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Original Case report

A RARE CASE REPORT: OSSEOUS METAPLASIA IN UTERINE LEIOMYOMA

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Abstract: ***Background:*** Osseous metaplasia in uterine leiomyoma is an extraordinarily rare form of degenerative alteration which involves the differentiation of smooth muscle cells or stromal fibroblasts into osteoblastic cells producing mature or immature bone tissue. The literature has only cited a small number of cases. These lesions may resemble the appearance of calcified fibroids on the imaging and are usually diagnosed accidentally after hysterectomy. The etiopathogenesis is ambiguous, but some mechanisms are suggested: chronic ischemia, necrosis and dystrophic calcification. ***Methods:*** We give a case of a 56-year-old postmenopausal woman (para 3, live 3) who presented with three months of lower abdominal pain and backache. A calcified intramural fibroid was indicated by clinical examination and ultrasound. The patient has been subjected to complete abdominal hysterectomy and bilateral salpingo-oophorectomy. The removed specimen was examined with the help of the microscope and histopathology. The presence of hematoxylin and eosin staining confirmed that there was the presence of the osseous metaplasia in a uterine leiomyoma. ***Results:*** The uterus was grossly enlarged at 12 weeks of age, and the intramural fundal fibroid was tough with 5×5 cm diameter. On cut section, a mass was observed to be grey-white with areas of focal bone hardness. Microscopy demonstrated well-differentiated trabeculae of mature bone in the smooth muscle bundles of the leiomyoma, which leads to the confirmation of the absence of osseous metaplasia. Postoperative course was event free and patient was discharged in good health. ***Conclusion:*** The presence of osseous metaplasia in uterine leiomyoma is a rare histopathological observation that is mostly observed in postmenopausal women. The diagnoses of this entity can be confused with calcified fibroids or malignant mixed Mullerian tumour, therefore, this entity must be noted. The management is still the final one, which is surgical excision.

Keywords: Leiomyoma, osseous metaplasia, calcified fibroid, uterine ossification, hysterectomy.

INTRODUCTION

Fibroids or uterine leiomyomas are benign smooth muscle tumors which represent the most frequent neoplasm of reproductive tract, occurring in as many as 70% of women over a lifetime [1]. These tumors develop out of the myometrium and their development is affected by both hormonal, genetic, and growth factor-mediated mechanisms. Though benign, secondary degenerative changes are common in leiomyomas, which are typically caused by insufficient blood supply and usually involve hyaline, cystic, myxoid, red degeneration and calcification [2]. Among them, the presence of the ossification or the presence of the osseous metaplasia is extremely uncommon; it has been recorded in the literature no more than fifty times all over the world [3,4]. Osseous metaplasia is the process of the development of bone tissue in a non-osseous structure. When it develops in the uterus, it may take place either in the endometrium or myometrium usually after chronic inflammation, ischemia, necrosis, or after an instrument had been placed in the uterus [5]. Chronic ischemia or degenerative calcification is believed to activate the stromal fibroblasts or smooth muscle cells to differentiate into osteoblast-like cells which deposit osteoid and ultimately develop into bone in the case of leiomyoma [6].

Clinically, patients with calcified or ossified fibroids are often asymptomatic, but may present with lower

abdominal pain, heaviness, menstrual irregularities, or pressure symptoms depending on size and location [7]. Radiological imaging such as ultrasound or computed tomography may reveal hyperechoic or calcified areas, yet differentiation between dystrophic calcification and true osseous formation requires histopathological confirmation [8].

We report a rare case of osseous metaplasia arising in a uterine leiomyoma in a postmenopausal woman, highlighting the clinicopathological features, histopathological findings, and differential diagnoses. This case adds to the limited body of literature describing such rare degenerative transformations.

MATERIALS AND METHODS

Patient Presentation

A 56-year-old postmenopausal woman, gravida 3, para 3, presented with complaints of lower abdominal pain and lower backache for three months. She had her last childbirth 22 years ago and had undergone sterilization. Her medical history was significant for systemic hypertension, controlled with telmisartan 40 mg once daily. There was no history of vaginal bleeding, discharge, or previous gynecological surgery.

Clinical Examination

General physical examination was unremarkable, and vital parameters were stable. Abdominal examination revealed a firm, non-tender, suprapubic mass corresponding to a 12-week-size uterus. Per speculum and bimanual examination confirmed an enlarged, firm uterus with restricted mobility.

Radiological Evaluation

Pelvic ultrasonography demonstrated a posterior intramural fibroid measuring approximately 5×5 cm with dense calcification and echogenic areas consistent with degenerative changes (Figure 1). The ovaries were normal.

