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Study question: Is magnetic resonance imaging (MRI) a valid method to access antral follicles count (AFC) compared to two-dimensional (2D) transvaginal ultrasonography (USG) and Anti-Mullerian Hormone (AMH) to evaluate the ovarian reserve?

Summary answer: AFC has a high agreement between MRI and USG methods, as well as with AMH. MRI can be an alternative method to evaluate ovarian reserve.

What is known already: In fact, two methods are the most used today to assess ovarian reserve: USG and AMH. The USG is considered the gold standard method for AFC, and contributes to predict and tailor treatment strategies, such as in-vitro fertilization. The major limitations of USG are its user dependency and equipment. Also, there are limitations in displaying a global view of the pelvis and large ovarian lesions. Magnetic resonance imaging (MRI), with its excellent soft-tissue contrast resolution and characteristics, is a useful non-invasive alternative modality to USG. Just one study evaluated MRI and revealed more small size antral follicles compared to 3D-USG.

Study design, size, duration: A prospective cross-sectional observational study was performed in an assisted reproduction techniques (ART) post-graduation program setting from an assisted reproductive center in Sao Paulo, Brazil, which ran throughout 2019-2020, with a total number of 59 patients that were in fertility treatment and needed to undergo to a MRI procedure to evaluate uterine or pelvic diseases as, Myoma, Adenomyosis, endometriosis, and adnexal cysts.

Participants/materials, setting, methods: Patients were evaluated to access the AFC by the MRI method and 2D transvaginal USG, and Anti-Mullerian Hormone (AMH) concentration to evaluate the ovarian reserve. Comparison between methods was done through Wilcoxon signed ranks test and Bland-Altman analysis. Ovarian reserve was classified as follows: very low (<4 follicles/AMH<0.5); low (5-7 follicles/AMH=0.5-1.1); normal (8-15 follicles/AMH=1.1-3.5); normal-high (>15 follicles/AMH>3.5). Weighted Cohen's kappa was used to verify agreement between MRI, USG and AMH classifications of ovarian reserve.

Main results and the role of chance: Average AFC for USG were 5,55±4.01 for left ovary and 5.55±3.8 for right ovary. Average follicle count for both ovaries was 10±7.07. Regarding MRI, mean counts were 6.44±4.81 for left ovary, 5.65±3.85 for right ovary, and a 11.89±7.89 follicle sum mean count. Average concentration of AMH was 1.79±1.44. The Wilcoxon test and Bland-Altman analyses found differences and systematic biases for comparison between USG and MRI for both ovaries (-2.58; limits of agreement=-14.56 to 9.40, Wilcoxon p=0.008) and for the right ovary (-1.48; limits of agreement=-8.32 to 5.35, Wilcoxon p=0,031). There was no difference between methods for the left ovary. Weighted Cohen Kappa coefficients showed substantial agreement between ovarian reserve classifications based on AMH levels, USG, and MRI. The conducted paired comparisons were USG with MRI (k=0.676), AMH with MRI (k=0.760) and USG (k=0.609).

Limitations, reasons for caution: The systematic biases found when comparing USG to MRI methods may suggest a consistent detection of more follicles with MRI procedures in comparison to the USG method. This bias found warrants caution as it must be confirmed, in future studies.

Wider implications of the findings: The MRI method reveals similar ovarian reserve to USG when used the same classification, and a higher agreement to AMH. This suggests that MRI is a reliable method of quantifying antral follicles and can also be adopted when the patient will need to evaluate pelvic pathologies.

Trial registration number: not applicable

P-679 Magnetic resonance imaging (MRI), an alternative method to evaluate the ovarian reserve

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