

Preoperative Assessment of Endometrial Carcinoma: Local Experience in a Private Hospital – a Pictorial Essay

HHL Chan¹, Cindy Xue², Gladys Lo¹

¹ Department of Diagnostic and Interventional Radiology, Hong Kong Sanatorium and Hospital

² Medical Physics and Research Department, Hong Kong Sanatorium and Hospital



Objectives

Our purpose is to evaluate the use of different imaging technique for detection of myometrial invasion and the disease stage in patients with endometrial cancer.

Materials and Methods

A retrospective study was performed. From January 2016 to July 2018, there were 37 women with endometrial cancer underwent preoperative MRI imaging by using a 1.5T MRI unit (Aera, Siemens). Three of the patients were performed with a 3T MRI unit (Skyra, Siemens). Multiplaner T1 and T2 weighted Imaging, Diffusion Weighted Imaging (DW imaging) (b=0 and 800 sec/mm²) and Sagittal Dynamic Contrast Material Enhanced (DCE) MRI imaging were performed. The depth of myometrial invasion was evaluated using the above-mentioned techniques. Three of the cases had non-contrast whole body PET MRI performed (Biograph mMR, Siemens). For the PET MRI cases, T2 weighted Imaging, Diffusion Weighted Imaging and FDG PET Imaging were performed.

Figure 1. MR images in a 44-year-old woman with FIGO stage IA endometrial cancer. Sagittal (a) DCE (b) T2 weighted, coronal (c) DCE (d) T2 weighted and axial (e) DCE (f) T2 weighted and (g) ADC map. DCE, T2 weight and DW images showed similar tumour extent (red arrows). The tumour was slightly enhancing on DCE, with intermediate T2 weighted signal intensity and hypointense on ADC map. No myometrial invasion was demonstrated.

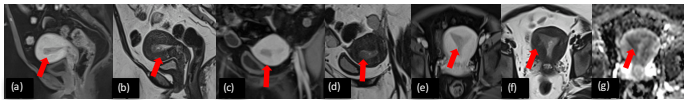


Figure 3. MR images in a 52-year-old woman with FIGO stage IB endometrial cancer. Sagittal (a) DCE, (b) T2-weighted, (c) DW, (d) ADC Map and axial (e) T2-weighted and (f) ADC map. The tumour was shown to have > 50% myometrial invasion (red arrows). DCE and T2 weighted with DW showed similar tumour extent.

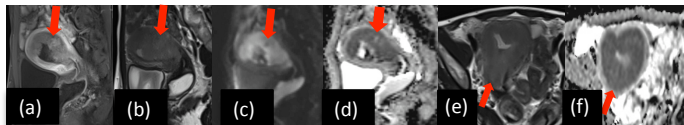
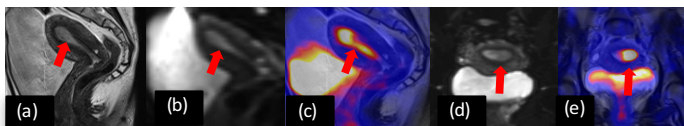


Figure 5. PET MRI images obtained from a 51-year-old woman with FIGO stage IA endometrial cancer. Sagittal (a) T2-weighted, (b) DW, (c) PET MRI fusion image and coronal (d) DW and (e) PET MRI fusion images. The tumour was almost completely filling the endometrial cavity without myometrial invasion (red arrows). No extension to cervix was found. On the PET MRI fusion images, the tumour was shown to be of similar extent as the T2 weighted and DW images.



References

1. FIGO Staging System for Endometrial Cancer: Added Benefits of MR Imaging. Peter Beddy et al. *RadioGraphics* 2012; 32:241–254.
2. Usefulness of DWI in preoperative assessment of deep myometrial invasion in patient with endometrial carcinoma: a systematic review and meta-analysis. Sushant K Das et al. *Cancer Imaging* 2014;14:32.
3. Myometrial invasion in Endometrial Cancer: Diagnostic Accuracy of Diffusion-Weighted 3.0T MR imaging – initial Experience. Gigin Lin et al. *Radiology*. 2009 Mar 250(3):784-92.
4. Value of fusion of PET and MRI for staging of endometrial cancer: Comparison with F-FDG contrast-enhanced PET/CT and dynamic contrast-enhanced pelvic MRI Kazuhiro Kitajima et al. *Eur J Radiol*. 2013 Oct; 82(10):1672-1676.

Results

Among the 40 patients with DCE MRI performed, 29 (72.5%) of them were found to have stage Ia disease, 10 (25%) with stage Ib disease and 1 (2.5%) with stage II disease. We did not have patients with stage III and IV disease. Among the patients with whole body PET MRI performed, one patient had stage Ia disease and two patients had stage II disease. No parametrial or lymph node metastasis were demonstrated. The age of our patients range from 30 to 72, with mean age at 53.7. Six cases were selected for illustration of the use of different techniques in demonstrating the depth of myometrial invasion.

Conclusions

Our results were comparable to other studies. T2 weighted with DW imaging and DCE imaging had comparable accuracy in accessing the depth of myometrial invasion. T2 weight and DW fusion images were better illustrated by using the 3T MRI machine. For the PET MRI studies, apart from assessing the myometrial invasion, it had the advantage of better assessment of the regional lymph node involvement and distant metastasis.

Figure 2. MR images in a 48-year-old woman with FIGO stage IA endometrial cancer. (a) Sagittal DCE MRI showed loss of endometrial ring (yellow arrow), suggestive of superficial myometrial invasion. (b) Sagittal T2 weight image showing tumour with intermediate signal intensity (red arrow). (c & d) The tumour was hyperintense on DW image and hypointense on ADC map (red arrows). The superficial myometrial invasion was less well demonstrated by the T2 weighted and diffusion images.

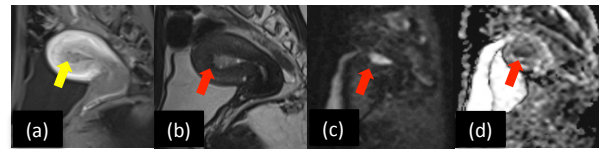


Figure 4. MR images obtained from a 58-year-old woman with FIGO IA endometrial cancer. Sagittal (a) T2-weighted (b) Fusion image of T2-weighted and DW and (c) DW Images using 3T MRI showing endometrial cancer with superficial myometrial invasion. In the fusion image, the colour coding demonstrates endometrial cancer and the superficial myometrial invasion (blue arrow) better than the T2 weighted and DW images (red arrows).

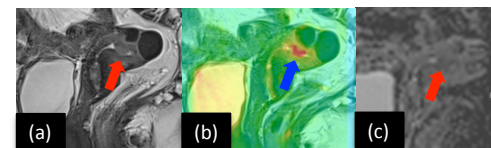


Figure 6. PET MRI images obtained from a 48-year-old woman with FIGO stage II endometrial cancer. Sagittal (a) T2 weighted and (b) PET MRI images showing >50% myometrial invasion (red arrows). Sagittal (c) T2 weighted and (d) PET MRI images showing cervical extension (yellow arrows). The extent of the myometrial invasion was better assessed by the T2 weighted image.

