

Cervical Cancer Overlying a Cervical Leiomyoma: A Rare Diagnostic and Therapeutic Challenge

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Abstract:

A 44-year-old woman presented with heavy menstrual bleeding for two months. A gynecological examination revealed an 8-cm bulky cervical mass. Magnetic resonance imaging demonstrated cervical mass measuring 7.0 cm. without organ invasion. Biopsy confirmed moderately differentiated squamous cell carcinoma, and the patient was diagnosed with early-stage cervical cancer coexisting with cervical leiomyoma. She underwent radical hysterectomy with bilateral salpingectomy and pelvic lymphadenectomy. Histopathological examination revealed squamous cell carcinoma overlying cervical leiomyoma. She did not receive postoperative adjuvant therapy. However, eight-month later, she developed a local recurrence at the vaginal stump. She received concurrent chemoradiotherapy. She remains in clinical remission, with 6 months of disease-free survival (last follow-up: September 2025).

Keywords: cervical cancer, cervical leiomyoma, management

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Introduction

Cervical leiomyomas are rare, accounting for only 0.6% of uterine leiomyomas¹. Based on location, they are classified as extra-cervical (subserosal) or intra-cervical, with surgical intervention being the primary treatment approach².

Cervical cancer developing on the surface of a cervical leiomyoma refers to a rare condition in which malignant cervical epithelium overlies or invades an underlying benign cervical leiomyoma. The occurrence of cervical cancer on the mucosal surface of a cervical leiomyoma is exceptionally rare. While early-stage cervical cancer is typically managed with surgery and radiation therapy³, limited research exists on the optimal approach in such cases. Radiation therapy may be less effective for a coexisting leiomyoma, as benign tumors do not typically shrink with irradiation. Additionally, treating a large tumor with radiation can compromise dose accuracy and increase toxicity risks to surrounding tissues.

We report a rare case of cervical cancer overlying a cervical leiomyoma, initially resembling a large exophytic cervical tumor. This case underscores the need for further investigation and increased awareness among clinicians to ensure accurate diagnosis and appropriate management.

Case report

A 44-year-old nulliparous woman presented with heavy menstrual bleeding for two months and visited our hospital in December 2023. She had no documented cervical myoma prior to this visit. Gynecological examination revealed an 8-cm bulky vaginal mass arising from the cervix, with a brownish lesion on its surface. The mass was mobile, with no palpable involvement of the upper vagina or parametrium.

A biopsy of the cervical mass confirmed moderately differentiated squamous cell carcinoma. Following the diagnosis of cervical cancer, an magnetic resonance

imaging (MRI) was performed approximately two weeks after the cervical biopsy. The MRI revealed a well-defined, homogeneous hyposignal on T1-weighted imaging (T1W) and a heterogeneous hypo- to hypersignal on T2-weighted imaging (T2W) at the posterior cervical lip, measuring 7.0×6.5 ×6.9 cm. The lesion showed hypervascularity with homogeneous enhancement and mild diffusion restriction (DWI/ADC=0.86×10³ mm²/s). The upper vagina and parametrium were not involved, and the cervical stroma was preserved, demonstrating a 4-mm T2W hyposignal rim. Overall, the imaging findings were inconclusive, showing benign features on T1/T2W and enhancement sequences but suggesting malignancy based on apparent diffusion coefficient (ADC) values. (Figure 1).

The patient was clinically diagnosed with stage IB3 cervical cancer (FIGO 2018) associated with a large cervical leiomyoma. She underwent radical hysterectomy with bilateral salpingectomy and pelvic lymphadenectomy.

Gross examination revealed a bulging cervix. On the coronal view, a brownish plaque covered the surface of the cervical mass, sparing the upper ectocervix. On the axial view, the mass did not extend into the upper vagina. The cut surface exhibited a whorled appearance with a yellowish surface. The cervical mass and underlying smooth muscle were distinct (Figure 2). The hysterectomy specimen included 2.5 cm of the anterior vaginal cuff, 3 cm of the posterior vaginal cuff, 2.5 cm of the right lateral vaginal cuff, 3 cm of the left lateral vaginal cuff, and 4 cm of parametrial tissue on both sides. A total of 8 right pelvic lymph nodes and 10 left pelvic lymph nodes were retrieved.

Histopathology identified a 4.0×3.0×0.6 cm moderately differentiated squamous cell carcinoma overlying a 4-cm leiomyoma, without infiltration into the leiomyoma. Extensive lymphovascular space invasion (LVSI) was present. The depth of stromal invasion of the tumor was the superficial one-third. The parametrium, vaginal cuff, and surgical margins were tumor-free (Supplementary Figure 1).

