

Ovarian masses: Evaluation with diffusion weighted MR imaging

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Purpose

To prospectively evaluate the diagnostic capabilities of diffusion weighted Magnetic Resonance Imaging (DWMRI) in characterizing ovarian masses.

Methods and Materials

40 consecutive patients with ultrasound evidence of 46 ovarian masses underwent pelvic MRI examination using a 1.5 Tesla MR unit. MRI protocol included conventional T1 and T2-weighted FSE sequences and single shot echo-planar diffusion weighted sequence with five different b values: b=0, 200, 300, 500, 1000 sec/mm². Apparent diffusion coefficient (ADC) maps were reconstructed. The ADC value of the ovarian masses was calculated and correlated with the histopathological examination available in all patients and considered as reference standard.

Results

The lesions observed were as follows: 4 functional cysts (fig.1), on page 310 endometrial cysts (fig.2), on page 34 fibromas (fig.3), on page 410 mature cystic teratomas (fig.4), on page 5 7 serous cystadenocarcinoma (fig.5), on page 6 2 mucinous cystadenocarcinoma, 1 granulosa cell tumor, 2 secondary lesion (fig.6), on page 76 tubo-ovarian abscess (fig.7) on page 8. The mean ADC value of malignant lesions on page 6 was $1.65 \pm 0.14 \times 10^{-3}$ mm²/sec, benign masses on page 3 was $1.53 \pm 0.57 \times 10^{-3}$ mm²/sec and inflammatory masses on page 8 was $1.21 \pm 0.28 \times 10^{-3}$ mm²/sec. There was statistically significant difference in the mean ADC values between malignant and inflammatory ovarian masses ($p < 0.001$) and within benign masses ($p < 0.006$). There was insignificant difference in ADC values between malignant and benign lesions ($p = 0.094$) and within malignant masses ($p = 0.624$).

Images for this section:

