



MRI MONITORING IN OVARIAN ENDOMETRIOSIS – FROM PHYSICIST TO RADIOLOGIST: A CASE PRESENTATION

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➤ INTRODUCTION

This study reports the case of a patient with an ovarian endometriotic cyst who underwent serial MRI examinations over a one-year period. Using a dual physicist-radiologist approach, the study highlights the value of integrating technical expertise with clinical interpretation.

Physicist perspective. In this case, particular attention was given to maintaining consistency in MRI equipment and acquisition parameters, as technical variations may mimic or obscure true pathological changes. Differences in field strength, sequence parameters, or signal-to-noise ratio (SNR) can alter image contrast (T1WI, T2WI) or the apparent cyst size without reflecting actual disease progression. Spatial resolution directly influences volumetric measurements and lesion delineation.

Radiologist perspective. Building upon these technical considerations, the clinical evaluation was performed using the same MRI system and identical sequence protocols to ensure reliable longitudinal comparison. Under these controlled conditions, the right ovarian endometriotic cyst demonstrated a marked increase in size compared with the previous year's examination, with an estimated fourfold increase in volume. In addition, two newly developed left ovarian endometriotic/hemorrhagic cysts were identified.

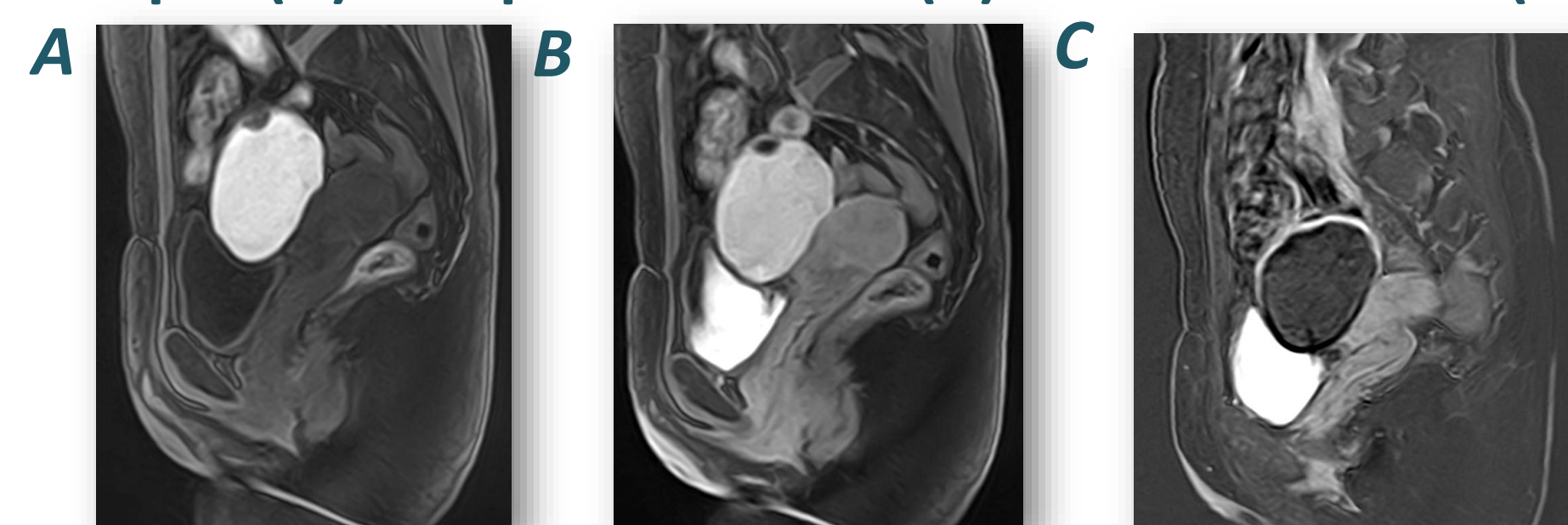
➤ DISCUSSION - OVARIAN ENDOMETRIOMA

Initial Investigation

SAG T2 WI AX DWI B=800 AX DWI ADC



Sequences T1 WI FAT SAT of pelvic with the right ovarian cyst pre (A) and post-contrast (B) and subtraction (C)