The final diagnosis was stage IB3 cervical cancer, based on a 4-cm squamous cell carcinoma without parametrial, vaginal, or pelvic lymph node involvement. As the patient did not meet the criteria for adjuvant therapy per the Sedlis criteria (NCCN v2.2024), she did not receive radiotherapy or chemotherapy. She underwent routine cancer surveillance every three months. At the eight-month follow-up, she remained asymptomatic; however, physical examination revealed a 2-cm mass at the vaginal stump. Pathologic evaluation confirmed squamous cell carcinoma. A CT scan of the whole abdomen and chest showed no evidence of distant metastasis, and she was diagnosed

with a locoregional recurrence at the vaginal stump. She subsequently received concurrent chemoradiotherapy, with a total treatment duration of 52 days.

After completing concurrent chemoradiotherapy (CCRT), she continued routine cancer surveillance with history taking and physical examination every 3 months for the first 2 years, every 6 months from years 2 to 5, and annually thereafter.

She is currently in clinical remission, with a disease-free survival of at least 6 months (last follow-up: September 2025).

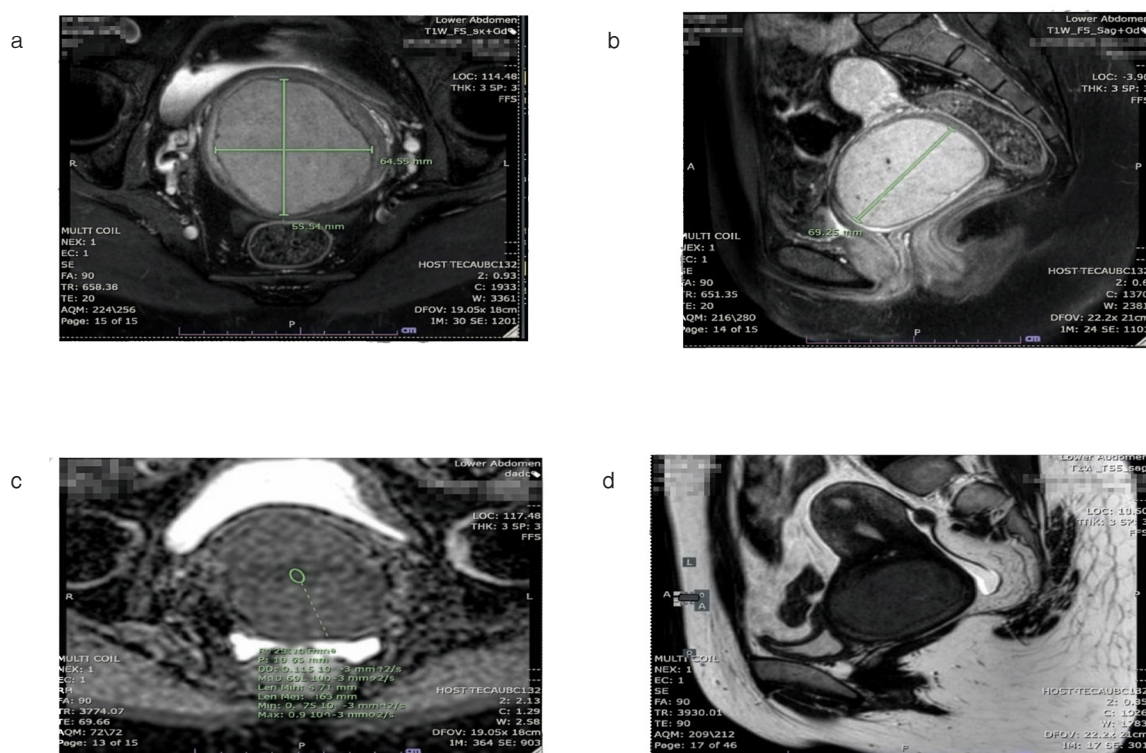


Figure 1 (a) and (b) MRI lower abdomen showed a well-defined homogenous hyposignal T1W/heterogenous hypoposignal T2W mass at the posterior cervical lip, size about 7.0x 6.5x6.9 cm. Hypervascularity is noted with homogenous enhancement. (c) Mild restriction diffusion with low high b-value diffusion-weighted imaging (DWI)/apparent diffusion coefficient (ADC)=0.86x103 mm²/s. (d) No involvement of the upper vagina and parametrium (the hyposignal T2W cervical stroma is about 4 mm). Normal both ovaries. No intraabdominal lymphadenopathy. No hydronephrosis and no hydroureter was seen.

