

# COMPARISON BETWEEN TWO DIMENSIONAL AND THREE DIMENSIONAL ULTRASOUND IN EVALUATION OF OVARIAN RESERVE

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## Introduction

The number and quality of oocytes currently present in the ovaries of a woman at a given time are referred to as her ovarian reserve. The ovarian reserve evaluation is essential in clinical management of infertility because it offers valuable diagnostic and prognostic information. It would cause the clinician to adapt the protocol of ovarian stimulation on individual basis, giving each couple the best chance possible and lowering the number of cancelled ART treatment due to poor ovarian response (POR) or hyper ovarian response. Regarding the number of oocytes retrieved a poor ovarian responder is defined by the oocytes retrieval as less than 4. Hyper responder is defined by the oocytes retrieval more than 15 oocytes after a standard stimulation regimen. There are many ovarian reserve tests( ORTs) such as :age, basal follicle stimulating hormone (FSH), Anti-Müllerian hormone (AMH), Inhibin B, Antral follicle count, basal estradiol (E2), clomiphene citrate challenge test, Exogenous follicle stimulating hormone ovarian reserve test and Gonadotrophin releasing hormone agonist stimulation test. Many authors found that the Anti –Müllerian hormone (AMH) and the Antral follicle count are the best markers of ovarian reserve status. For several years Transvaginal 2D ultrasound has been used broadly to assess the antral follicle with good resolution and accuracy in the early follicular phase, by determining the mean of two perpendicular measures. Recently several studies show a very good reliability of transvaginal 3D ultrasound versus Transvaginal 2D Ultrasound

## Aim of the work

The aim of this study was to compare Transvaginal 3D ultrasound and Transvaginal 2D ultrasound in evaluation of ovarian reserve.

## Patients and Methods

This study was carried on 60 women undergoing assisted reproduction (IVF or ICSI). All cases underwent transvaginal ultrasound by 2 D then by 3D on day 3 of cycle in determination of Antral follicle Count , the AMH was be measured on day 3 of cycle by appropriate immunoassay method and finally the number of oocytes retrieval was determined .

## Results

The Mean  $\pm$ SD of total AFC measured by 2D ultrasound were  $8.82 \pm 4.96$  . The mean  $\pm$ SD of total AFC measured by 3D were  $13.60 \pm 8.08$  . According to the AMH the Mean  $\pm$ SD of AMH were  $3.20 \pm 2.93$  ng/ml. According to number of oocytes retrieval the mean  $\pm$  SD were  $11.77 \pm 9.74$ . The correlation between AFC measured by 2D US and the AMH was positive and highly statistically significant. The correlation between the AFC measured by 2D US and the number of oocytes was strongest, positive and statistically significant. The correlation between AFC finding by 3D US and AMH was positive ( $r=0.53$ ) and statistically significant. The AUC of AMH to predict the poor ovarian response was 0.945 with a cutoff of  $\leq 1.2$  ng/ml. While the AUC of AFC finding by 2D US to predict the poor ovarian response was 0.968 with a cutoff  $\leq 4$  follicles . For the AFC finding by 3D US the AUC to predict the poor ovarian response was 0.965 with a cutoff of  $\leq 6$  follicles . But the difference was not statistically significant . The AUC of AMH to predict the hyper ovarian response was 0.873 with a cutoff of  $>3.62$  ng/ml . While the AUC of AFC measured by 2D US to predict the hyper ovarian response was 0.925 with the cutoff of  $>10$  follicles. For AFC measured by 3D US the AUC to predict the hyper ovarian response was 0.938 with the cutoff of  $>14$  follicles (95%CI:0.880-0.995).But the difference was not statistically significant.

