

P-688 Assessment of ovarian vascularity by three-dimensional vaginal power Doppler on day two of menstrual cycle to predict the number of mature eggs collected

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Study question: Could ovarian vascularity indices, measured by 3-dimensional (3D) vaginal power Doppler, predict the number of mature oocytes collected after controlled ovarian stimulation?

Summary answer: Ovarian vascularity index (VI) may be an indicator of poor (<three mature eggs collected) and high (>ten mature eggs collected) ovarian responses to gonadotropins.

What is known already: Poor and/or hyper ovarian responses to gonadotropins may be related to cycle cancellation during controlled ovarian stimulation (COS). In this context, gonadotropin dose is often individualized using patient features that predict ovarian response (such as age, antral follicular count (AFC) and anti-Müllerian hormone (AMH)). In parallel, ovarian vascularity color doppler is a valuable evaluation method to predict the ovarian hyperstimulation syndrome and the growth/maturity of Graafian follicles. The aim of the present study is

to estimate the utility of 3-dimensional vaginal power Doppler and ovarian vascular flow indices in the prediction of the number of mature oocytes collected after COS.

Study design, size, duration: A prospective study was conducted on 200 couples undergoing intracytoplasmic sperm injection cycle at Al Hadi Laboratory and Medical center, Beirut, Lebanon. It was performed between January 2020 and July 2020. Couples were categorized into poor responders group (3 or less metaphase II (MII) eggs collected) (n=43), high responders group (10 or more MII eggs collected) group (n= 66), and normal responders group (more than 3 and less than 10 MII eggs collected) (n=66).

Participants/materials, setting, methods: On the second day of the menstrual cycle, ovarian volume and vascularity parameters (vascularity index (VI), flow index (FI), and vascularity flow index (VFI)) were measured using the 3D power Doppler and the Virtual Organ Computer-Aided Analysis. On the same day, the antral follicle count was evaluated and a blood sample for AMH testing was collected. Women included in the study have undergone COS using GnRH antagonist protocol.

Main results and the role of chance: Receiver operator characteristics (ROC) curve model was used to predict the number of mature eggs collected. 7 parameters were used to predict poor and high ovarian responses (Age, AMH, AFC, ovarian volume, VI, FI and VFI). Ovarian VI significantly predicted poor ovarian response to gonadotropins ($p=0.033$ and area under the curve (AUC)=0.668). Subsequently, the cut off value was 0.0025 with 84% sensitivity and 83.3% specificity. In parallel, ovarian VI significantly predicted high ovarian response to gonadotropins ($p=0.036$ and AUC (0.778)) with a cut off value 0.0375 and with 77.8% sensitivity and 78.3% specificity. Furthermore, VFI significantly predicted high ovarian response to gonadotropins ($p=0.045$; AUC=0.677).

Limitations, reasons for caution: It will be necessary to perform a prospective analysis on a broad sample size to validate these findings. In addition, it will be interesting to assess the impact of ovarian vascularity on pregnancy outcomes.

Wider implications of the findings: Assessing ovarian vascularity prior to ovarian stimulation can help reduce the rate of cycle cancellation. In addition, more studies are welcomed in the field to unravel the mechanisms behind altered ovarian vascularity and to test the possibility of restoring normal ovarian physiology.

Trial registration number: Not applicable