P-643 Is Euploid blastocyst number higher in luteal versus follicular phase? A case-control study of IVF outcomes of follicular versus luteal phase ovarian stimulation

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Study question: Is there a difference between IVF outcomes in patients undergoing follicular versus luteal phase ovarian stimulation in different menstrual cycles?
Summary answer: Number of euploid blastocyst were higher in luteal phase ovarian stimulation IVF cycles. All other outcomes were similar between follicular and luteal phase IVF cycles.
What is known already: It has been published that human beings can have two or three follicular recruitment waves as observed in animals studies a long time ago. From these findings, several recent studies showed that two egg retrievals at the same menstrual cycle, named as Duo Stim, optimize time and IVF outcomes in women with low ovarian reserve due to more eggs retrieved in a shorter period with consequently higher probability of having good embryos to transfer. However, there is no knowledge about diferences concerning IVF outcomes between folicular and luteal ovarian stimulation, performed at the same women in different menstrual cycles.

Study design, size, duration: Retrospective, case-control study in a single IVF center. One-hundred-two patients who had two IVF treatments – the first cycle initiating ovarian stimulation at follicular phase (FPS) and the second cycle initiating after a spontaneous ovulation at luteal phase (LPS) – in different menstrual cycles (until 6 months apart) between 2014 and 2020, were included. Statistical analysis was performed with Mann-Whitney test and was considered significant when $p \leq 0.05$. Data is represented as mean±SD.

Participants/materials, setting, methods: Patients underwent two IVF treatments in different menstrual cycles; the FPS IVF treatment was initiating at D2/D3 of menstrual cycle and the LPS treatment started three or four days after spontaneous ovulation, if at least 4 antral follicles were detected. Both IVF treatments were performed with and antagonist protocol and freeze all strategy. The majority of patients presents low ovarian reserve/Ovarian age as primary infertility factor (84.3%).

Main results and the role of chance: Patient's mean age was 39.30±3.15 years, BMI (22.66±3.16) and AMH levels (0.85±0.85 ng/mL). Comparison of hormonal levels at the beginning of ovarian stimulation showed differences for FPS vs LPS, as expected: E2 (39.69±31,10 pg/mL vs 177.33±214.26 pg/mL,p< 0.0001) and P4 (0.76±2.47ng/mL vs 3,00±5.00 ng/mL,p< 0.0001). However, E2 and P4 at the day of oocyte maturation trigger were not different between FPS and LPS (1355.24±895.73 pg/mL vs 1133.14±973.01 ng/mL,p=0.0883 and 1.12±1.49 ng/mL vs 2.94±6.51,p=0.0972 respectively). There was no difference for total dose of gonadotrofins (FPS 2786.43±1102.39.01UI vs LPS 2824.12±1188.87UI, p=0,8578), FSH (FPS 9.50±4.98 vs LPS 11.90±12.99,p=0.7502) and AFC (FPS 7.13±4.25 vs LPS 6.42±4.65,p=0,0944). From 102 patients that started ovarian stimulation, 78 had 1 or more oocyte collect in FPS group and 75 in LPS group: OPU (FPS 4.78±4.93 vs LPS 4.65±5.54,p=0.7889), number of MII (FPS 3.21±3.52 vs LPS 3.40±4.53,p=0.7889). From those, 52 patients performed ICSI in both cycles; fertilization rate 64.9%±28.6% for FPS vs 62.1%±32.4% for LPS,p=0.7899) and blastocyst formation 2.15±2.15 for FPS vs 2.54±2.35,p=0.3496). Data from 25 patients who had embryo biopsy for PGT-A showed similar number of blastocyst biopsed (2.12±1.72 FPS vs 2.48±1.71 LPS,p=0.3101) and a statistically significant difference regarding number of euploid blastocyst (0,20±0,41 FPS vs 0,96±0,93 LPS,p=0,0008).

Limitations, reasons for caution: This is a retrospective study in a limited number of patients. Therefore, it is not possible to make a definitive conclusion that LPS proportionate higher number of euploid than FPS. More studies are necessary to investigate not only IVF outcomes but also the impact on pregnancy rates.

Wider implications of the findings: In our study, LPS protocol after spontaneous ovulation, presents similar IVF outcomes compared to routinely FPS protocol. Intriguingly, the number of euploid blastocyst was significant higher in LPS, which may be further investigated. In this way, LPS is another option of IVF treatment, and may optimize time and treatment results.

Trial registration number: Not Applicable