

Uterine carcinosarcoma with heterologous osteosarcomatous differentiation: a case report

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Case Report

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Abstract

Background Uterine carcinosarcoma is a rare biphasic malignant tumor, and the subtype with heterologous osteosarcomatous differentiation is exceedingly uncommon, making preoperative diagnosis challenging.

Case Presentation We report the case of a 72-year-old postmenopausal woman who presented with vaginal bleeding. Transvaginal ultrasonography revealed a hypoechoic nodule within the uterine cavity, containing irregular calcified foci and punctate blood flow signals. She subsequently underwent hysteroscopic resection of the lesion with removal of the intrauterine device. Postoperative histopathology and immunohistochemistry supported a diagnosis of uterine carcinosarcoma with heterologous osteosarcomatous differentiation. To exclude a primary bone tumor and to evaluate the extent of disease, bone scintigraphy and pelvic magnetic resonance imaging were performed, followed by definitive surgical treatment. The final pathological stage was FIGO IA. Adjuvant chemotherapy with nab-paclitaxel plus carboplatin was administered. No definite evidence of recurrence or metastasis was identified during 6 months of follow-up.

Conclusions This case suggests that uterine carcinosarcoma with heterologous osteosarcomatous differentiation, although rare, should be included in the differential diagnosis in postmenopausal women with abnormal uterine bleeding when ultrasonography shows an intrauterine mass with irregular calcified foci and blood flow signals, and when hysteroscopic findings suggest a malignant lesion with osseous components. Definitive diagnosis still relies on pathological examination, whereas MRI and bone scintigraphy may assist in preoperative evaluation and differential diagnosis.

Introduction

Uterine carcinosarcoma (UCS), also known as malignant mixed Müllerian tumor (MMMT), is a rare biphasic malignant neoplasm composed of both epithelial and mesenchymal malignant components, accounting for only 2%-5% of all uterine malignancies [1]. According to the origin of the sarcomatous component, UCS can be classified into two subtypes: homologous and heterologous. The heterologous subtype contains elements not native to the uterus, such as rhabdomyosarcoma, chondrosarcoma, and osteosarcoma, among which osteosarcomatous differentiation is particularly rare [2]. The presence of heterologous sarcomatous elements has been associated with poorer survival outcomes [2–4].

We report a case of UCS with heterologous osteosarcomatous differentiation. In addition to the rarity of its pathological subtype, this case is notable for the presence of preoperative ultrasonographic clues and a relatively complete preoperative diagnostic workup, including hysteroscopic biopsy, MRI, and bone scintigraphy. In conjunction with a review of the relevant literature, we focus on the ultrasonographic features, pathological diagnostic points, and differential diagnostic considerations of this rare subtype.

Case Presentation

A 72-year-old woman, who had been menopausal for 22 years, presented with vaginal bleeding for 1 week after menopause. She had no history of hypertension, diabetes mellitus, heart disease, or other chronic illnesses. Her obstetric history was gravida 3, para 2, and she had no family history of malignancy. A timeline of the diagnostic and therapeutic course is shown in Fig. 1.

Transvaginal ultrasonography showed a retroverted uterus with a hypoechoic nodule in the uterine cavity measuring approximately 1.7 cm × 1.1 cm × 1.8 cm. The lesion had an indistinct border with the myometrium and a relatively regular shape. Irregular calcified foci were noted within the lesion. Color Doppler Flow Imaging (CDFI) demonstrated punctate blood flow signals within the nodule. A small amount of fluid was observed around the lesion, and the intrauterine device appeared to be in an approximately normal position. Based on the clinical and imaging findings, a malignant lesion could not be excluded, and further evaluation was recommended (Fig. 2).

