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Case Report

Peritoneal vaginal fistula and contrast extravasation during MRI ☆,☆☆

Esraa Al-Jabbari, MD, Neel Shroff, MD, Hasan Khan, MD, Maryamnaz Falamaki, MD, Peeyush Bhargava, MD, MBA*

Department of Radiology, University of Texas Medical Branch, 301 University Blvd, Galveston, TX, 77555, USA

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ABSTRACT

Gynecological malignancies including primary cervical cancers are frequently treated with chemotherapy and radiation. Fistulas affecting the gynecological organs and surrounding cavities are a known consequence of radiotherapy due to focal necrosis of the regional mucosa. In this report, we will demonstrate a rare case of a posterior vaginal wall rupture with resulting fistulization into the peritoneal cavity in a 50-year-old female patient with squamous cell carcinoma of the cervix status postchemoradiotherapy. Magnetic resonance imaging (MRI) showed a discontinuity in the posterior vaginal wall near the fornix with extravasation of ultrasound gel used as contrast into the intraperitoneal compartment. Patient later presented with peritonitis like signs and symptoms and was treated successfully with antibiotics. Vaginal gel should be used with caution in patients with prior history of radiation due to the possibility of vaginal rupture which may lead to peritoneal vaginal fistula and contrast extravasation.

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Introduction

MRI is commonly used in the evaluation of pelvic anatomy in gynecological and rectal disease processes. It effectively demonstrates tumor location, regional extension, and metastatic processes. Furthermore, it can also demonstrate adverse impact of radiotherapy such as fistula formation. Ultrasound gel is frequently used to distend the vagina for better visualization of the relevant anatomy. In the case of fistula formation, the gel can extravasate. In this report, we

present the findings of a peritoneal vaginal fistula demonstrated on MRI and discuss patient's subsequent symptoms and management.

Case report

A 50-year-old patient with a history of Stage IIIC squamous cell carcinoma of the cervix, status postchemoradiation was seen by her provider for symptoms of pelvic pain and nausea

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* Corresponding author.

E-mail address: Peeyush_bhargava@yahoo.com (P. Bhargava).

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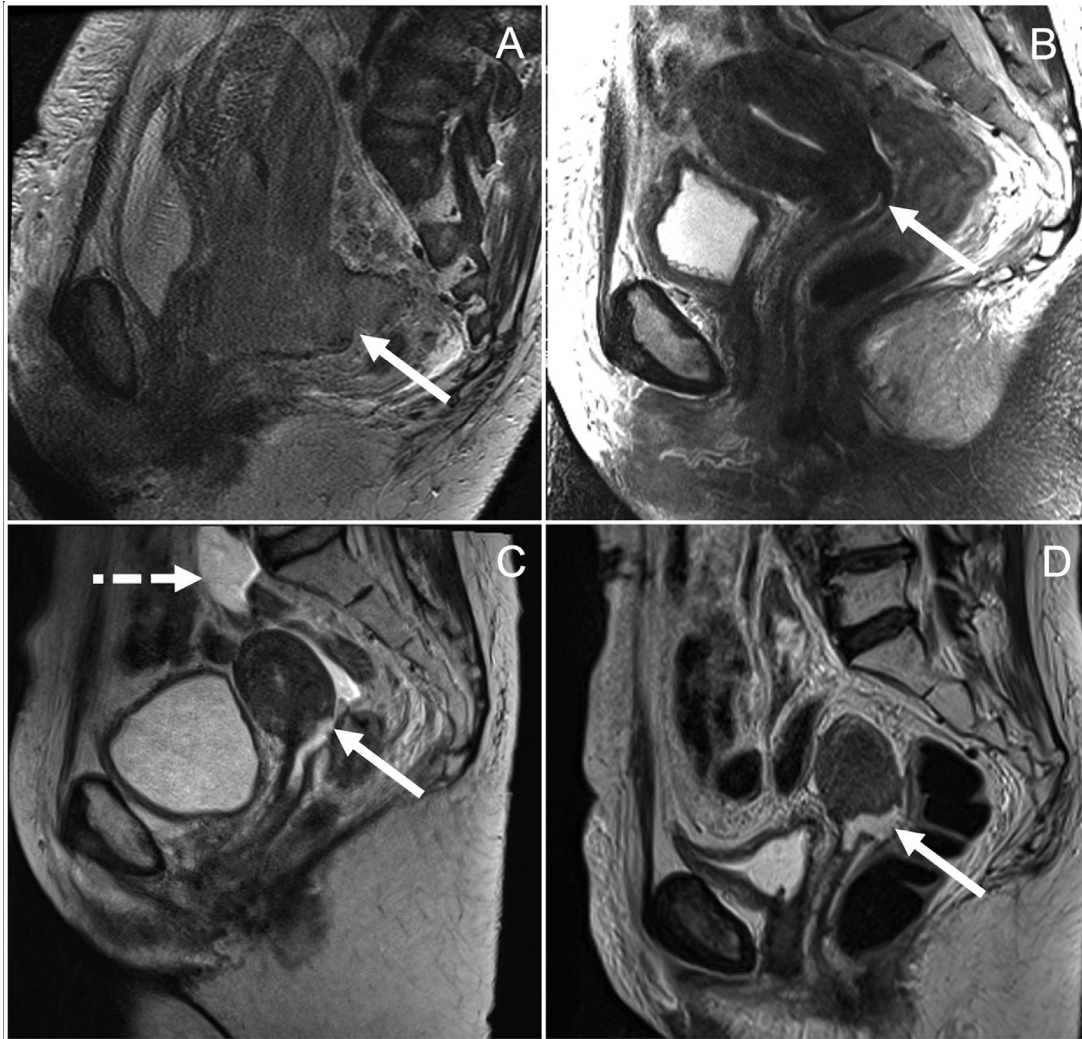