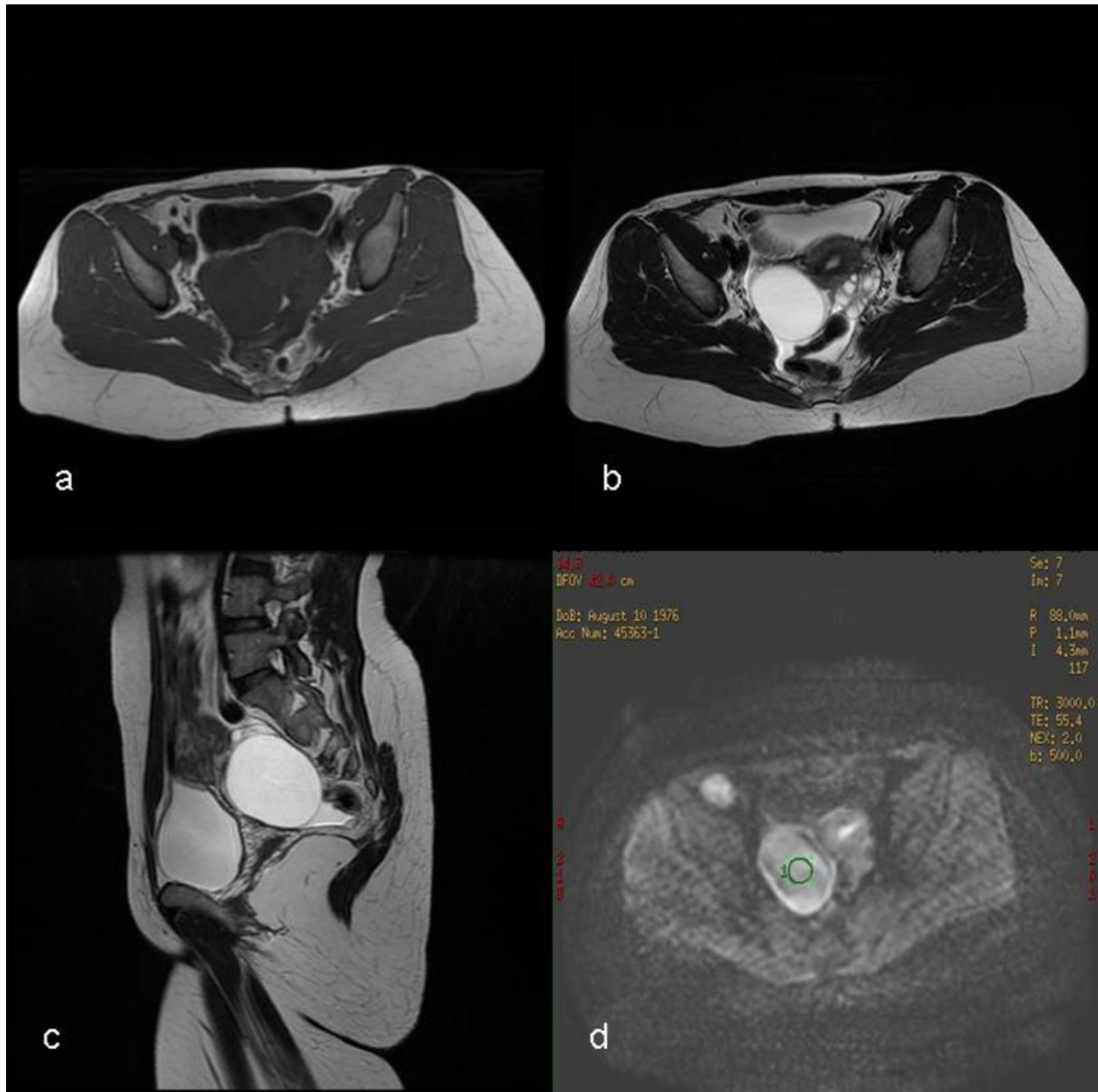


Fig. 1: Right functional ovarian cyst in a 32 years-old female. (a) Axial T1-weighted image shows the right ovarian functional cyst as low signal intensity lesion. Axial (b) and sagittal (c) T2-weighted images show the lesion as a high signal intensity area. (d) Diffusion weighted image - b 500