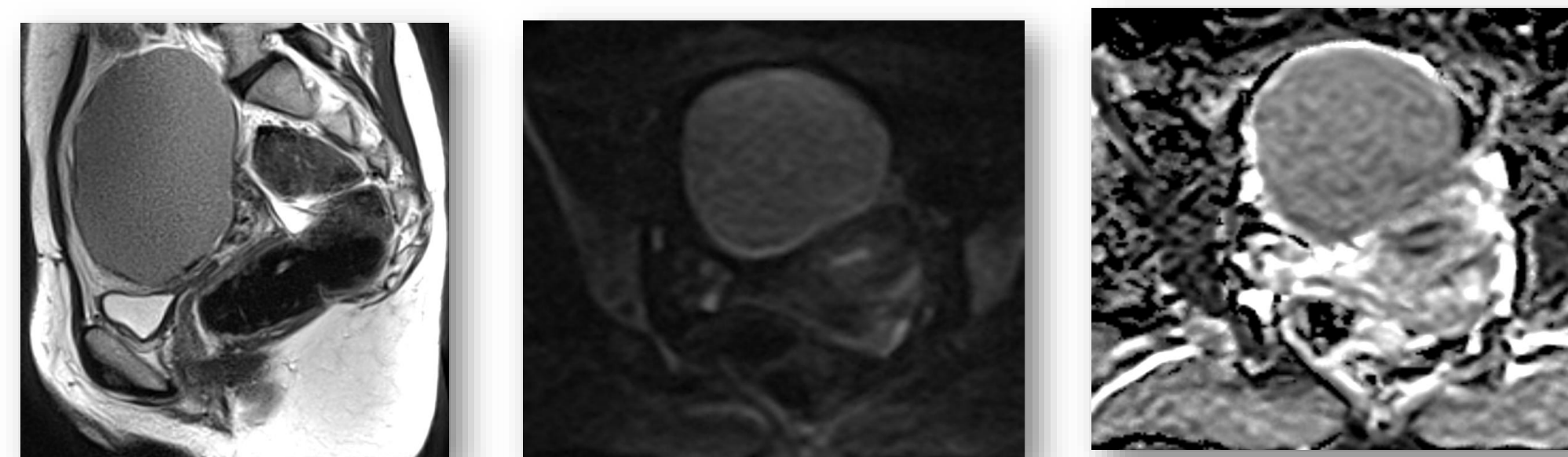


AFTER THE INITIAL MRI, SIX MONTHS OF HORMONAL THERAPY SHOWED NO CHANGE IN CYST SIZE. MRI WAS REPEATED AFTER A FURTHER SIX MONTHS.

The lesion showed hypointense signal on T2-WI and hyperintense signal on T1-WI FAT SAT, shading sign, suggesting hemorrhagic content. The mean ADC value measured was $1.14 \times 10^{-3} \text{ mm}^2/\text{s}$ which is consistent with previously reported ranges in the literature for endometriomas. In this case, the ovarian cyst showed no contrast enhancement on DCE-MRI and post-contrast T1-WI sequences, just the wall of the cyst shows mild enhancement, imaging pattern suggestive of an endometrioma. Also, this result is consistent with its typical hemorrhagic content and low vascularity.

Follow-Up Examination After One Year

SAG T2 WI AX DWI B=800 AX DWI ADC



Sequences T1 WI FAT SAT of pelvic with the right ovarian cyst pre (A) and post-contrast (B) and subtraction (C)



The lesion exerted a significant mass effect, causing posterior displacement of the uterus and compression of the urinary bladder. Despite the significant increase in size, the cyst maintained similar MRI signal contrast enhancement features compared to the previous examination.

The mean ADC value of the endometrioma increased from $1.14 \times 10^{-3} \text{ mm}^2/\text{s}$ to $1.44 \times 10^{-3} \text{ mm}^2/\text{s}$ after one year, likely reflecting progressive degradation and dilution of the hemorrhagic content, resulting in less restricted diffusion. As in the case of the first MRI investigation the ovarian cyst showed no contrast enhancement on DCE-MRI and post-contrast T1-WI sequences, just the wall of the cyst shows mild enhancement.

Laparoscopic Surgical Treatment After Confirmed Diagnosis

After the second MRI, the diagnosis of ovarian endometriotic cyst was confirmed, and the patient underwent surgery.

Intraoperative view of the endometriotic cyst.



Histopathological examination of the excised lesion confirmed the diagnosis, revealing the presence of corpora albicantia. After surgery, hormonal treatment was recommended to the patient to reduce the risk of recurrence, along with regular monitoring.

➤ CONCLUSIONS

Image quality is an important factor in **the accurate diagnosis of pelvic MRI**. Various artifacts, including respiratory motion, susceptibility effects, and improper parameter selection, can compromise the investigation image, hide pathological findings or may be confused with a pathology. Although MRI is a non-invasive technology that provides significant diagnostic value, a comprehensive understanding of the **physical principles of image acquisition and contrast generation** is essential for optimizing image quality and ensuring diagnostic accuracy. In conclusion, this work emphasizes that a solid understanding of how acquisition parameters affect image quality and quantitative consistency is fundamental for meaningful longitudinal assessment. When combined with careful clinical interpretation, these considerations contribute to more accurate and confident diagnostic evaluations.

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