The patient then underwent hysteroscopic endometrial lesion resection and removal of the intrauterine device under general anesthesia. Intraoperatively, an oval mass measuring approximately 2.0 cm × 1.5 cm was identified on the left posterior wall of the uterine cavity, with a stalk measuring about 0.2 cm in width. The lesion was completely resected and submitted for pathological examination. Histopathology and immunohistochemistry demonstrated that the tumor consisted of malignant epithelial and malignant mesenchymal components. The epithelial component expressed CK (AE1/AE3), ER, and PR, supporting a high-grade endometrioid carcinoma component. The sarcomatous component showed positive SATB2 expression, and hematoxylin and eosin staining demonstrated direct tumor osteoid formation, supporting osteosarcomatous differentiation. Mismatch repair proteins (MLH1, MSH2, MSH6, and PMS2) were positive in both the epithelial and sarcomatous components. Based on the morphologic and immunohistochemical findings, the lesion was diagnosed as carcinosarcoma with heterologous osteosarcomatous differentiation (high-grade endometrioid adenocarcinoma plus osteosarcoma) (Fig. 3).

Because the pathological findings suggested an osteosarcomatous component, bone scintigraphy was performed to exclude a primary bone tumor or other osseous lesions. No evidence of a primary bone tumor was identified (Fig. 4). Pelvic MRI was then performed to further evaluate the local extent of disease and the depth of myometrial invasion. MRI revealed focal thickening of the endometrium with slightly prolonged T1- and T2-weighted signals, slightly high signal intensity on fat-suppressed sequences, restricted diffusion on diffusion-weighted imaging (DWI), low signal intensity on the apparent diffusion coefficient (ADC) map, and mild enhancement after contrast administration. Decreased enhancement was noted in the posterior uterine wall, and the intrauterine signal was heterogeneous with uneven enhancement, which was considered likely related to postoperative hysteroscopic change. The depth of myometrial invasion was less than one-half of the myometrial thickness. A small amount of pelvic fluid and multiple pelvic lymph nodes were also seen (Fig. 5).

The patient subsequently underwent laparoscopic total hysterectomy, bilateral salpingo-oophorectomy, pelvic lymphadenectomy, para-aortic lymph node dissection, omentectomy, and peritoneal biopsy under

general anesthesia. Final pathology confirmed uterine carcinosarcoma with heterologous osteosarcomatous differentiation. The tumor invaded less than half of the myometrial thickness and did not involve the endocervical canal. No definite lymph node metastasis, neural invasion, or lymphovascular invasion was identified. The pathological stage was FIGO IA. Postoperatively, the patient received adjuvant chemotherapy with nab-paclitaxel 300 mg plus carboplatin 300 mg. During 6 months of follow-up, no definite recurrence or metastasis was observed.

Discussion

Uterine carcinosarcoma is a rare and highly aggressive biphasic malignant tumor, and cases with heterologous osteosarcomatous differentiation are even rarer [1, 5]. As shown in Table 1, previously reported cases have mainly focused on young age at onset, unusual metastatic patterns, or special pathological components, whereas comprehensive descriptions of preoperative ultrasonographic findings, pathological clues, and differential diagnostic strategies remain limited. Compared with previous reports, the present case is notable in that it not only documented the ultrasonographic appearance of an intrauterine mass with calcification and blood flow signals, but also presented a relatively complete diagnostic process integrating hysteroscopic pathology, MRI, bone scintigraphy, and final postoperative pathology.

