALK-1, SMA	Describes a case of IMT in the uterine cervix, with emphasis on diagnosis and managementSurgical	Surgical excision	No recurrence on follow-up	Useful in recognizing IMTs in the cervix and their management
Zhou et al. [16]	Case report & literature review	Uterine cervix IMT	Not specified	Not detailed	Reviews the occurrence of IMTs in the uterine cervix with case examples	Surgical excision	Not specified	Provides additional case examples of IMTs in the uterine cervix
Hassan et al. [13]	Case series	Paediatric cases	Children with varying presentations	Not detailed	Documents diagnosis and management challenges in paediatric cases	Surgical excision, sometimes with chemotherapy	Variable follow-up; generally good outcomes noted	Highlights the need for awareness across age groups

and a fibroid, leading to the initial suspicion of a benign lesion. Histopathologically, as in many other cases, the tumour in the study patient demonstrated spindle-shaped cells with a prominent inflammatory infiltrate, including lymphocytes and plasma cells.

The IHC profile in the study patient, with positivity for smooth muscle actin, desmin and ALK-1, mirrors findings in several studies, reinforcing the smooth muscle origin of the tumour.

One distinctive feature in the study patient was the successful management with total laparoscopic hysterectomy, which was necessary after failed medical management. This highlights the importance of surgical intervention when conservative treatments do not provide relief. As in some other reports, no signs of malignancy, mitosis or necrosis were observed in the tumour, which is consistent with the generally benign or low-malignant potential nature of IMTs. The risk of recurrence in the study patient remains low, as noted in other cases where complete excision was achieved.

8. Conclusion

IMTs of the uterine cervix are rare, benign lesions that present unique diagnostic and management challenges. Surgical excision remains the primary treatment modality, and complete resection is crucial to minimize the risk of recurrence. Molecular testing for ALK rearrangements may provide additional insights into prognosis and treatment options. Given their rarity, increased awareness and careful diagnostic evaluation are essential to optimize patient outcomes.

Declaration of Competing Interest

I have nothing to declare.

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