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ORIGINAL ARTICLE

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ABOUT COVER

Peer Reviewer of *World Journal of Clinical Cases*, Madhukar Mittal, FACE, MBBS, MD, Professor, Endocrinology and Metabolism, All India Institute of Medical Sciences Jodhpur, Jodhpur 342005, India. mittalspace@gmail.com

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CASE REPORT

Endometrial carcinoma with cervical stromal invasion: Three case reports

Ming-Ming Liu, Yu-Ting Liang, Er-Hu Jin

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Ming-Ming Liu, Er-Hu Jin, Department of Radiology, Beijing Friendship Hospital, Capital Medical University, Beijing 100050, China

Ming-Ming Liu, Yu-Ting Liang, Department of Radiology, Beijing Obstetrics and Gynecology Hospital, Capital Medical University, Beijing Maternal and Child Health Care Hospital, Beijing 100006, China

Co-corresponding authors: Yu-Ting Liang and Er-Hu Jin.

Corresponding author: Er-Hu Jin, MD, Doctor, Department of Radiology, Beijing Friendship Hospital, Capital Medical University, No. 95 Yongan Road, Xicheng District, Beijing 100050, China. erhujin@ccmu.edu.cn

Abstract

BACKGROUND

Endometrial cancer is a kind of well-known tumors of female genitourinary system. Cervical stromal invasion is an adverse factor for poor prognosis of endometrial cancer. There is still controversy regarding the use of magnetic resonance imaging (MRI) in the diagnosis of cervical stromal invasion of endometrial cancer. The diagnosis of cervical stromal invasion varies significantly between different observers and institutions. We present a limited case series of the particular pattern of endometrial cancer, which infiltrates the cervical stroma and is often overlooked.

CASE SUMMARY

We present three cases of endometrial carcinoma with cervical stromal invasion with cancer-free uterine cavity. One patient, a reproductive-aged woman, exhibited irregular menstruation and was diagnosed with endometrial polyps by hysteroscopy and segmental curettage. A MRI scan revealed polypoid nodules within the internal cervical orifice. The other two cases were postmenopausal women who presented with abnormal vaginal bleeding. Hysteroscopy and segmental curettage suggested atypical hyperplasia of the endometrium. MRI scans did not detect any malignant signs in the endometrium. In one case, a non-thickened endometrium was observed, while in another, hyperplasia of the endometrium was seen. Notably, none of these patients had malignant tumors identified in the uterine cavity *via* MRI scans. However, postoperative pathological results following hysterectomy consistently indicated cervical stromal invasion.

CONCLUSION
Cervical stromal invasion is easily missed if no cancer is found in the uterine body on MRI. Immunohistochemistry of endoscopic curettage specimens should be conducted to avoid underestimation of the disease.

Key Words: Endometrial carcinoma; Cervical stromal invasion; Atypical hyperplasia of the endometrium; Magnetic resonance imaging; Case report

Core Tip: We focus on endometrial carcinoma with cervical stromal invasion, given its correlation with reduced 5-year survival rates and heightened lymph node metastasis risk in patients diagnosed with endometrial cancer. Patients with cervical stromal invasion are required to have a total hysterectomy and lymphadenectomy. In contrast, they only require a total hysterectomy. In instances of endometrial carcinoma that involves the cervix but lacks an apparent primary uterine body tumor, magnetic resonance imaging examinations should be performed with greater caution to prevent potential misdiagnoses.

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INTRODUCTION

Endometrial cancer is known as a malignant tumor, and predominantly occurs women aged over 50 years, with a proportion of cases (4%) occurring in individuals under 40 years[1]. Magnetic resonance imaging (MRI) is important for preoperative evaluation of endometrial cancer, which can accurately evaluate prognostic indicators, and this information can aid clinicians in devising tailored treatment strategies[2,3]. The discovery of cervical stromal invasion by MRI may have many challenges, including difficulty in identifying the boundary between cervix and uterine body, and difficulty in distinguishing between cervical stroma and mucosa infiltration[4]. Nonetheless, an accurate evaluation of cervical stromal involvement is crucial for determining accurate staging, prognosis, and the necessity for adjuvant therapy. We report the results in the context of clinical practice that endometrial cancer involving cervical stroma without obvious lesions in the uterine cavity, and highlight what contribution this study adds to the literature already existing on the topic and to future study perspectives.