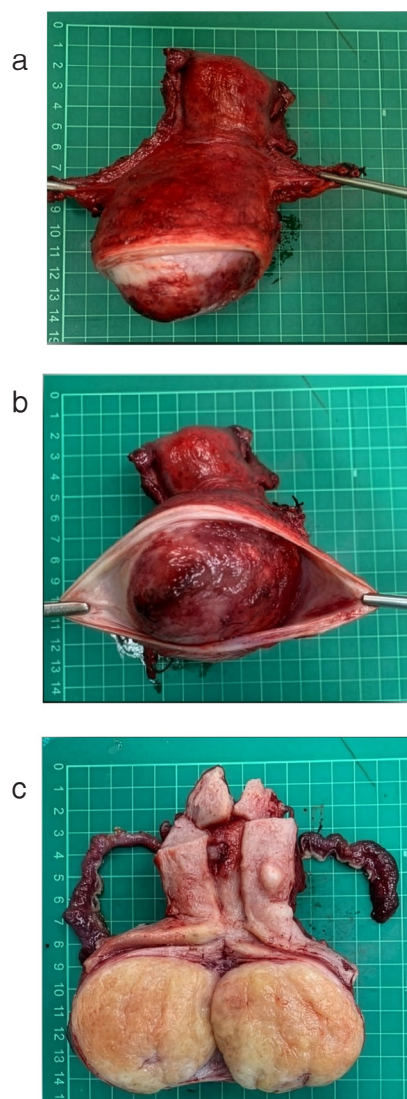


Figure 2 Gross features of the uterus show a bulging cervix. (a) In the coronal view, a brownish plaque is visible overlying the bulging cervical mass, with sparing of the upper ectocervix. (b) In the axial view, the cervical mass is not involved in the upper part of the vagina. (c) The cut surface shows a whorled-like appearance with a yellowish surface. The cervical mass and the overlying smooth muscle are shown separately.

Discussion

Cervical leiomyomas are rare, accounting for approximately 0.6% of uterine leiomyomas¹. Surgical intervention is typically required for symptomatic cases, including those causing bulk-related symptoms, abnormal uterine bleeding, recurrent pregnancy loss, or infertility⁴. Reports of cervical leiomyomas coexisting with cervical squamous cell carcinoma are scarce, primarily limited to case studies.

The first documented case, reported by Hee Rim Nam et al. (2005) in Korea, described a 7-cm exophytic mass protruding through the external os without parametrial extension. Cervical biopsy confirmed invasive squamous cell carcinoma. MRI before radiation therapy showed a high-intensity signal on the tumor's surface with a central low-intensity area. Initially classified as stage IB, the patient underwent radiation therapy. However, the mass did not shrink, raising suspicion of a carcinoma overlying a pedunculated cervical leiomyoma. Surgical excision followed by intracavitary brachytherapy was performed, with no reported complications⁵.

A more recent case by Xitong Zhao et al. (2022) in China involved a 6-cm vaginal mass arising from the cervix. MRI revealed a slightly high-intensity lesion on its surface. Biopsy confirmed squamous cell carcinoma, and the patient was diagnosed with stage IB3 cervical cancer. Radical hysterectomy with bilateral salpingo-oophorectomy and pelvic lymphadenectomy was performed. No adjuvant therapy was required postoperatively, and the patient remained disease-free for three years⁶. The comparison of these case reports with our study is summarized in Supplementary Table 1.

These cases emphasize the importance of early detection and accurate diagnosis. MRI plays a crucial role in distinguishing between cervical leiomyoma, cervical cancer, and the rare presentation of cervical cancer overlying a

leiomyoma. While MRI features may sometimes mimic a leiomyoma, diffusion-weighted imaging (DWI) is essential in identifying potential malignancy⁷.

The absence of standardized treatment guidelines presents a challenge in managing such cases. The decision between surgery and radiation therapy is critical, as radiation is often ineffective for leiomyomas. When malignancy is suspected, surgery remains the preferred approach, with hysterectomy being the recommended method.

However, determining the appropriate surgical technique requires careful preoperative assessment.