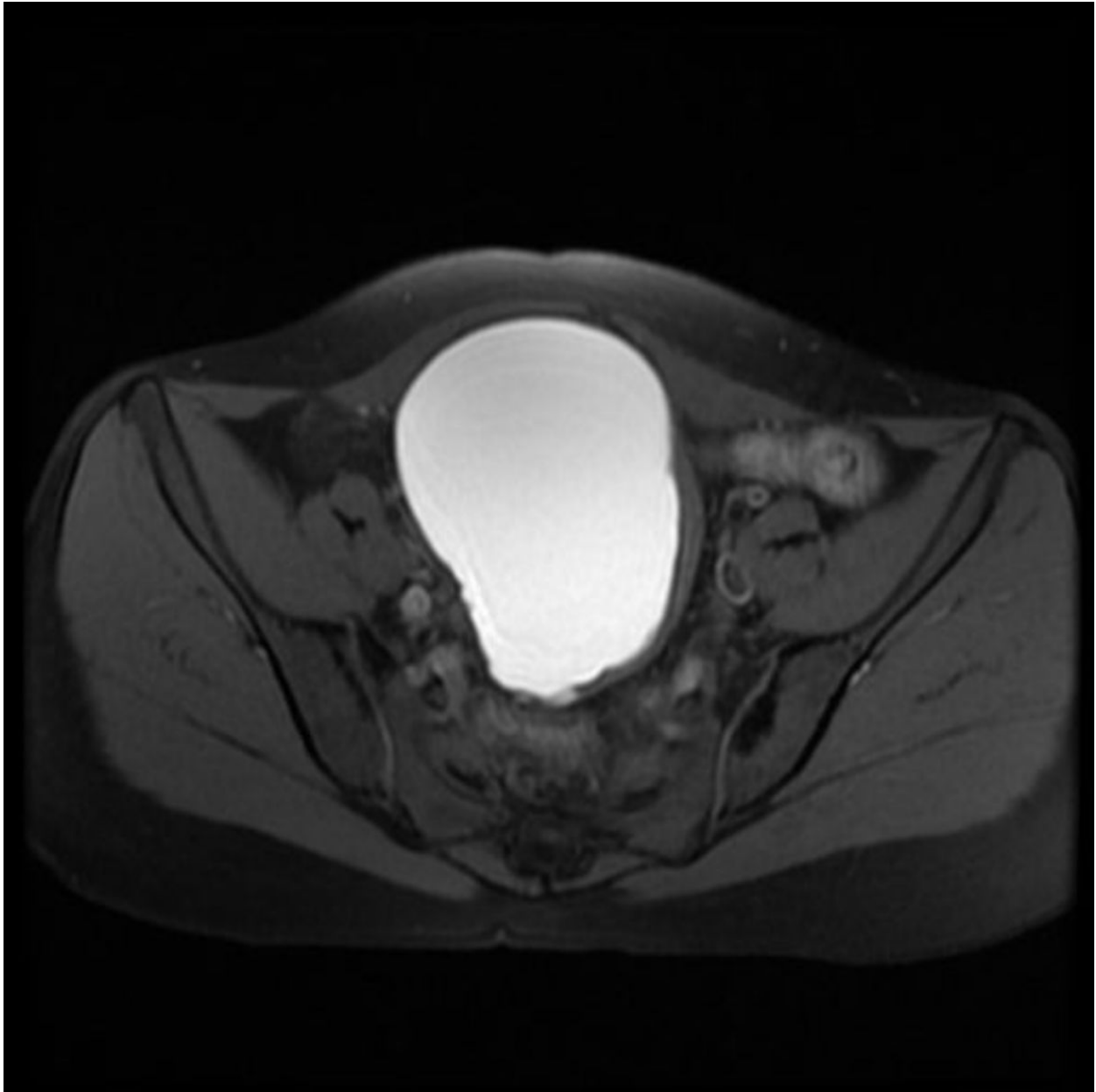


Fig. 2: Endometriomas in a 29 years-old woman. Axial T1-weighted fat-saturated spin-echo MR image shows a pelvic mass with high signal intensity that represents endometriomas.

