

## Osseous metaplasia of the endometrium: A rare finding in endometrial biopsy

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### ABSTRACT

Endometrial osseous metaplasia is a rare benign condition characterized by the presence of bone within the endometrial cavity. It is an uncommon cause of abnormal uterine bleeding and secondary infertility, often following abortion. We report the case of a 28-year-old female presenting with irregular menstrual bleeding after two consecutive abortions. Ultrasonography suggested osseous metaplasia, and an endometrial biopsy was performed. Histopathological examination revealed well-formed bony trabeculae with hematopoietic elements, without evidence of atypia or malignancy, confirming the diagnosis of endometrial osseous metaplasia. This case emphasizes the pivotal role of histopathology in establishing a definitive diagnosis and excluding important differential diagnoses such as retained fetal bone and malignant endometrial lesions.

**Key words:** Endometrium, Histopathology, Osseous metaplasia

Endometrial osseous metaplasia is a rare clinical entity, with fewer than 100 cases reported in the world literature [1]. It is defined by the formation of mature or immature bone from non-osseous tissue within the endometrium and is distinct from the persistence of embryonic or fetal skeletal tissue [2,3]. Most reported cases occur following abortion and commonly present with secondary infertility [3]. Other clinical manifestations include dysmenorrhea, abnormal uterine bleeding, pelvic pain, dyspareunia, vaginal discharge, and occasional spontaneous passage of bony fragments. The broad morphological spectrum of endometrial lesions makes accurate diagnosis a continuing challenge in gynecological pathology. Recent studies have highlighted endometrial osseous metaplasia as a potentially reversible cause of infertility, with favorable outcomes following appropriate management [3]. Hysteroscopic evaluation with removal of osseous tissue has been shown to be both diagnostic and therapeutic, facilitating restoration of normal endometrial architecture. Definitive diagnosis, however, relies on histopathological examination, which remains essential for confirmation and for exclusion of mimickers such as retained fetal bone and malignant endometrial lesions [1,3].

### CASE REPORT

A 28-year-old female (PIL1A2) presented to the obstetrics and gynecology outpatient department

with complaints of irregular menstrual bleeding for 3 months, associated with lower abdominal pain. She had been married for 5 years and had a history of one lower-segment cesarean section 3 years prior, followed by two consecutive abortions at a period of gestation of 8 and 18 weeks, respectively. As per the patient, both were managed by suction and evacuation at a private facility. Histopathological examination of the products of conception was not performed, with no other medical record available for review. Menarche occurred at 14 years of age, and her menstrual cycles had previously been regular. There was no history of medical comorbidities or chronic illness.

General physical examination and bimanual pelvic examination were unremarkable. Routine hematological investigations were within normal limits. Transvaginal ultrasonography revealed an anteverted, normal-sized uterus. A linear echogenic focus with minimal posterior acoustic shadowing was noted within the endometrial cavity, measuring approximately  $4.0 \times 0.7$  cm, suggestive of endometrial osseous metaplasia. Both ovaries appeared normal, with no free fluid seen in the cul-de-sac.

The patient subsequently underwent hysteroscopic evaluation and removal of the calcified fragments. Histopathological evaluation of the endometrial biopsy was done. On gross examination, multiple tan-white soft tissue fragments measuring  $1.5 \times 1$  cm in aggregate were received.

H&E-stained section examined from the received biopsy revealed multiple fragments of mature bony trabeculae

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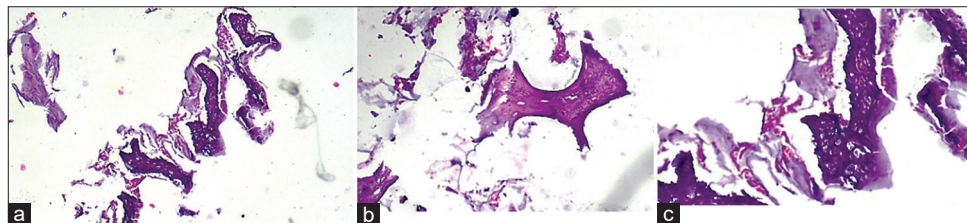
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**Figure 1:** (a) H and E stain ( $\times 4$ ) showing fragments of mature bony trabeculae. (b and c) H and E stain ( $\times 10$ ) showing bony trabeculae containing marrow elements with hematopoietic cells and focal hemorrhage

within the endometrial stroma (Fig. 1). The trabeculae showed marrow elements with hematopoietic cells and focal hemorrhage (Fig. 2). No cytological atypia or malignant features were identified. In addition, one focus showed ectocervical tissue lined by stratified squamous epithelium along with a few endocervical glands. These findings were consistent with endometrial osseous metaplasia.

