OVARIAN FOLLICLE SIZE CORRELATES WITH THE SUBSEQUENT PACE OF IN VITRO EMBRYO DEVELOPMENT

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Background

Delayed blastulation (forming after day 5) reportedly correlates with embryo ploidy and implantation potential, particularly if the embryos are transferred in fresh autologous cycles following controlled ovarian stimulation.

The causes of delayed blastulation have not been fully investigated.

The objective of this study was to determine if the day of embryo blastulation correlates with the size of the originating ovarian follicle.

Methods

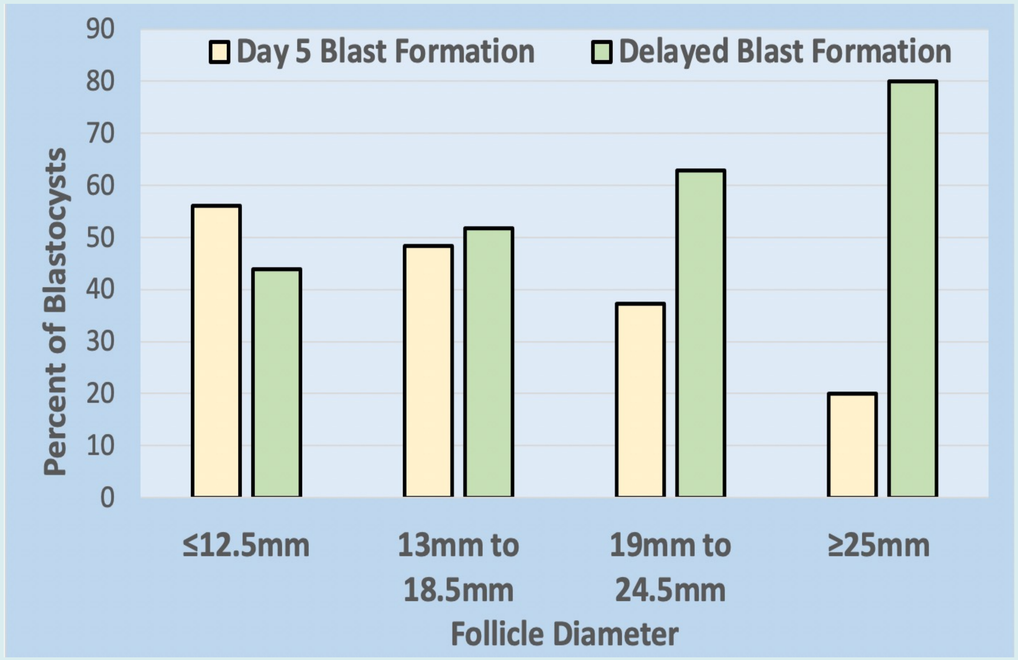
In this IRB-approved prospective observational study, patients underwent routine ovarian stimulation with exogenous gonadotropins.

During oocyte collection, each punctured follicle was sonographically measured. Embryos were group-cultured to the blastocyst stage according to follicle diameter.

The day of blastulation was recorded for blastocysts of transferable quality (no CC grades). Blastulation day frequencies were compared with a chi-square test. Logistic regression was used to control for potential confounding variables (age, oocyte cohort size, and use of PGT). $P<0.05$ was considered significant.

Results

	Diameter of punctured follicle			
	≤12.5mm	**13mm to 18.5mm**	**19mm to 24.5mm**	**≥25mm**
Day 5 blastulation	37 (56.1%)	97 (48.3%)	77 (37.2%)	9 (20.0%)
Day 6 blastulation	25 (37.9%)	90 (44.8%)	116 (56.0%)	27 (60.0%)
Day 7 blastulation	4 (6.1%)	14 (7.0%)	14 (6.8%)	9 (20.0%)
Total	66 (100%)	201 (100%)	207 (100%)	45 (100%)



The day of blastulation was recorded for 519 blastocysts derived from measured follicles. The frequencies of blastulation on each day are shown in Table 1. There was significant dependence between follicle size and day of blastulation ($P=0.0002$). The proportion of blastocysts forming on day 5 steadily decreased as follicle diameter increased. This relationship still held in logistic regression ($P<0.0001$) with follicle size as a continuous variable and after controlling for patient age, the number of oocytes collected, and the use of PGT.

Conclusions

Larger follicles were significantly less likely to produce rapidly developing (day 5) blastocysts. These findings provide interesting insight regarding ovarian stimulation and suggest an additional mechanism that could potentially limit success rates if prolonged stimulation is employed in pursuit of larger follicles.

Impact

If this is a causal relationship, then prolonged stimulation in order to obtain more large follicles (and hence more mature oocytes) might cause some delayed blastocyst formation. While follicle size reportedly does not correlate with embryo ploidy, delayed blastulation is associated with reduced implantation potential in fresh autologous cycles. Therefore, prolonged stimulation may be a poor choice in such cycles.