Table 1
Comparison of previously reported cases and the present case

Reference	Age/Initial presentation	Preoperative findings	Pathological and immunohistochemical findings	Main features
Al Dallal et al.,2025	31 years; irregular menstruation and postcoital bleeding	Preoperative D&C suggested high-grade endometrioid carcinoma with heterologous osseous elements	Uterine carcinosarcoma, approximately 60% high-grade endometrioid carcinoma, approximately 40% spindle cells with heterologous osseous components; SATB2 is positive	Young age at presentation and rarity of this subtype
Asfer et al.,2024	74 years; postmenopausal bleeding for 7 months and abdominal pain	Initial ultrasound showed endometrial thickening of 15mm; repeat ultrasound showed a central uterine mass with calcification and blood flow; D&C and biopsy initially favored high-grade endometrial stromal sarcoma	High-grade uterine carcinosarcoma, with heterologous components including osteosarcoma and chondrosarcoma, myometrial invasion > 1/2, FIGO stage II	Ultrasound manifestations show an evolution process from endometrial thickening to uterine cavity mass, with calcification and blood flow signals appearing inside the mass; Preoperative pathological misclassification
Sun et al.,2024	55 years; postmenopausal bleeding	Ultrasound shows a mass of approximately 25mm x 15mm in the uterine cavity, with unclear boundaries	Endometrioid adenocarcinoma with osteosarcoma; SATB2 positive	Suggested a possible association between nulliparity and UCS; reported SATB 2-positive osteosarcomatous differentiation
Amin et al.,2023	59 years; pulmonary malignant lesion as the initial manifestation	The initial diagnosis was endometrial serous carcinoma. Later, samples were collected again due to osteosarcoma-like lesions in the lungs, and bone	Uterine carcinosarcoma with osteosarcoma components	Pulmonary lesion as the initial presentation; emphasized the need to exclude a primary bone tumor

Reference	Age/Initial presentation	Preoperative findings	Pathological and immunohistochemical findings	Main features
		scintigraphy showed no evidence of primary bone tumors		
Present case	72 years; postmenopausal bleeding for 1 week	Transvaginal ultrasound indicates a mass-type lesion in the uterine cavity, with irregular calcification and blood flow signals inside; further evaluation is conducted via hysteroscopic pathology, MRI and bone scintigraphy	Uterine carcinosarcoma with osteosarcoma components, SATB2 positive, FIGO stage IA	Provided a relatively complete preoperative ultrasonographic, hysteroscopic, pathological, and differential diagnostic workup

The ultrasonographic features of UCS with heterologous osteosarcomatous components have rarely been described, and the available findings are generally nonspecific. In the case reported by Asfer et al., the initial transvaginal ultrasound showed only endometrial thickening, whereas repeat ultrasonography demonstrated a central uterine mass with calcification and blood flow signals, suggesting a possible evolution from nonspecific endometrial thickening to a mass-forming lesion [6]. In the case reported by Sun et al., the lesion appeared as an ill-defined intrauterine mass [7]. In our case, ultrasonography demonstrated a mass-forming intrauterine lesion with irregular calcified foci and internal blood flow signals. Correlation with the postoperative pathological findings suggests that these irregular calcified foci may be related to osseous or osteosarcomatous components; however, because of the limited number of reported cases, this imaging-pathology correlation requires further confirmation.

This case suggests that in postmenopausal women with abnormal uterine bleeding, UCS with heterologous osteosarcomatous differentiation should be considered in the differential diagnosis when ultrasonography reveals an intrauterine mass with irregular calcified foci and blood flow signals. At the same time, endometrial calcification is not specific for malignancy and may also occur in benign conditions, especially endometrial osseous metaplasia [8, 9]. Therefore, pathological evaluation and, when necessary, systemic imaging are still required for differential diagnosis.

Pathological examination remains the cornerstone for the diagnosis of this tumor. The essential pathological feature of uterine carcinosarcoma is the coexistence of malignant epithelial and malignant mesenchymal components, and recognition of heterologous osteosarcomatous differentiation is

important for final classification. Previous reports have shown that limited preoperative sampling may lead to misdiagnosis because of incomplete representation of the tumor. For example, the case reported by Asfer et al. was initially interpreted as high-grade endometrial stromal sarcoma [6], while the case reported by Amin et al. was initially diagnosed as endometrial serous carcinoma and only later reclassified after repeat sampling prompted by an osteosarcoma-like lung lesion [10]. In the present case, hysteroscopic pathology had already suggested a malignant lesion with an osteosarcomatous component, and the final surgical specimen subsequently confirmed the biphasic architecture.