Surgical Procedure

A total abdominal hysterectomy with bilateral salpingo-oophorectomy was performed under spinal anesthesia. Intraoperatively, the uterus was enlarged, and a hard, calcified intramural fibroid was noted in the fundal region (Figure 2). The specimen was sent for histopathological examination.

Histopathological Processing

The specimen was fixed in 10% neutral buffered formalin. Serial sections were processed, embedded in paraffin, and stained with hematoxylin and eosin. Microscopic examination was carried out under low and high power magnification.

Ethical Considerations

Institutional ethical norms were followed. The patient's details were anonymized.

RESULTS

Gross Findings

The uterus measured 10×7×5 cm. On sectioning, a well-circumscribed, firm, intramural mass measuring 5×5 cm was identified in the fundal region. The cut surface revealed grey-white whorled areas with focal gritty and bony-hard consistency (Figure 5). No areas of hemorrhage or necrosis were evident.

Microscopic Findings

Histopathological examination revealed interlacing bundles of smooth muscle cells consistent with leiomyoma. Within these, there were irregular trabeculae of mature lamellar bone formation lined by osteoblasts (Figures 3 and 4). The intervening stroma showed fibrosis with scattered calcific deposits. No atypia, mitotic activity, or necrosis suggestive of malignancy was noted.

Diagnosis

The histopathological diagnosis was **leiomyoma with osseous metaplasia.**

Postoperative Course

The patient's postoperative period was uneventful. She was mobilized on the first postoperative day, tolerated oral intake, and was discharged on the third day with complete resolution of symptoms.

Tables

Table 1. Summary of patient's clinical and radiological features

Parameter	Observation
Age	56 years
Parity	P3L3
Menopausal status	Postmenopausal
Symptoms	Lower abdominal pain, backache
Imaging finding	Calcified intramural fibroid (5×5 cm)
Diagnosis	Osseous metaplasia in leiomyoma

Table 2. Intraoperative and gross findings

Feature	Observation
Procedure	Total abdominal hysterectomy with BSO
Fibroid location	Fundal intramural
Fibroid size	5×5 cm
Consistency	Firm, partially calcified
Cut section	Grey-white, bony hard areas

Table 3. Histopathological summary

Feature	Observation
Microscopy	Interlacing smooth muscle bundles
Bone formation	Mature lamellar trabeculae
Osteoblasts	Present lining trabeculae
Calcification	Focal
Atypia	Absent
Final diagnosis	Leiomyoma with osseous metaplasia

Figures

FIGURE 1: ULTRASOUND PELVIS SHOWING POSTERIOR INTRAMURAL FIBROID (FIGO TYPE 4) WITH CALCIFIC/OSSEOUS CHANGE.

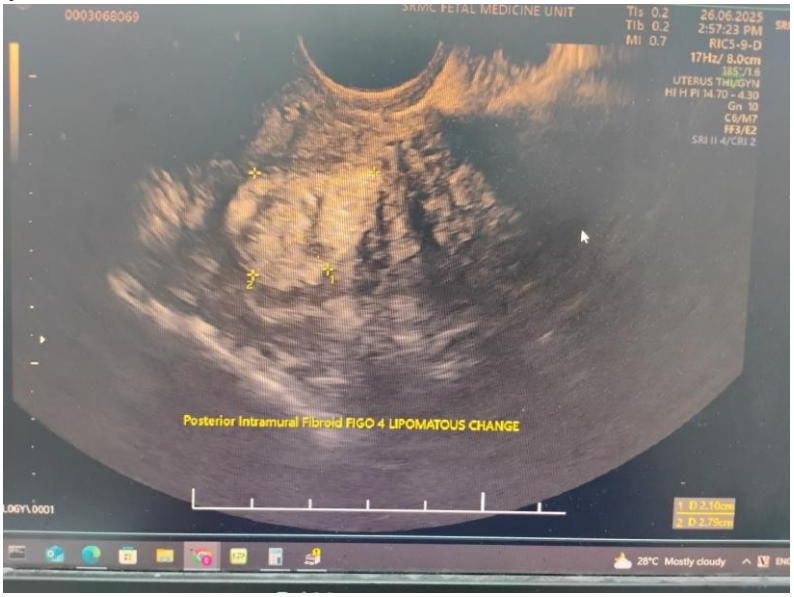


FIGURE 2: GROSS INTRAOPERATIVE SPECIMEN SHOWING ENLARGED UTERUS WITH CALCIFIED INTRAMURAL FIBROID

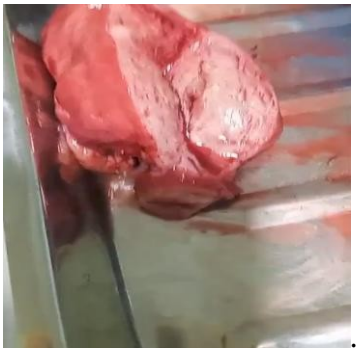


FIGURE 3: PHOTOMICROGRAPH (H&E, ×10) SHOWING TRABECULAE OF BONE WITHIN LEIOMYOMATOUS TISSUE.