CASE PRESENTATION

Chief complaints

Case 1: A 48-year-old female patient had been experiencing intermittent vaginal bleeding for five years.

Case 2: A 44-year-old female patient experienced irregular menstruation for one year.

Case 3: A 64-year-old female patient had persistent abnormal vaginal bleeding for 10 days.

History of present illness

Case 1: Six years after menopause, the patient experienced five years of intermittent vaginal bleeding without abdominal pain and fever. Ultrasound examination indicated a thickened endometrium.

Case 2: This patient of childbearing age, with regular menstruation, and no dysmenorrhea, in the previous year, her period was advanced by seven days, with a large amount of blood accompanied by clots.

Case 3: This patient who had been postmenopausal for 20 years, presented with vaginal bleeding that was initially observed eight years previously and had not been treated. The vaginal bleeding recurred ten days ago.

History of past illness

Case 1 and 2: No previous health conditions.

Case 3: This patient had a 1 year history of diabetes, and used 6-9 U subcutaneous insulin and took 0.5 g metformin orally three times daily. The fasting blood glucose was controlled at 6.1-6.9 mmol/L.

Personal and family history

All three patients did not have a history of smoking or alcohol abuse. They were no family history of the disease.

Physical examination

The vulva in these patients was normal. The vaginal mucosa exhibited smoothness, and the surface of the cervical region was also smooth. No masses were palpated in the pelvis, and no tenderness was detected within the pelvic cavity.

Laboratory examinations

Human papilloma virus, thinprep cytologic test were normal in all patients.

Imaging examinations

Case 1: Ultrasonography revealed that the endometrium was approximately 1.0 cm thick. Hysteroscopy indicated atypical hyperplasia of the endometrium. MRI (Figure 1) demonstrated an endometrium of similar thickness, with slightly elevated signals in both T2-weighted imaging (T2WI) (Figure 1A) and diffusion weighted imaging (DWI) (Figure 1B) images. Enhanced scans (Figure 1C) revealed uneven enhancement of the endometrium, clearly demarcated from the muscle layer. Multiple small cysts were observed in the upper segment of the cervix, arranged in clusters.

Case 2: Ultrasonography revealed that the endometrium was approximately 1.2 cm thick, with a distinct 1.8 cm polypoid nodule detected in the cervical canal. MRI examination indicated an endometrial thickness of 0.8 cm without obvious abnormalities. Nodules were identified within the isthmus of the uterus (Figure 2), extending into the cervical canal, with a diameter of 1.8 cm, which were considered to be endometrial polyps. The signal and enhancement characteristics of the endometrial polyps were similar to those of the endometrium.

Case 3: Ultrasonography indicated that the endometrium was approximately 0.4 cm thick. MRI findings revealed hydrops of the uterus. The endometrium was thin (Figure 3). Uterine effusion showed a high signal on T2WI (Figure 3A), higher signal on DWI (Figure 3B), but no enhancement (Figure 3C). Additionally, uneven signals were observed in the myometrium and upper region of the cervix, which were attributed to compression of the hydrops in the uterus.

FINAL DIAGNOSIS

Case 1

Renal-type adenocarcinoma in the endometrium, with cancerous tissue infiltrating less than 1/2 of the myometrium and down into the intercervical stroma (less than 1/2 wall thickness). The median renal-type adenocarcinoma involved both sides of the ovarian surface.

Case 2

Uterine sub-endometrial polyps, adenocarcinoma alterations, high-moderate differentiation, and infiltration of the myometrium at a depth less than half of the myometrial thickness. Additionally, the cancer foci were situated within the superficial layer of the cervix.

Case 3

Endometrial cancer Type II, serous carcinoma, focal clear cell carcinoma, invasive to the myometrium greater than 1/2 wall thickness, with visible vascular tumor thrombus, involving the cervical stroma (about 1/2 wall thickness).

TREATMENT

Case 1

The patient was treated by total hysterectomy, bilateral salpingo-oophorectomy, pelvic lymphadenectomy, and para-aortic lymph node dissection. Postoperative radiotherapy and chemotherapy were performed.