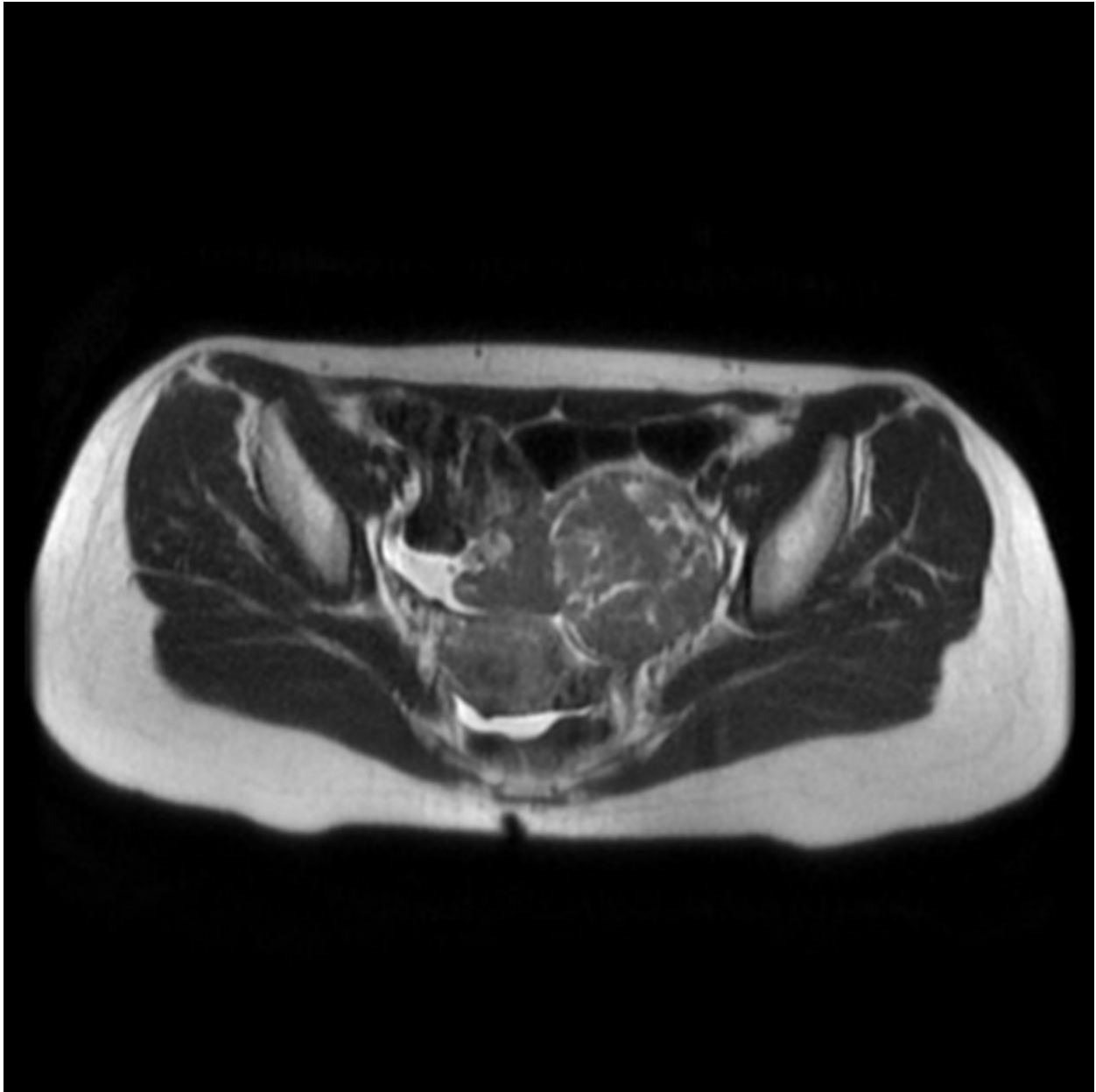


Fig. 3: Fibroma in 26 years-old woman. Axial FSE T2-weighted image shows the mass as hypointense.



Fig. 4: Mature cystic teratoma in a 38 years-old woman. Axial chemical-shift image shows the mass with heterogeneous iso-high-low signal intensity.