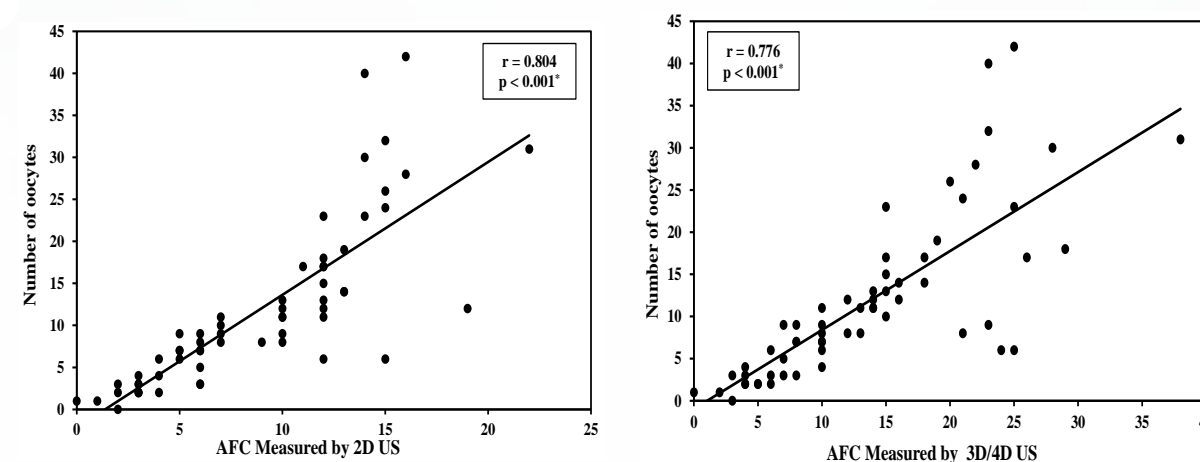


Fig (1): Correlation between the AFC by 2D US and the number of oocytes retrieval

Fig (2): Correlation between the AFC by 3D US and the number of oocytes retrieval

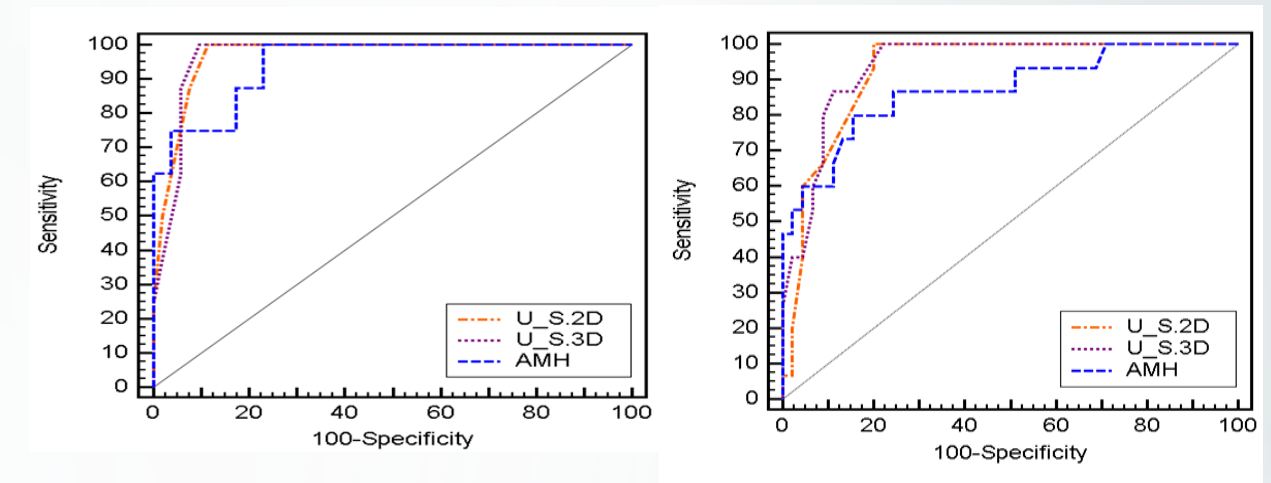


Fig (3) : comparison between ROC curves of AMH , AFC measured by 2D US and AFC measured by 3D US in prediction of the poor ovarian response

Fig (4) : comparison between Roc curves of AMH, AFC by2D and AFC by 3D in prediction of hyper ovarian response

## Conclusion

AFC measured by any of the two techniques appear to be a good predictor of poor ovarian response and hyper ovarian response. AFC by 2D is slightly better to predict the poor ovarian response than the AFC by 3D and AMH but the difference was not statistically significant. AFC by 3 D was slightly better to predict the hyper ovarian response than the AFC by 2D and AMH. However, there is no real reason to use 3D in ovarian evaluation because it does not add any much in to our clinical management .In the country with limited resources, the assessment of AFC by 2D in evaluation of ovarian reserve is encouraged and the systematic using of 3D to evaluate the AFC is not recommended