From an immunohistochemical perspective, positive SATB2 expression may support osseous or osteosarcomatous differentiation [11]. However, SATB2 is not entirely specific and may also be expressed in non-osteosarcomatous components [12]. Therefore, the gold standard for diagnosing osteosarcomatous differentiation remains the histomorphological identification of neoplastic osteoid or tumor bone formation [13, 14], interpreted together with epithelial markers and immunohistochemical results such as SATB2 [15].

When preoperative sampling is limited, the differential diagnosis of this subtype can be challenging. It should be distinguished from high-grade endometrial stromal sarcoma, other high-grade uterine malignancies, and certain dedifferentiated tumors [16–18]. When osseous or osteosarcomatous elements are present, benign osseous metaplasia and primary or metastatic bone tumors should also be considered. Reported cases have shown that postmenopausal endometrial osseous metaplasia may also appear as a hyperechoic lesion with posterior acoustic shadowing on ultrasound, and hysteroscopy may reveal osseous tissue, creating potential confusion with osteosarcoma or other mesenchymal malignancies [9]. In addition, the case reported by Amin et al. initially presented as a pulmonary osteosarcoma-like lesion, and only after bone scintigraphy excluded a primary bone tumor was the diagnosis of UCS further supported [10].

In our case, after ultrasonography revealed an intrauterine mass with irregular calcification, hysteroscopic pathology, MRI, and bone scintigraphy were sequentially integrated to complete the differential diagnostic workup. This emphasizes the importance of a diagnostic pathway that combines imaging, pathology, and systemic evaluation in the management of such rare lesions.

Conclusions

This case adds to the limited literature by providing a relatively complete account of the preoperative diagnostic process and differential diagnostic considerations for this rare subtype. Clinically, it suggests that when postmenopausal women with abnormal uterine bleeding show an intrauterine mass with irregular calcified foci and blood flow signals on ultrasonography, this rare tumor should be considered, and early diagnosis should be pursued through hysteroscopic sampling, pathological assessment, and, when necessary, systemic imaging.

The main limitation of this report is that it describes only a single case. In addition, pelvic MRI was performed after hysteroscopic resection of the primary lesion, and therefore complete preoperative MRI

data of the lesion were not available. Moreover, the follow-up period was relatively short, and the long-term prognosis requires further observation.

Abbreviations

ADC
Apparent diffusion coefficient
CDFI
Color Doppler flow imaging
DWI
Diffusion-weighted imaging
FIGO
International Federation of Gynecology and Obstetrics
HE
Hematoxylin and eosin
IHC
Immunohistochemistry
MRI
Magnetic resonance imaging
UCS
Uterine carcinosarcoma

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Suining Central Hospital (KYLLMC20260041).

Consent for publication

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

Availability of data and materials

No data was used for the research described in the article.

Competing interests

The authors declare that they have no competing interests.

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No funding was received for this study.

Authors' contributions

S. Chang and R. Yang conceived the study; S. Chang and J. Zhao collected the clinical data; L. Zhou and C. Tang curated the data; S. Chang and J. Zhao drafted the manuscript; R. Yang critically revised the manuscript; L. Zhou and C. Tang prepared the figures; R. Yang supervised the study. All authors have read and agreed to the published version of the manuscript.