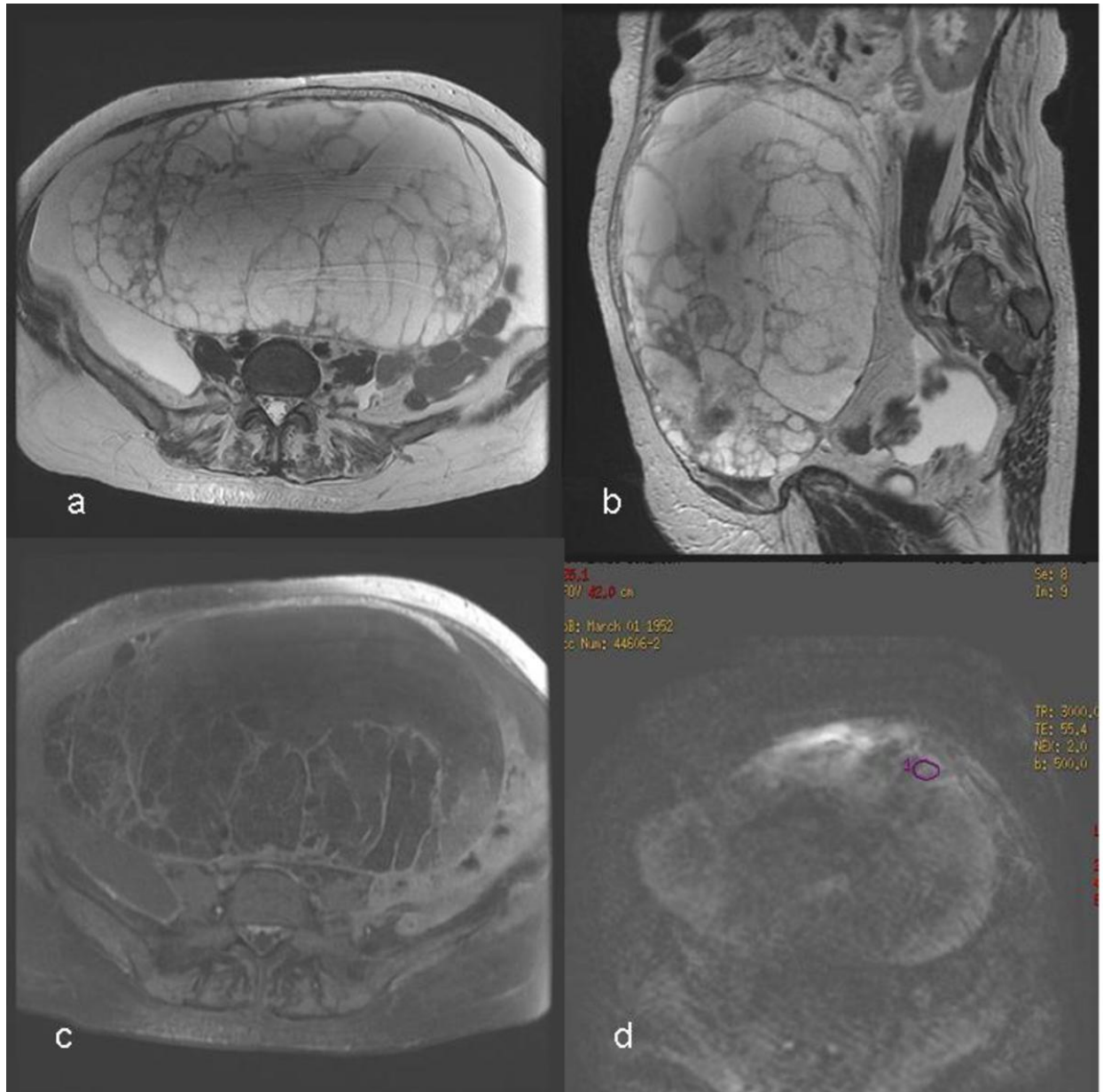


Fig. 5: Serous cystadenocarcinoma in a 56 years old women. Axial(a)and sagittal (b) T2-weighted images demonstrate a large multilocular cystic mass with multiple septa and papillary projections. Axial (c) Contrast-enhanced T1-weighted image demonstrates enhancement of septa and papillary projections within the cystic tumor. (d) Diffusion weighted image - b 500.

