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Case Report

A Clinically Suspected Case of Rectal Cancer with Exophytic Growth Tumor in the Vaginal Cavity

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Abstract

Rectal cancer typically exhibits an intraluminal growth, but some cases show extramural growth and make it difficult to differentiate from other pelvic tumors. A case is extramural growth-type rectal cancer located in the vagina. The patient was 74 years. CT revealed a 12 cm pelvic tumor and lymphadenopathy. Gynecological examination showed a tumor throughout the vagina. Cytology suggested squamous cell carcinoma. Cervical cancer was suspected. MRI showed a normal cervix and vaginal tumor with rectal invasion. Vaginal cancer or rectovaginal septum tumor was suspected from the MR images. Histological diagnosis confirmed intestinal-type adenocarcinoma, indicating rectal cancer with vaginal invasion. Re-evaluation of MRI images showed hemorrhagic necrosis in the vaginal tumor, whereas the rectal wall tumor had consistent signals with common rectal cancer, suggesting an original tumor. Determining the primary site of extramural growth-type rectal cancer can be difficult, but MRI-based internal characterization of the tumor can facilitate diagnosis.

Keywords

Tumor of the Vagina, Rectal cancer, Extramural growth

INTRODUCTION

Rectal cancer usually develops towards the lumen side, but in some cases, it exhibits an extramural growth pattern, making it difficult to distinguish from pelvic tumors originating from other organs. We experienced a case of extramural growth-type rectal cancer in which the main mass was located in the vagina, making it challenging to determine the originating organ.

CASE REPORT

A 74-year-old woman with no remarkable medical or family history had been experiencing atypical genital bleeding for the prior six months. She had no bloody stool or constipation. After she was found collapsed on the roadside, she was transported by emergency services to the previous hospital. A non-contrast CT scan taken at that time revealed an irregularly shaped tumor of approximately 12×9 cm, in contact with the bladder and rectum **(Fig. 1a)**. Enlarged lymph nodes were noted in the para-aortic,

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bilateral common iliac, bilateral internal iliac, bilateral obturator, perirectal, and bilateral inguinal regions, along with left hydronephrosis and dilation of the left ureter. The normal structure of the uterus was difficult to identify. Pelvic examination by a gynecologist identified a mass spreading throughout the entire vagina, centered on the posterior vaginal wall. Cytology diagnosed non-keratinizing squamous cell carcinoma. She was suspected of being cervical cancer, and referred to our hospital.

A gynecological examination at our hospital revealed that the entire cervix had been replaced by a tumor, with infiltration observed from the posterior vaginal wall to the vaginal orifice. A rectal examination revealed infiltration through the rectal wall. Blood tests showed a mild increase in inflammatory response and mild anemia (Hb 10.8 g/dL), with the tumor marker CEA elevated to 57.7 ng/mL. AFP, CA125, CA19-9, and SCC were within normal ranges. Based on CT findings from previous hospital, the tumor was determined to have infiltrated to the pelvic wall on both sides. Initially, the gynecologists diagnosed stage IVA cervical cancer with rectal invasion. Then MRI and tumor biopsy were performed.

On MR imaging, it was estimated that cervix was not involved by the tumor because of normally enhanced