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Figures

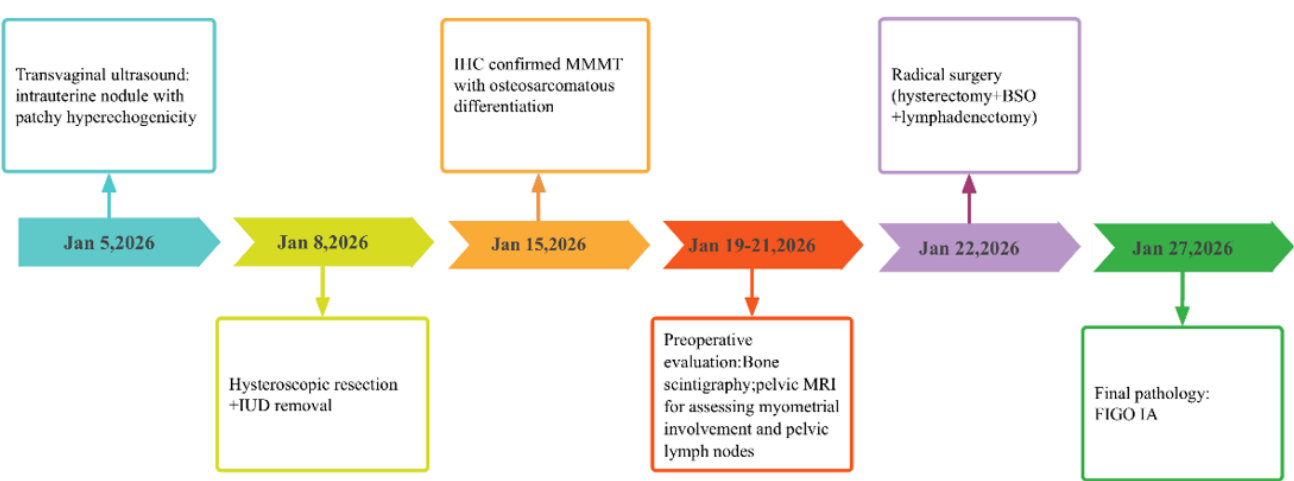


Figure 1

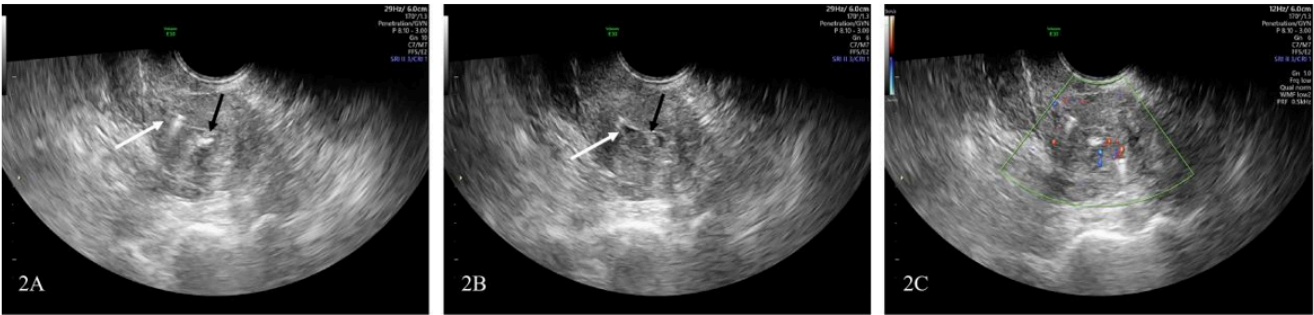


Figure 2

Ultrasonographic images. A: hypoechoic nodule in the uterine cavity with irregular calcified foci (black arrow) and an intrauterine device (white arrow). B: small amount of fluid surrounding the lesion (white arrow indicates fluid; black arrow indicates the hypoechoic nodule). C: CDFI showing punctate blood flow signals within the lesion.