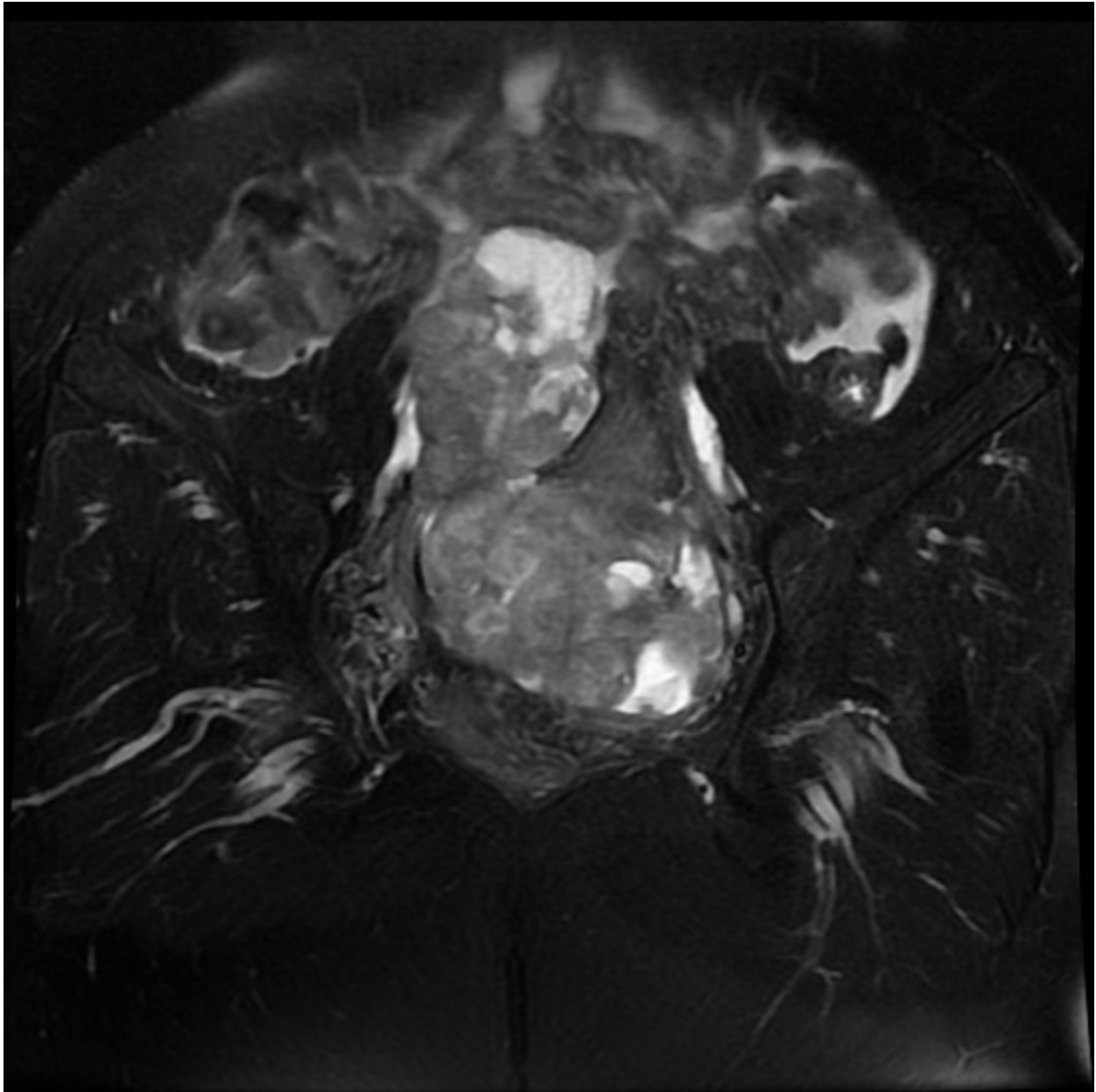


Fig. 6: Krukenberg tumor in a 43-year-old woman. Coronal T2-weighted fat saturated fast spin-echo image demonstrates a large lobulated mass of heterogeneous high and intermediate intensity.