Case 2

The patient was treated by total hysterectomy, followed by postoperative radiotherapy.

Case 3

The patient was treated by total hysterectomy, followed by postoperative radiochemotherapy.

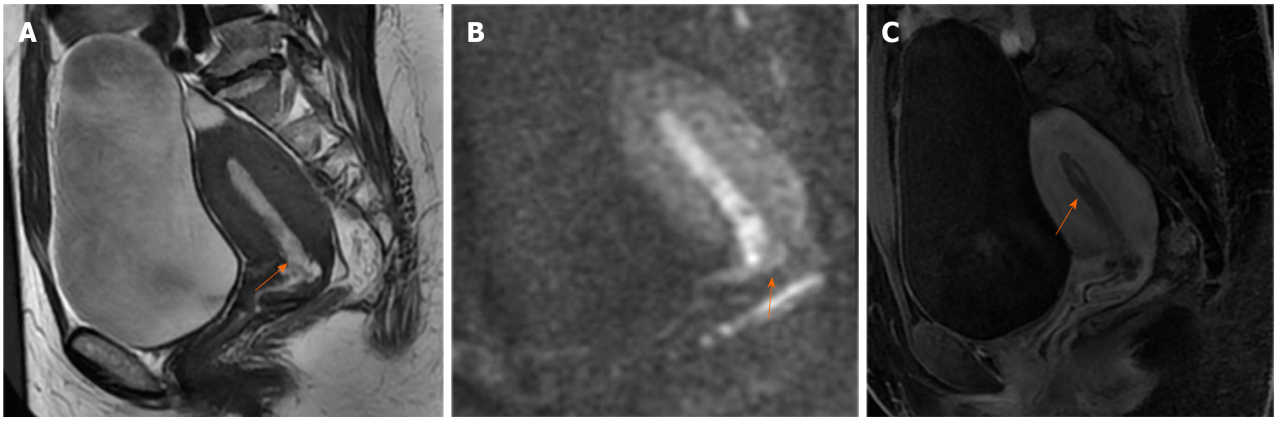

Figure 1 Endometrial carcinoma involving the cervical stroma in Case 1. A: On the T2WI image, the endometrium appears slightly thickened and extends downwards into the intra-cervical inlet area (arrow), showing a clear boundary with the cervix. The mucosa within this region exhibits a cyst; B: On the diffusion weighted imaging image, no obvious hyperintensity is evident in the endometrium, while the endocervical stroma appears hypointense (arrow); C: On the enhanced image, the endometrium does not exhibit uniform enhancement, with a distinct demarcation from the muscle layer (arrow).