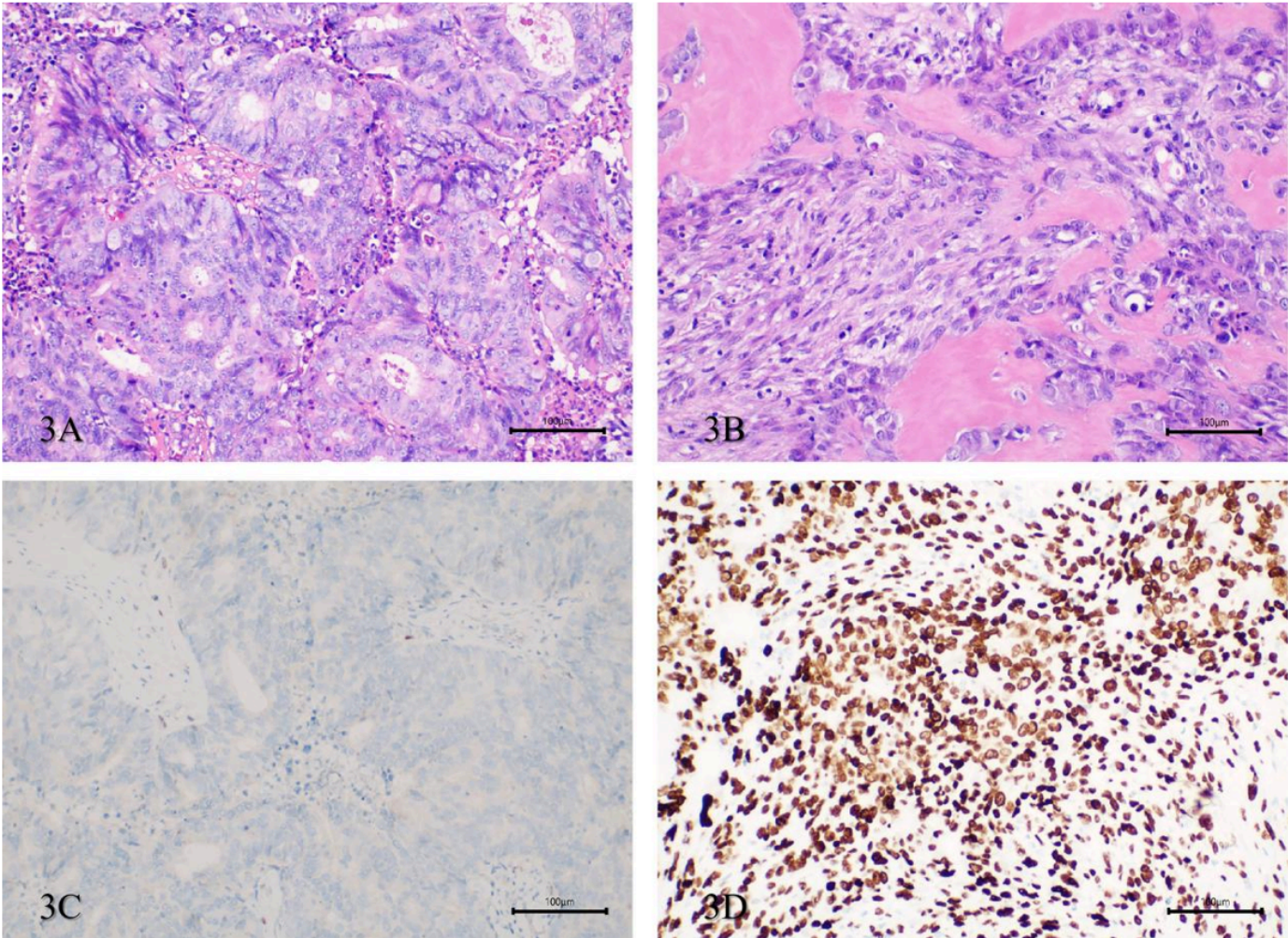


Figure 3

Histopathological and immunohistochemical findings. A: high-grade endometrioid adenocarcinoma component, HE ×200. B: osteosarcomatous component, HE ×200. C: SATB2 negative in the high-grade endometrioid adenocarcinoma component, ×200. D: SATB2 positive in the osteosarcomatous component, ×200