The histopathological findings were communicated to the treating gynecology team, following which the patient underwent appropriate management and subsequently showed symptomatic improvement, with resolution of abnormal uterine bleeding on follow-up.

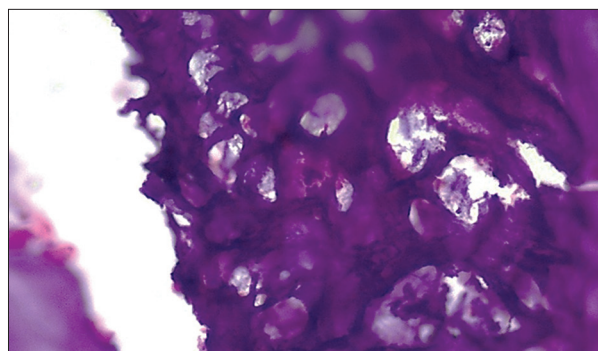
## DISCUSSION

Endometrial osseous metaplasia is a rare benign condition characterized by the presence of bone tissue within the endometrial cavity and is an uncommon cause of abnormal uterine bleeding and infertility [1,3,4]. Only a limited number of cases have been reported in the literature, which may contribute to its under-recognition in routine gynecological practice [1,5]. It is most often seen in women of reproductive age and is frequently associated with a prior history of abortion or uterine instrumentation, as noted in the present case [1,3,4].

Endometrial metaplasia involves the replacement of normal epithelial or stromal elements by cell types not typically present at this site. While epithelial metaplasias are relatively common, stromal metaplasias such as osseous change are rare and may pose diagnostic challenges by mimicking malignant lesions due to their unusual histological appearance [6]. According to the World Health Organization classification, osseous metaplasia is categorized under non-epithelial endometrial metaplastic changes [1].

The etiopathogenesis of endometrial osseous metaplasia remains unclear, with several hypotheses proposed [1,3]. A widely accepted theory suggests metaplastic differentiation of endometrial stromal cells into an osteoblastic lineage in response to chronic inflammation, hormonal imbalance, or tissue injury [1,3,6]. Another hypothesis attributes the condition to retained fetal skeletal fragments following abortion [2,4]. However, the presence of well-formed lamellar bone without associated fetal tissue in many cases supports true osseous metaplasia rather than retained fetal bone [1,3,7].

An important differential diagnosis of endometrial osseous metaplasia is retained fetal bone following prior



**Figure 2:** H and E stain ( $\times 40$ ) showing bony trabeculae in the endometrial stroma

abortion. While retained fetal bone represents persistence of fetal skeletal elements, osseous metaplasia is thought to arise from metaplastic transformation of endometrial stromal cells, often in the setting of chronic inflammation. Histopathological evaluation helps in distinguishing these entities, with the absence of fetal tissue favoring osseous metaplasia, as observed in the present case [8].

Clinically, secondary infertility is the most common presentation, as osseous fragments act as a mechanical barrier to implantation, similar to an intrauterine contraceptive device [1,4,6]. Other symptoms include abnormal uterine bleeding, dysmenorrhea, pelvic pain, dyspareunia, vaginal discharge, and spontaneous expulsion of bony fragments [3-5]. The clinical features observed in the present case are consistent with previously reported cases [1,3,5].

Ultrasonography is often the initial diagnostic modality, demonstrating hyperechoic areas within the endometrial cavity with posterior acoustic shadowing [2,7]. Nevertheless, histopathological examination remains the gold standard for diagnosis [1,3]. Microscopy typically reveals mature bony trabeculae within the endometrial stroma, occasionally containing hematopoietic elements, with the absence of cytological atypia, thereby excluding malignant entities such as malignant mixed Müllerian tumors [1,3,6].

Hysteroscopic removal of osseous fragments is the treatment of choice and allows complete excision under direct visualization [2,6,7]. Most patients show symptomatic improvement and restoration of normal endometrial architecture, with several studies documenting successful conception following treatment, confirming the reversible nature of infertility associated with this condition [4,6,7]. Recent literature further supports that endometrial osseous metaplasia is a reversible cause of infertility, with hysteroscopic

removal leading to restoration of fertility in a significant proportion of cases, highlighting the importance of early diagnosis and management [9].

Early recognition and appropriate management are essential to prevent prolonged symptoms and unnecessary infertility investigations [1,3,6]. Endometrial osseous metaplasia should therefore be considered in the differential diagnosis of abnormal uterine bleeding or infertility, particularly in women with a history of abortion [1,3,4].

## CONCLUSION

Endometrial osseous metaplasia is a rare but clinically significant benign endometrial pathology. Accurate histopathological identification of bony trabeculae within the endometrium is essential to confirm the diagnosis and differentiate it from retained fetal bone and malignant conditions. Recognition of this entity by pathologists is crucial, as appropriate management can result in symptom resolution and restoration of normal endometrial function.

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