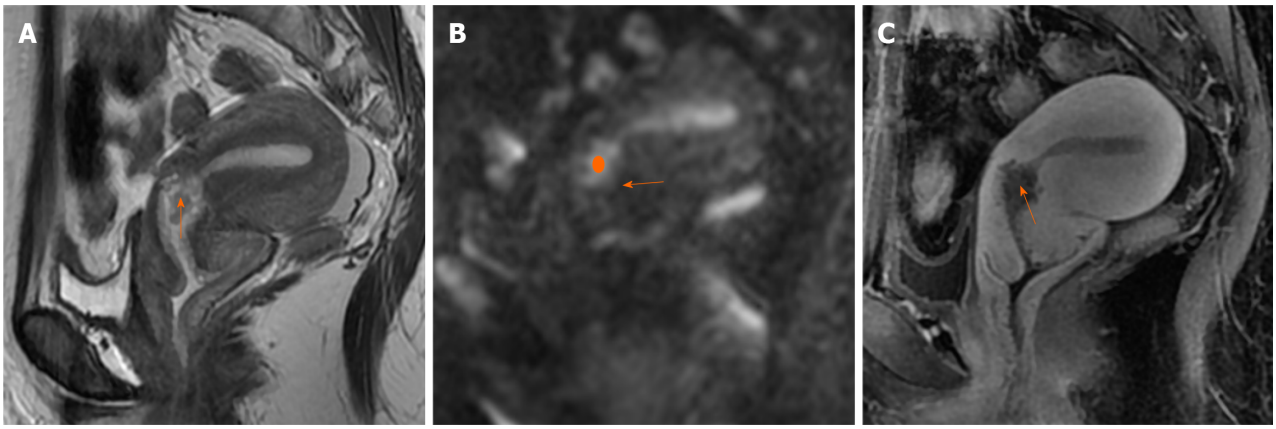

Figure 2 Endometrial carcinoma involving the cervical stroma in Case 2. A: On the T2WI image, polypoid nodules were observed within the mucosa of the intrauterine cervical orifice region (arrow), showing a clear boundary with the cervix; B: On the DWI image, the nodule exhibited a slightly hyperintense signal (circle), while the endocervical stroma displayed a hypointense signal (arrow); C: On the enhanced image, the nodule was marginally enhanced and distinctly separate from the endocervical stroma (arrow).

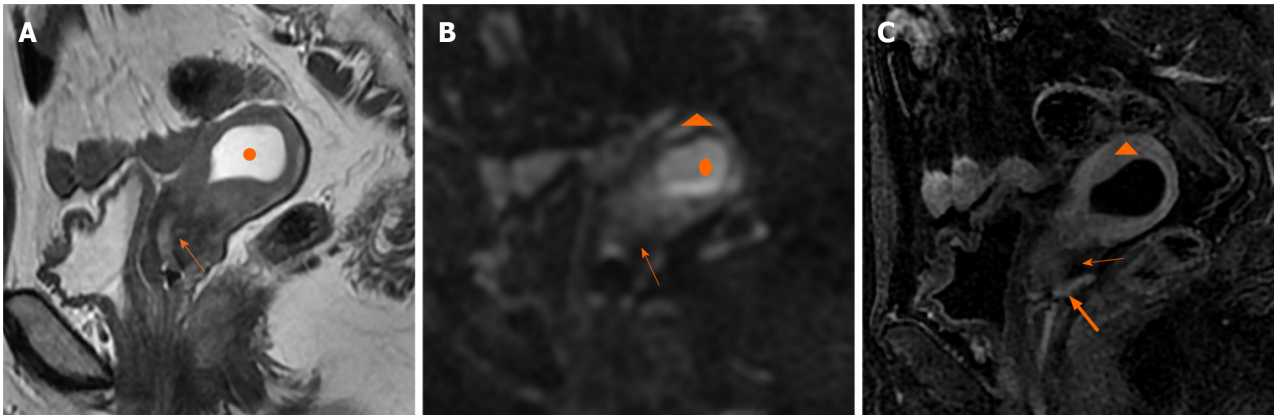

Figure 3 Endometrial carcinoma involving the cervical stroma in Case 3. A: On the T2-weighted imaging image, the endometrium cannot be seen, with fluid accumulation in the cavity (circle). The cervix stroma is depicted as low signal (arrow); B: On the diffusion weighted imaging (DWI) image, the fluid accumulation within the cavity is blood, and the DWI displays a slightly elevated signal (circle). Additionally, the myometrium exhibits a marginally high signal (triangle), while the cervix interstitial region maintains a low signal (arrow); C: On the enhanced image, the endometrium cannot be seen, while the muscle layer shows marked prominent enhancement (triangle). The cervical stroma shows hypo-enhancement (narrow arrow), but the mucosa is significantly enhanced (bold arrow).

OUTCOME AND FOLLOW-UP

Case 1

Surgery was performed approximately one and a half years prior to the present study. Postoperative bleeding following intercourse occurred. Pathological examination of the vaginal endoscopic biopsy suggested chronic inflammation of the mucosal tissue.

Case 2

At three years and two months post-surgery, there was no evidence of recurrence.

Case 3

No recurrence was observed after a period of 2 years and 9 months.

DISCUSSION

Endometrial carcinoma with cervical stromal invasion is associated with lymph node metastasis and poor survival[5]. Lymph node status is a key prognostic indicator of endometrial cancer, and sentinel lymph node localization can even detect micrometastases and change the patient's treatment regimen[6]. Therefore, correct diagnosis of cervical interstitial involvement is crucial. Currently, MRI is the best imaging tool for evaluation of endometrial cancer.