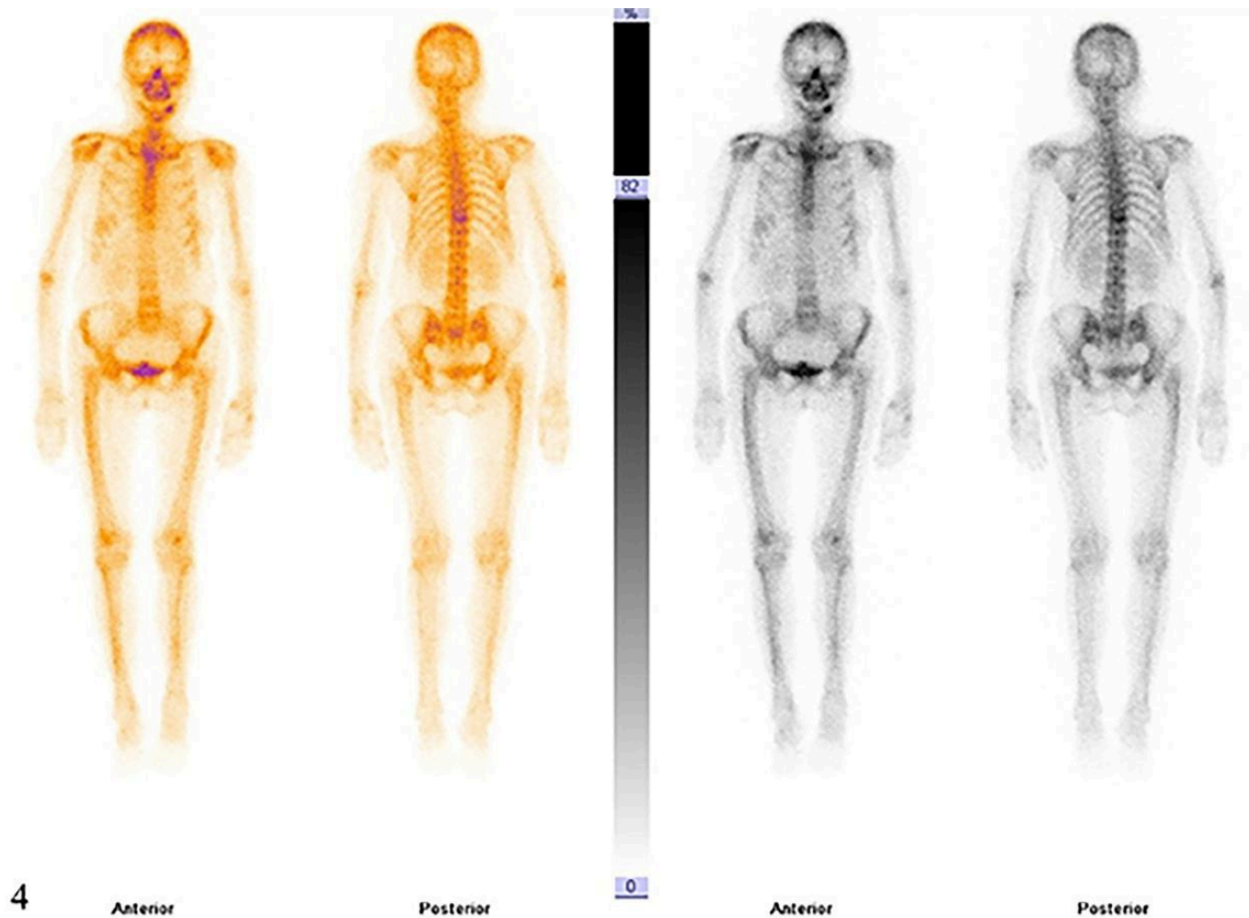


Figure 4
bone scintigraphy showing no definite abnormal osseous radiotracer uptake

