

# A Novel Magnetic Resonance Rectography for Rectal Cancer Staging

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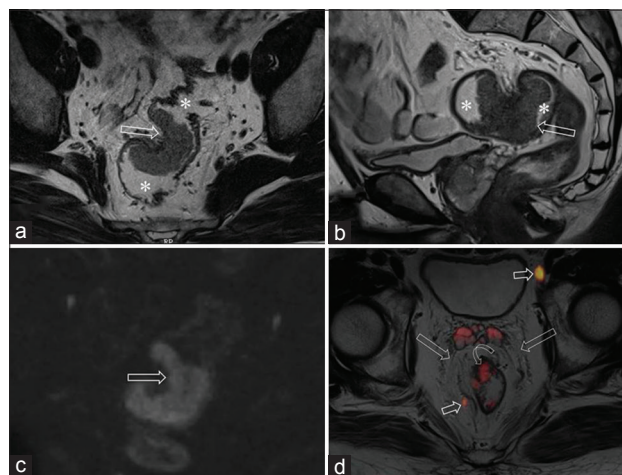
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To the Editor: Magnetic resonance (MR) imaging plays an important role in rectal cancer (RC) treatment decision-making.<sup>[1]</sup> There is controversy about whether it is necessary to use rectal contrast materials during MR imaging for RC.<sup>[2-4]</sup> Feces and gas in the rectum may affect the display of lesions and induce artifacts, especially on diffusion-weighted image (DWI).<sup>[5]</sup> Therefore, some investigators thought that rectal filling is necessary. The conventional method is to infuse ultrasound gel or oral gadopentetate dimeglumine and polyethylene glycol to fill the rectum. The intestinal lumen caused by rectal filling may alter the distance between the tumor and surgical plane, which may affect the accuracy of staging. There are other limitations of rectal filling with ultrasound gel including inconvenience for inserting the enema tube during MR examination and patients' discomfort after large amount of agent to defecate. Gadopentetate dimeglumine and polyethylene glycol solution show hyperintense on T1-weighted images and introduce the susceptibility artifacts on both enhanced images and DWI. The former could obscure lesions and their enhancement after intravenous injection of contrast agent. To overcome these limitations of rectal filling during MR imaging, we developed a novel MR rectographic regimen. Our protocol is the following: (1) taking 500 ml 20% mannitol administered orally as the laxative at night before the examination to clear the colorectum and then withhold all oral taken; (2) the examinations were scheduled in the morning. About 1500 ml of isotonic mannitol solution was drunk continuously within 90–120 min before examination; (3) during MR rectography, when the patient has an impulse to defecate, it means that the agent has reached the rectum. To ensure the completeness of the examination, the patients were permitted to have two or three bowel movements before the beginning of examination.

The preliminary results of the study had shown that our present technique could achieve satisfied bowel distention, bowel cleaning, lesion depictures, and visualization of surgical planes [Figure 1a and 1b]. It could eliminate the effects of gas and feces on image quality, especially on DWI [Figure 1c]. In addition, fusion of MR rectography and DWI was carried out to facilitate staging of RC [Figure 1d]. This procedure also showed the patients' good toleration and cooperation.

In summary, this new protocol for MR rectography, which using isosmotic mannitol instead of US gel to distend bowel lumen after

bowel cleansing, has shown to be a feasible method to improve image quality and lesion depictures of RC through eliminating an effect of gas and feces. Another advantage is that our method can get rid of a susceptibility artifact induced by gas interface so that it is very suitable for DWI. Fusion of MR rectography and DWI



**Figure 1:** MR rectography and fusion of MR rectography with DWI. (a-c) A 54-year-old man with high RC. (a) Axial and (b) sagittal MR rectographic images show the tumor (arrows) and the well-distended rectal lumen (stars). (c) Axial DWI demonstrates the tumor (arrow) with high quality. (d) Axial fusion of MR rectography with DWI in a 59-year-old man with low RC visualizes the tumor (curve arrow) and enlarged lymph nodes (short arrows) with restricted diffusion in hot color. The clear mesenteric fascia (long arrows) can be identified also. MR: Magnetic resonance; DWI: Diffusion-weighted image; RC: Rectal cancer.

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might be a promising technique to improve the accuracy of RC local staging.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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