At present, the standard for cervical stromal invasion by MRI is as follows[7]: On T2WI, a medium-intensity tumor disrupts the low signal intensity of the cervical stroma; on contrast-enhanced imaging, a low-intensity tumor disrupts the normal enhancement of the cervical stroma; and on DWI, a high-intensity tumor disrupts the low-intensity cervical stroma. There are primarily two patterns of endometrial carcinoma invading the cervix[8,9]: The first involves the tumor infiltrating the uterine body and both the cervix mucosa and cervical stroma, while the second involves the tumor directly penetrating the cervical stroma through the myometrium, bypassing the cervix mucosa. Cases of endometrial carcinoma involving the cervical stroma without a distinct lesion in the endometrial cavity are rare, and their pathogenesis remain unclear.

In our cases, hysteroscopy and segmental curettage suggested atypical hyperplasia and polyps in the endometrium. MRI examination in Case 1 revealed a heterogeneous endometrium, with thickened endometrium extending downward to the endocervix. No malignant tumors were detected within the endometrium. Multiple cysts were observed on the surface of the cervix mucosa, but the stroma remained intact; thus, endometrial hyperplasia was diagnosed. MRI examinations of Case 2 revealed a nodule in the endocervix, with no evidence of invasion into the cervical stroma. Case 3 presented with hydrosalpinx and a non-thickened endometrium. The myometrium exhibited inconsistent enhancement, which was interpreted as a consequence of compression of the muscle layer. No lesions were found in the cervix. All three patients had either missed or misdiagnosed MRI results.

Similar to the findings in the present study, Taylor *et al*[10] reported four patients with endometrial hyperplasia exhibiting cervical stromal invasion. On pathological examination, it was found that the endometrium did not meet the criteria for endometrioid adenocarcinoma. This was consistent with dysplasia or no atypia, but cancerous foci had invaded the stromal layer of the cervix. They previously identified this undescribed phenomenon as likely due to the spread of endometrial hyperplasia into the cervix, secondary carcinogenesis, and invasion of the stromal layer of the cervix. They proposed designating it as stage II endometrial carcinoma. However, our cases differ from theirs in that our three patients had different types of endometrial carcinoma with varying grades, not limited to low-grade endometrioid adenocarcinoma.

Further assessment of Case 1 and Case 2, showed that their disease may be similar to the first type of invasion[8,9], where endometrial lesions (either polyps or hyperplasia) extending to the cervix, subsequently lead to secondary malignancy. These lesions then infiltrate into both the cervix mucosa and stroma, which is similar to the implantation invasion reported by Tambouret *et al*[11]. Case 3, may be identical to the second type of invasion, where cancer cells infiltrate the myometrium and then directly infiltrate the cervical stroma without accumulating in the cervical mucosa[8,9].

CONCLUSION

We describe a rare occurrence of endometrial carcinoma with cervical stromal invasion which presents a diagnostic challenge. When the criteria for endometrial carcinoma are not met, cervical stromal invasion may be present. We hope that our cases will enrich the diagnostic experience of radiologists, and help future research to discover the mechanism of this type disease. Furthermore, we advocate that clinicians should incorporate immunohistochemical results into routine hysteroscopy pathology assessments for a more comprehensive evaluation. This approach aims to prevent potential misdiagnoses and ensure appropriate treatment.

FOOTNOTES

Author contributions: Liu MM contributed to manuscript writing and editing, and data collection; Liang YT and Jin EH contributed to conceptualization and supervision; all authors have read and approved the final manuscript. Both Jin EH and Liang YT have played important and indispensable roles in the experimental design, data interpretation and manuscript preparation as the co-corresponding authors. Jin EH conceptualized, designed, and supervised the whole process of the project. He searched the literature, revised and submitted the early version of the manuscript. Liang YT was instrumental and responsible for data re-analysis and re-interpretation, comprehensive literature search, preparation and submission of the current version of the manuscript. This collaboration between Jin EH and Liang YT is crucial for the publication of this manuscript and other manuscripts still in preparation. Jin EH takes primary responsibility for communication with the journal during the manuscript submission, peer review, and publication processes.

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ORCID number: Ming-Ming Liu 0009-0005-3859-0354; Yu-Ting Liang 0009-0003-9722-1028; Er-Hu Jin 0000-0002-0650-933X.

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