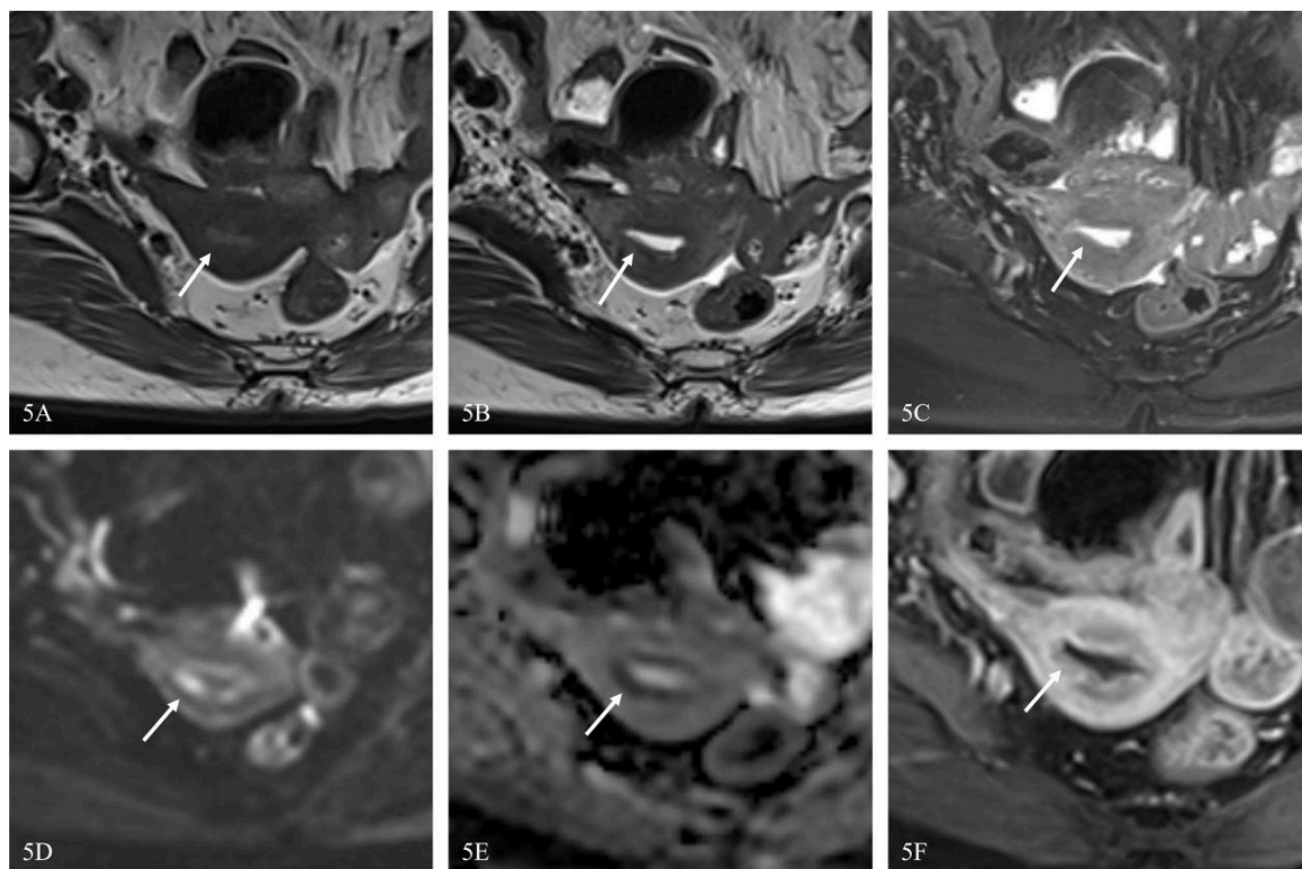


Figure 5

Pelvic MRI findings. A: T1WI. B: T2WI. C: T2WI-FS. D: DWI. E: ADC. F: contrast-enhanced T1WI. Focal thickening of the endometrium is seen, showing slightly prolonged T1- and T2-weighted signals, slightly high signal intensity on fat-suppressed images, restricted diffusion on DWI, low signal intensity on ADC, and mild post-contrast enhancement.