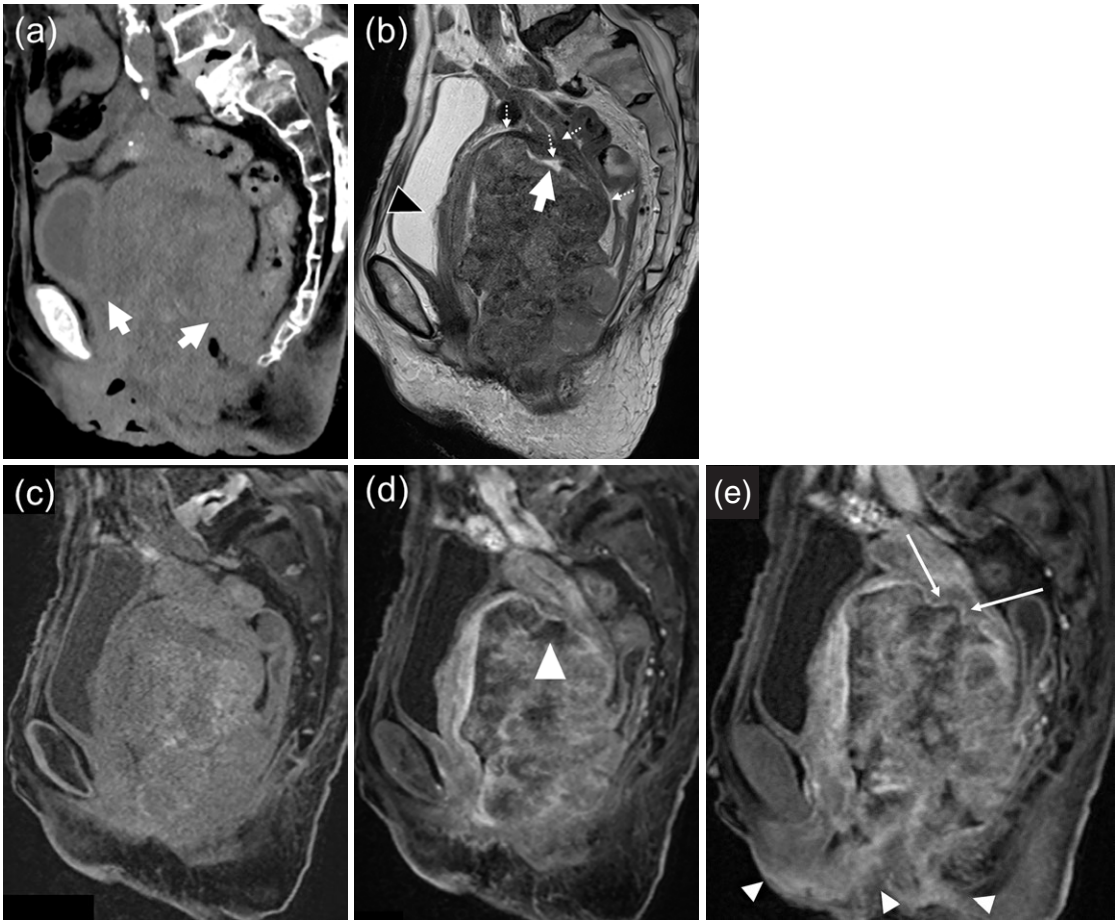

Fig.1 (a) Sagittal image of non-contrast computed tomography. An approximately 12×9 cm irregularly shaped tumor is visible in the pelvis. The tumor contacts with the bladder and rectum (arrow). (b) Sagittal T2-WI. Sight space between uterine cervix and tumor was recognized (arrow). The tumor extensively involved the posterior vaginal wall and invades the rectal wall and perineum. The mucosal surface of the anterior vaginal wall is preserved. The tumor's internal signal is heterogeneous, ranging from mid-signal to low signal, with some areas showing strong low signals. The dotted arrows indicate, from left to right, the anterior vaginal fornix, the external os, the internal os, and the posterior vaginal fornix. (c) Sagittal Fat saturated T1-WI. The tumor shows high signals corresponding to the areas of low signals on the T2-WI, suggesting hemorrhage. (d) Contrast-enhanced fat saturated T1-WI. The tumor displays heterogeneous enhancement, with irregular non-enhancing areas at the tumor periphery (arrowhead). (e) Normally enhanced anterior and posterior lip on contrast- enhanced T1-WI (arrows). Tumor invasion from the perineum is noted (arrowheads), along with bullous edema in the posterior bladder wall mucosa (black arrowhead on (b)). In addition, tumor invasion along with broad ligament was also suspected.

anterior/posterior lip and the existence of slight space between the tumor and cervix both on T2 and contrast-enhanced T1-weighted images (WI). Most of the tumor was located within the vaginal cavity, with infiltration from the lower half of the posterior vaginal wall to the perineum. The anterior vaginal wall was also irregularly thickened. Bullous edema was observed in the bladder mucosa. Continuous tumor infiltration from the anterior vaginal wall to the muscle layer of the posterior bladder wall was suspected. Because of tumor invasion, normal anterior wall structure of the rectum was not recognized, with circumferential infiltration observed near the pelvic floor. The continuity of the mucosal surfaces of the posterior vaginal wall and the anterior rectal wall was disrupted. Tumor invasion into the left broad ligament was observed accompanying ureteral stenosis at the region. Within the tumor, faint high signals on T1-WI and strong low signals on T2-WI and apparent diffusion coefficient (ADC) map suggested hemorrhage. Contrast-enhanced T1-WI showed heterogeneous enhancement. The lesion showed high signal intensity on diffusion-weighted imaging (DWI) and the mean ADC value was $0.85\times10^{-3}mm^2/sec$ **(Figs. 1b-1j)**. Enlarged lymph nodes with high signal intensity on DWI and low ADC values ($0.7\text{-}0.86\times10^{-3}mm^2/sec$) were noted in the bilateral internal iliac, bilateral obturator, perirectal, and bilateral inguinal regions. Based on these findings, the