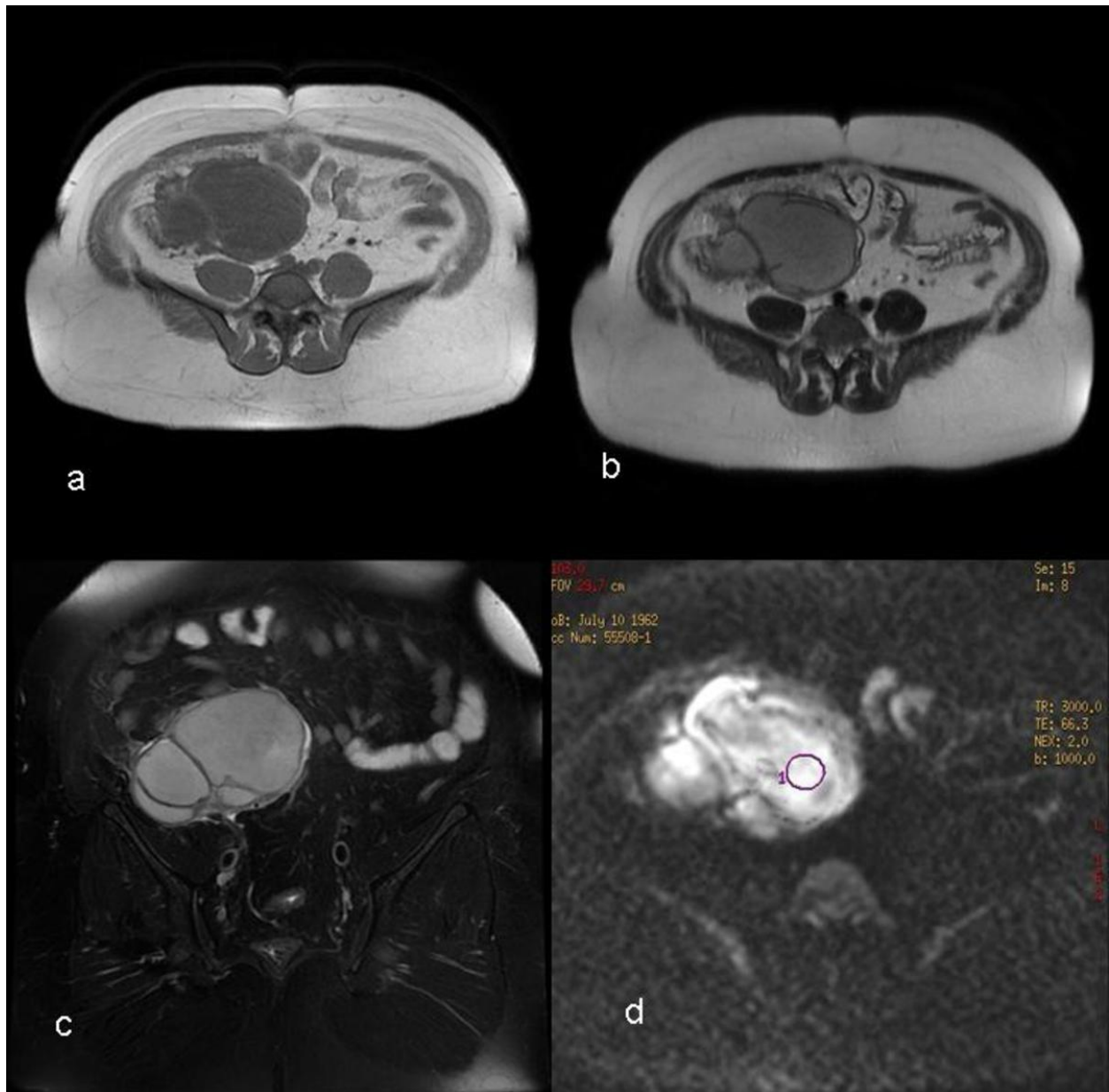


Fig. 7: Tubo-ovarian abscess in a 46 year-old woman. (a) Axial T1-weighted MR image shows a right adnexal mass with high signal intensity of the inner wall. Axial T2-weighted (b) and Coronal T2-weighted fat-saturated (c) MR images show that the mass is septate and cystic with a thick wall. The contents have high signal intensity, which is lower than that of a pure cyst. (d) Diffusion weighted image - b 500

Conclusion

Direct visual assessment of DW images of ovarian lesions and ADC measurement are not useful in differentiating benign from malignant ovarian lesions. Diffusion weighted MRI is a non-invasive imaging tool that can be useful for differentiating malignant from inflammatory ovarian masses.

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