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YOUNGER PATIENTS ARE MORE LIKELY TO HAVE MOSAIC-ONLY EMBRYOS DUE TO THEIR LOWER LIKELIHOOD OF AGE-RELATED WHOLE CHROMOSOME ANEUPLOIDY

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OBJECTIVE: While embryo mosaicism is most likely a frequent biological occurrence, during ART treatment mosaicism frequencies had been thought to be influenced by embryo culture environment, sperm quality, insemination method, and/or biopsy protocol. ¹ Notwithstanding these associations, mosaicism rates had been thought to be largely independent of female age.^{2,3} A recent study shown a statistical trend towards decreased rates of mosaicism in women of advanced age (>37 years) compared with younger groups ⁴. Based on these observations, our study aims to assess the rate of mosaicism across patient age in a large cohort of screened blastocysts from a single IVF center.

MATERIALS AND METHODS:

Patients who underwent IVF from January 2020 - March 2021 were included. All embryos underwent PGT-A with FAST-SeqS. Embryos were assigned an interpretation of aneuploid, mosaic, or euploid; indeterminate/no call embryos were not included in the analysis. The PGT lab utilized for testing did not report mosaicism when present with a full aneuploidy; those embryos were assigned the interpretation of aneuploid. Thus, any embryos designated as mosaic are "mosaic-only." Cohorts were segregated into 5 groups based on SART age groups: (A: <35; B: 35-37; C: 38-40; D: 41-42; E: ≥43 years, respectively). Frequencies of mosaicism were compared across age groups with a Chi squared analysis and a multivariate regression analysis was performed to adjust for confounding variables.

RESULTS:

A total of 7,940 embryo biopsies were analyzed. A 13.01% prevalence of mosaic-only embryos was found in the cohort (n=1,035). When analyzing these frequencies per age, younger age groups had a significant higher prevalence of mosaic-only embryos: Group A: 15.2% (n=524); B: 14.13% (n=274); C: 10.9% (n=177); D: 6.6% (n=45) and E: 5% (n=13) (p<0.0001). After adjusting for day of biopsy and embryo grading, an increase in age was significantly associated with lower odds of isolated mosaicism (OR 1.06 CI95% 1.05-1.06). Day of biopsy, and embryonic quality were not associated with increased odds of isolated mosaicism. A sub-analysis analyzing the mosaicism levels detected with the NGS platform found no differences in frequencies of high and low level mosaicism across age groups.

CONCLUSIONS:

With the introduction of NGS, reproductive specialists have expanded knowledge surrounding the complexities of early human genomics. Our analysis demonstrates that younger women were more likely to have mosaic embryos without concurrent full aneuploidies. Patients of advanced age are more prone to meiotic segregation abnormalities, resulting in an increased probability of experiencing full and/or complex aneuploidies. For younger patients who are less likely to have meiotic errors, any abnormal findings are more likely to be mitotic in origin, and therefore mosaic.



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IMPACT STATEMENT:

Our study shows younger females are more likely to have mosaic embryos without concurrent full aneuploidies, which many clinics may consider an option for transfer. These findings could be utilized in order to enhance pre-cycle counseling for patients undergoing PGT-A.

REFERENCES:

1. Xiong S, et al. *J Assist Reprod Genet.* 2021 Mar 4:1–10.
2. Nakhuda G, et al. *Fertil Steril* 2018;109:857–65.
3. Rubio C, et al. *Biol Reprod.* 2019 Dec 24;101(6):1083-1090.
4. Rodrigo L, et al. *ASEBIR: Revista de Embriología Clínica y Biología de la Reproduccion* 2019;24:231–2.