Fig. 1 – Sagittal T2-weighted image from pretreatment MRI (A) showing the large locally advanced cervical tumor with extension into the posterior fornix and invasion through the posterior wall of the vagina (arrow). Follow-up MRI after chemoradiation (3 months later) shows complete response with no residual tumor in the cervix and intact posterior wall of the vagina (arrow in B). Most recent MRI (about 17 months after the second/post-treatment MRI showing no tumor recurrence, a discontinuity in the posterior wall of the vagina (white arrow in C) and extravasation of gel (high T2 signal) into the intraperitoneal compartment (dashed white arrow in C). A 7-day follow-up image (D) shows reabsorption of the gel and unchanged discontinuity of the posterior vaginal wall (white arrow in D).

along with concerning physical examination findings. Due to history of cervical cancer, MRI was ordered to visualize pelvic anatomy. The pretreatment MRI (Fig. 1A) showed a large locally invasive cervical cancer involving the posterior fornix and growing through the posterior vaginal wall. Patient's last MRI demonstrated good treatment response with no discernable cervical tumor or metastases (Fig. 1B) and an intact posterior vaginal wall. Current MRI demonstrates no residual or recurrent cervical tumor; however, a discontinuity is noticed in the posterior vaginal wall, along with extravasation of vaginal gel into the peritoneal cavity (Fig. 1C). Perhaps the wall of the vagina was interrupted due to tumor invasion and never completely healed after treatment, with radiation leading to further weakening and fistula formation. The patient was counseled on the findings of the MRI and advised to go to the emergency department (ED) for any new or wors-

ening of symptoms. The patient was seen in the ED, 2 days later, where she was treated with Zosyn for findings concerns for peritonitis. The patient remained afebrile throughout the admission with down trending WBC count from $23 \times 10^3/\mu\text{l}$ to within normal limits ($<11.0 \times 10^3/\mu\text{l}$). Urine and blood cultures resulted with no growth. The patient improved clinically with resolution of pelvic pain. She was transitioned to oral ciprofloxacin and metronidazole for a total of 10 days. Patient was educated on the fistula with watchful waiting with close follow up for spontaneous resolution.

Discussion

Magnetic resonance imaging (MRI) is widely used as the imaging modality of choice for the evaluation of the pelvis

including evaluation of gynecologic or rectal diseases [1–4]. T2-weighted MR imaging allows good assessment of the uterine cavity, rectum, and vagina. MR imaging is essential in demonstrating the exact location of the tumor, parametrial extension, pelvic sidewall involvement, and spread to the surrounding structures such as the bladder or urethra, rectum, and lymph nodes [4,5]. Additionally, MR imaging is useful in illustrating pelvic anatomy for surgical and radiation therapy planning [2,5].