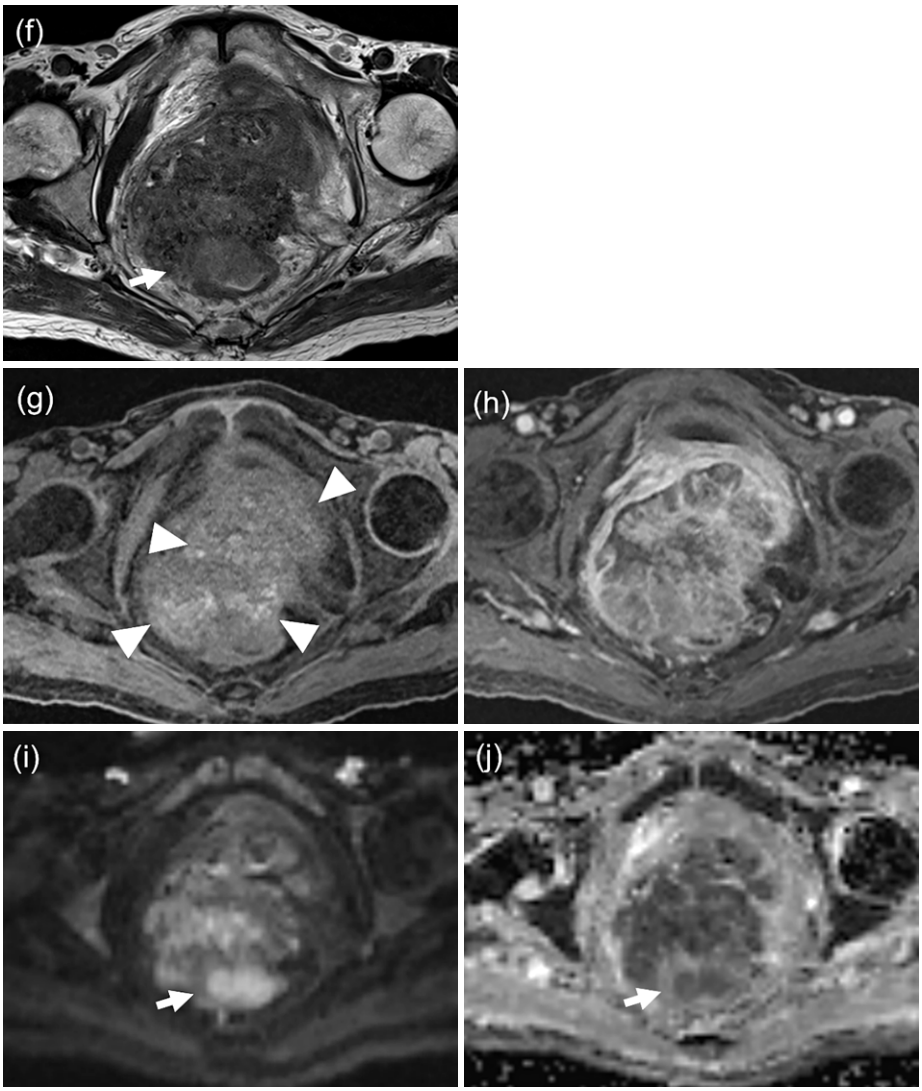

Fig.1 (f) Axial T2-WI. The tumor widely invades into the anterior rectal wall. The tumor surrounding the rectum showed uniformly mild low signal (arrow). (g) Axial fat saturated T1-WI. Amorphous high signal intense area was observed mainly within vaginal area, corresponding low signal intense area on ADC, indicating hemorrhage of this region (arrowheads). (h) Axial contrast-enhanced fat saturated T1-WI. The tumor overall shows heterogeneous enhancement. (i) DWI (b=1000s/mm^2) and (j) ADC map. A diffusion restriction was observed in the tumor of the rectal wall (arrow) (Mean ADC value: $0.85x10^{-3}mm^2/sec$).

radiologists diagnosed the tumor as originating primarily from the posterior vaginal wall, suggesting vaginal cancer or a tumor arising from the rectovaginal septum with infiltration of surrounding organs.