The choice between extrafascial and radical hysterectomy depends on the stage of cervical cancer. Extrafascial hysterectomy is appropriate only for stage IA1 disease, whereas radical hysterectomy is indicated for stages beyond IA1 but not exceeding stage IIB. Extrafascial hysterectomy offers advantages such as shorter operative time, reduced blood loss, and lower morbidity. However, if final pathology reveals lymphovascular space invasion (LVSI), deep stromal invasion, or a large tumor, adjuvant therapy may be required. Conversely, radical hysterectomy may reduce the likelihood of needing adjuvant treatment but carries a higher risk of surgical complications. If high-risk features are identified postoperatively, additional therapy may still be necessary.

Given these complexities, thorough preoperative counseling is essential to ensure patients understand their treatment options and associated risks^{8,9}. Although there was neither intermediate risk (Sedlis criteria) nor high risk (Peter criteria) in this patient, locoregional recurrence at the vaginal stump appeared within 8 months. Thus, further studies are needed to establish the optimal management strategies for this rare clinical scenario.

Conclusion

Cervical cancer overlying a leiomyoma is rare and poses diagnostic challenges. MRI, particularly DWI, aids in differentiation. Surgery remains the preferred treatment, with

the choice of technique requiring careful evaluation. This case underscores the need for further research to guide optimal management.

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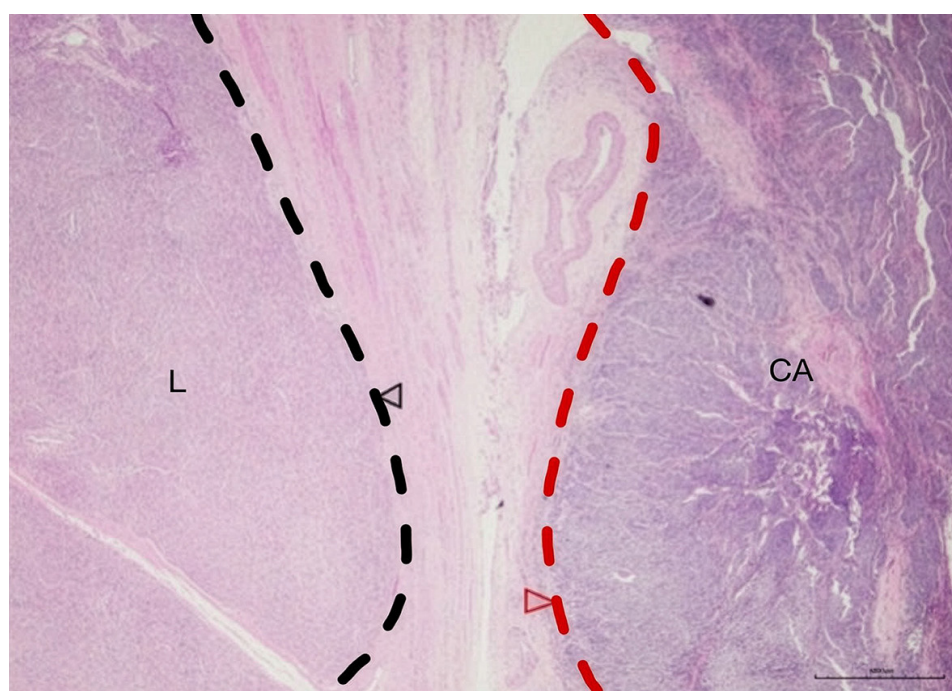
The authors would like to thank the patient.

Conflict of interest

The authors report that there are no competing interests to declare.

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L=leiomyoma, CA=malignancy

Supplementary Figure 1 At 20x magnification, two tumor masses can be observed. On the left side (black arrow and black line), the mass is well-circumscribed. On the right side (red arrow and red line), the mass exhibits more intense staining and has an infiltrative border, which raises suspicion of malignancy

Supplementary Table 1 Literature review of cervical cancer overlying cervical leiomyoma⁵⁻⁶

Patient	Age, years	Clinical feature	Gross feature	Histological subtype	Treatment	Adjuvant treatment	Outcome
1	54	Vaginal discharge and vaginal spotting	Bulking exophytic mass protrude from external os size 7 cm	Squamous cell carcinoma	Primary radiation	mass excision with intracavitary brachy therapy	Clinical remission
2	62	Asymptomatic	Bulky vaginal mass 6 cm with ulcerative lesion 4 cm	Squamous cell carcinoma	Radical hysterectomy with bilateral salpingo-oophorectomy with pelvic lymph node lymphadenectomy	None	Clinical remission
Our study	42	Abnormal vaginal bleeding	8 cm bulky vaginal mass arising from the cervix	Squamous cell carcinoma	Radical hysterectomy with bilateral salpingectomy with pelvic lymph node lymphadenectomy	None	Locoregional recurrent at vaginal stump