Since the vagina is normally collapsed, distinguishing between anterior and posterior vaginal walls and between cervix and vaginal fornix is not always easy. The anatomy of these structures is best seen when the walls, that may spontaneously be collapsed, are distended [3,4,6]. Vaginal distention improves detection of small lesions and aids in staging gynecologic malignancy and therefore the appropriate treatment provided to the patients [3,4]. On average, the sensitivity rate for MRI in detecting pelvic disorders increased by 54% after the use of a vaginal contrast medium [6]. Furthermore, some studies have shown that use of vaginal gel changed treatment planning in 14% of cases, with appropriate treatment chosen in 90% of cases versus 79% without use of vaginal opacification [4]. Furthermore, after hysterectomy, vaginal distention improves detection of recurrence and its relationship with the vaginal cuff, and the use of ultrasound gel can increase confidence in excluding recurrence [3,4].

Recent recommendations from the Urogenital Society of Radiology state that vaginal opacification is “optional” for staging of uterine cervical cancer, as it is used by few expert centers [4]. On MR images, the gel is of slightly higher signal intensity than water on fast spin-echo T1-weighted and T2-weighted images, most likely because of T1 shortening effects of gel contents [3,4]. Vaginal gel may be used with any sequence protocol for imaging the female pelvis [3]. Distension of the vagina during pelvic MRI has been conducted with a variety of methods including the use of ultrasound gel or saline solution [4,6]. Ultrasound gel has the advantage to ensure stable distension of vagina and to provide high contrast with adjacent structures on T2-weighted images. Most centers use ultrasound gel, either sterile or nonsterile as gel is a broadly available contrast agent, low-cost, easy to use and administer, and convenient for vaginal distension [3,4]. When pelvic MRI exam is scheduled with vaginal distension, adequate explanation provided to the patient before administration improves tolerability (with an acceptance rate ranging from 91.3% to 98.7%) [4]. Furthermore, as the gel is viscous, it allows adequate expansion of vagina and doesn't leak during the exam [4]. The amount of gel used to fill the vagina is a matter of debate. Usually, 50–100 mL can be used to fill the vagina [4]. At our hospital, we use approximately 60 mL ultrasound gel to distend the vagina for pelvic MR imaging. The gel is nonstaining, water-soluble jelly that is nonirritating to the skin or mucous membranes.

Radiotherapy is widely used in the treatment of gynecological cancer, especially in the case of cervical cancer. Radiotherapy may result in the development of fistulas, induce progressive obliterating endarteritis, resulting in mucosal surfaces necrosis and rupture. Approximately 2% of the patients offered radiotherapy for cervical cancer develop fistulas that may occur up to 30 years after the treatment [1]. MR imag-

ing is also used in evaluating complications of the disease and treatment, such as vesicovaginal or rectovaginal fistulas. This is best depicted on sagittal or axial sections from high-resolution T2-weighted or short inversion time inversion-recovery (STIR) imaging [1,5].

Our patient was diagnosed with cervical cancer and underwent chemoradiation therapy with good treatment response. Patient starts feeling chronic abdominal and pelvic pain. MR imaging of the pelvis with vaginal distention with ultrasound gel demonstrated focal rupture of the posterior wall of the vagina with spillage of the Ultrasound gel into the peritoneal cavity best seen on fluid sensitive sequences (Fig. 1). Appropriate management for low grade peritonitis was started with antibiotics and follow-up.

Conclusion

This case highlights that vaginal gel should be used with caution in patients with prior history of radiation due to the possibility of vaginal rupture, which may lead to peritoneal vaginal fistula and contrast extravasation. Extravasation of ultrasound gel into the intraperitoneal compartment may lead to peritonitis.

Authorship statement

The authors declare that this is their original work and they all approve the content of this manuscript. They confirm that this manuscript has not been published previously, in any language, in whole or in part, and is not currently under consideration elsewhere.

Ethical clearance

This project did not involve any research and no ethical clearance was required.

Patient consent

A written informed consent was obtained from the patient for the publication of this case report.

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