Biopsy specimens were submitted for pathology assessment as a cervical tumor. The tumor consisted of atypical glandular epithelium with tubular and cribriform structures, with necrotic debris present in the lumina **(Fig. 2a)**. The glandular cells were tall and columnar with inconspicuous mucin production. Increased cellularity and mitotic figures were observed. Immunohistochemically, tumor cells showed only patchy positive for p16, suggesting lack of a relation to HPV. Additionally, ER and vimentin were negative, indicated a low likelihood of endometrial origin. HIK1083, calretinin, and CD10 were also negative, leading to a diagnosis of cervical adenocarcinoma, HPV-independent, NOS. However, given that cervical origin was ruled out based on imaging, the tumor cells were considered to be of other origin, requiring further immunohistochemical analyses. The tumor was negative for CK7 and positive for CK20 **(Figs. 2b, c)**. It was positive for CDX20 and negative for PAX8 **(Fig. 2d)**. Therefore, the tumor was considered an adenocarcinoma of intestinal phenotype. With imaging findings and clinical frequency, a diagnosis of rectal cancer was made.

Following the diagnosis described above, further investigation and treatment were proposed, but the patient declined, leading to a decision for best supportive care.

DISCUSSION

In this case, a large pelvic tumor was detected using plain CT. Gynecological examination revealed that the entire vagina had been replaced by the tumor. Cytology suggested squamous cell carcinoma, leading to an initial diagnosis of cervical cancer. However, MRI indicated a normal cervix. The tumor was located primarily in the vagina, raising suspicions of vaginal cancer or a tumor from the rectovaginal septum with bladder and rectal invasion. However, the final pathological diagnosis was intestinal-type adenocarcinoma. Approximately 15% of vaginal cancers are adenocarcinomas, with clear cell carcinoma being the most common histological type. Although it is rare, cases of vaginal adenocarcinoma with intestinal features exist and they are thought to arise from lesions such as vaginal adenosis, villous adenoma, and so on, or dysplastic changes in the intestinal epithelium because of surgical procedures or aging.[1] Primary adenocarcinoma of the rectovaginal septum is also extremely rare and is often