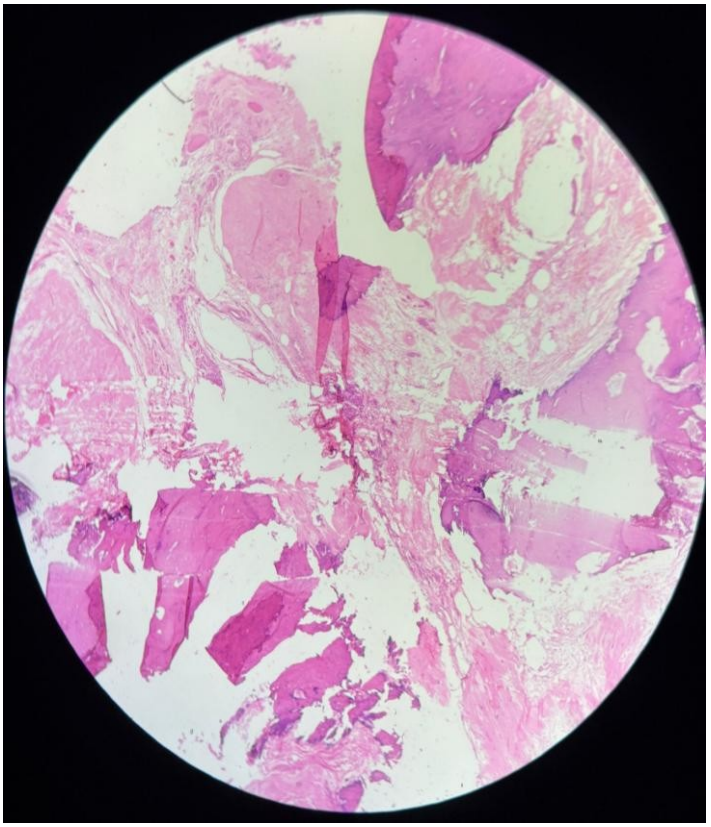


FIGURE 4: PHOTOMICROGRAPH (H&E, ×40) DEMONSTRATING MATURE LAMELLAR BONE LINED BY OSTEOBLASTS.

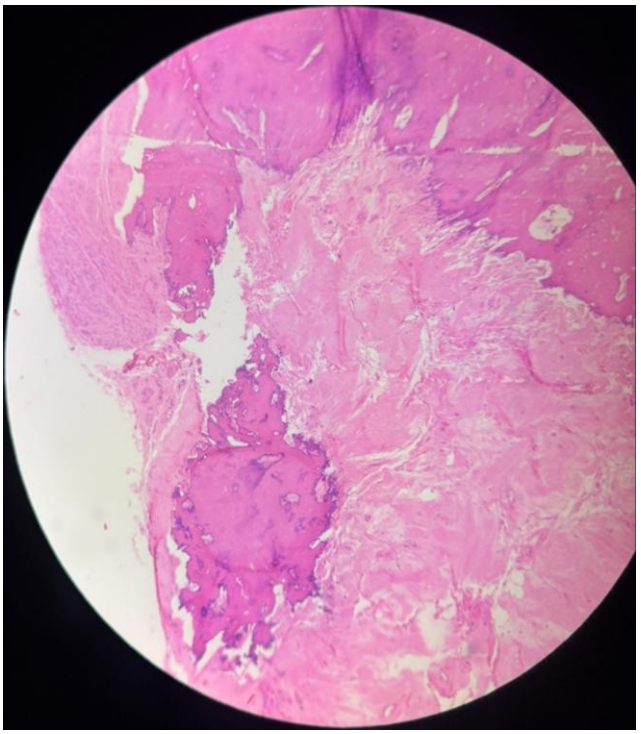
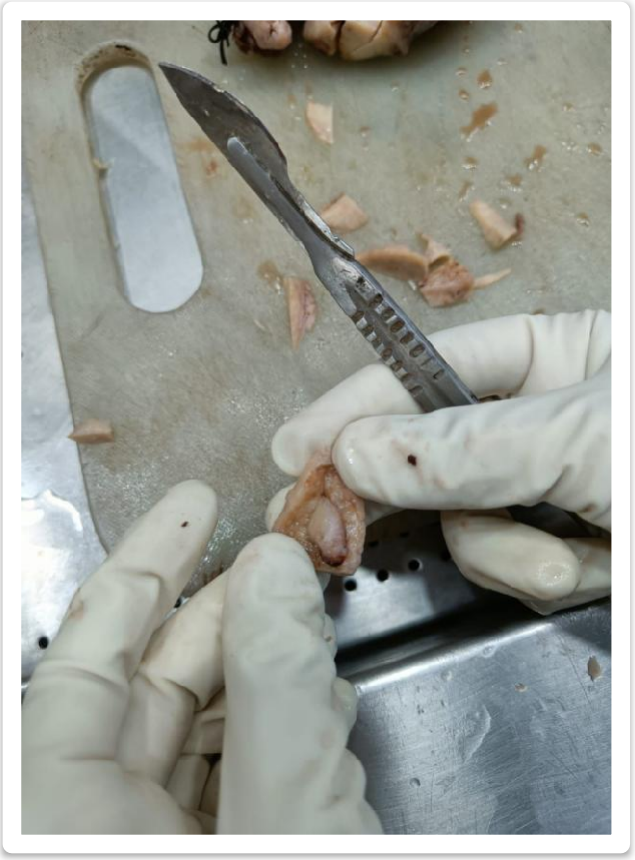


FIGURE 5: INTRAOPERATIVE SECTIONING OF FIBROID SHOWING HARD, WHITISH BONY AREA WITHIN SMOOTH MUSCLE TISSUE.



DISCUSSION

Osseous metaplasia in uterine leiomyoma is a rare phenomenon that reflects an advanced stage of degenerative change within a benign tumor. The first documented case was reported by Von Rokitansky in the 19th century, and only sporadic reports have been published since then [9].

The precise mechanism remains uncertain. Proposed theories include dystrophic calcification secondary to necrosis, chronic ischemia, or metabolic abnormalities in calcium metabolism [10]. Another hypothesis suggests that pluripotent mesenchymal cells or fibroblasts within the myometrium undergo metaplastic transformation into osteoblasts under persistent irritation or hypoxia [11]. In some cases, retained fetal bone following abortion or chronic endometrial inflammation has been implicated, though this mechanism primarily applies to endometrial ossification rather than myometrial lesions [12].

Most cases occur in perimenopausal or postmenopausal women presenting with nonspecific pelvic symptoms. The rarity and nonspecific imaging findings make preoperative diagnosis difficult. Ultrasound may reveal dense echogenic areas with posterior acoustic shadowing, often interpreted as calcification [13]. Computed tomography or MRI can demonstrate high-density areas corresponding to ossification, but histology remains the gold standard [14].

Microscopically, osseous metaplasia must be distinguished from heterologous elements of malignant mixed Müllerian tumors or leiomyosarcomas, which show cellular atypia, mitotic activity, and immature osteoid [15]. In benign metaplasia, bone trabeculae are mature, lined by osteoblasts, and lack atypia or mitosis.

A review of the literature reveals very few similar cases. Yadav et al. reported a case of osseous metaplasia in a fibroid in a 48-year-old woman with similar histopathological findings [16]. Jaiswal et al. described a comparable case in a 52-year-old postmenopausal woman, emphasizing chronic ischemia as the likely trigger [17]. Gadre et al. and Singh et al. have also documented isolated occurrences in postmenopausal women following degenerative transformation [18,19]. These consistent demographics highlight that hormonal withdrawal and vascular insufficiency play central roles in pathogenesis.

Surgical excision remains curative. No recurrence or malignant transformation has been documented. Recognition of osseous metaplasia is essential to prevent misdiagnosis as a malignant mixed tumor or metastatic calcification.

CONCLUSION

Osseous metaplasia within a uterine leiomyoma is an exceedingly rare entity encountered predominantly in postmenopausal women. It likely represents an end-stage degenerative process following chronic ischemia or dystrophic calcification. Diagnosis is histopathological, as radiology alone cannot distinguish ossification from calcification. Awareness of this condition is crucial for pathologists and gynecologists to avoid diagnostic pitfalls. Total hysterectomy remains both diagnostic and therapeutic, with an excellent prognosis.

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