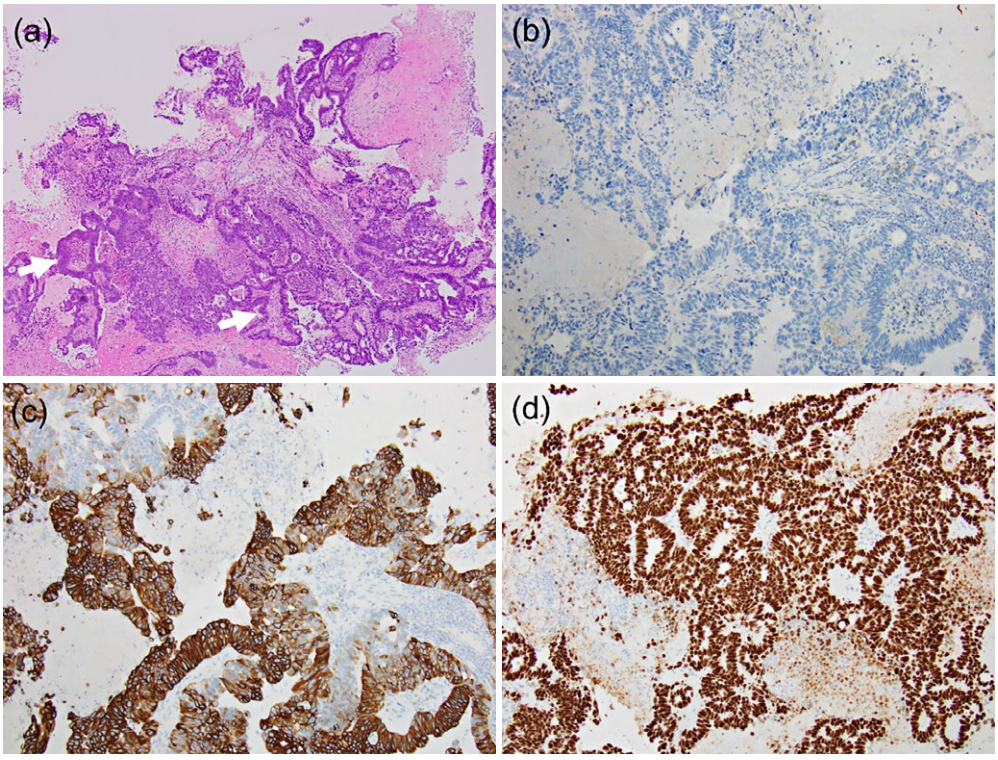

Fig.2 (a) HE staining. The tumor consisted of atypical glandular epithelium with tubular and sieve-like structures (arrow), with necrotic debris present in the lumina. (b) CK7 immunohistochemistry is negative. (c) CK20 immunohistochemistry is positive. (d) CDX2 immunohistochemistry is positive.

associated with endometriosis, with endometrioid carcinoma being more common.[2] This case lacked sufficient findings to support primary vaginal cancer or adenocarcinoma from the rectovaginal septum, suggesting that rectal cancer had extended outward, forming a large mass in the vagina.

Colorectal cancer exhibits a higher incidence of invasion into other organs than those of other gastrointestinal malignancies, with reported rates of 5–20%. This invasion frequently involves the abdominal wall, small intestine, and urogenital organs, including the vagina.[3,4] Colorectal cancer generally grows predominantly towards the lumen side, with the primary tumor located within the colon in most cases presenting with other organ invasion. However, cases of extramural growth-type colorectal cancer have been reported, particularly in Japan, in which the primary tumor is located outside the bowel.[5] 78 cases of This type of colorectal cancer have been reported in Japan and this case is regarded as included in this category. No difference in age or sex has been reported between extramural growth-type and typical colorectal cancers. Extramural growth-type colorectal cancer is known to have a tendency to cause less bowel obstruction despite tumor progression, resulting in fewer symptoms related to bowel passage obstruction compared to typical colorectal cancer.[6] Therefore, it often lacks clinical symptoms in the early stages and is frequently discovered in an advanced state because of abdominal masses or abdominal pain. Histologically, extramural growth-type colorectal cancer more frequently shows mucinous carcinoma compared to typical colorectal cancer, approximately 26.2% of extramural growth-type colorectal cancers.[7] Mucinous carcinoma is regarded as having higher malignancy and poorer prognosis than those of differentiated adenocarcinoma, with many cases being advanced cancer at discovery, contributing to the tendency for extramural growth-type colorectal cancer to have a poorer prognosis than typical colorectal cancer. Because many cases exhibit expansive growth in the pelvis, compressing other pelvic organs, or invasion to adjacent organs, these growth patterns make it difficult to differentiate from other pelvic tumors, such as cervical cancer or with vaginal invasion.[6,7] However, no report has described a case of extramural growth-type colorectal cancer penetrating and growing expansively within the vagina, as in this case. Given the frequency of pelvic tumors with the primary tumor in the vagina, gynecologic malignancies are the top differential diagnosis, but extramural growth-type colorectal cancer should also be considered.

A retrospective review of the MRI in this case revealed differences in signal intensity on T2-WI and DWI, enhancement patterns, and the extent and location of hemorrhage between the tumor in the rectal wall and the vagina. The rectal wall tumor showed minimal hemorrhage, mild hyperintensity on T2-WIs, more or less uniform enhancement, and strongly restricted diffusion. These MR findings were consistent with those commonly presented for rectal cancers.[8] By contrast, the vaginal tumor showed extensive hemorrhage, heterogeneous enhancement, and low signal intensity on DWI, implying tumor necrosis. The mechanism of necrosis formation within tumors is probably attributable to the rapid growth of the tumor outpacing development of the vascular system, leading to a lack of oxygen and nutrient supply to parts of the tumor, leading to necrosis. The imaging findings in this case can be interpreted as reflecting the hemorrhagic necrosis occurring as the tumor extends from the rectum, supporting the diagnosis of rectal cancer rather than a metastatic vaginal tumor with rectal invasion. When a tumor invades multiple organs in the pelvis, as in this case, accurately assessing degeneration within the tumor on MRI can facilitate identification of the primary site, potentially leading to a faster and more accurate diagnosis.

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