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Results and clinical outcomes of PGT-A from a single fertility centre in Johannesburg, South Africa

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Abstract

Background

The use of preimplantation genetic testing for aneuploidy (PGT-A) as part of assisted reproductive technology (ART) has become routine practice in some settings as it is hypothesized that the selection of a euploid embryo should increase the probability of achieving a pregnancy. However, PGT-A as a universal screening tool for all ART cycles is yet to be determined as there are insufficient studies that support or refute its use.

Aims

The fundamental aim of this study was to investigate the effectiveness of PGT-A on ART cycles by evaluating the clinical outcomes at one ART centre in Johannesburg, South Africa. The study also aimed to quantify the chromosomal status of the blastocyst biopsies. In addition, the maternal age effect on ART and clinical outcomes was also evaluated.

Methods

A total of 1448 ART cycles fulfilled the inclusion criteria of the retrospective case-control record review. The PGT-A cases compr-*ised 854 ART cycles and the control group included 594 ART cycles. The next-generation sequencing (NGS) results for 2518 embryo biopsies subject to PGT-A analysis were available for investigation.

Positive beta-human chorionic gonadotropin (β-hCG) levels, implantation rates and clinical pregnancy were evaluated in the case and control groups to determine whether PGT-A improved clinical outcomes.

Results

The overall maternal ages ranged from 21 to 48 years, the mean ± standard deviation maternal age in the case group was 36 ± 4.50 years and was 35 ±4.32 years in the control group. The PGT-A results of the blastocysts identified chromosomes 22, 16, 15, 21, 4, 2, 19, X, 9 and 13 (incidence is reflected by the order) as having the highest number of abnormalities overall.

A logistic regression analysis revealed that the ART cycles in the PGT-A case group were 2.07 more likely to establish a clinical pregnancy ($p < 0.0001$) compared to the control group in the overall dataset. Furthermore, in the >40-year maternal age category the odds of establishing a

clinical pregnancy increased by three times in the case group compared to the control group ($p = 0.0015$).

Discussion

The study is novel in its contribution to the current body of PGT-A knowledge as it is the first evaluation of PGT-A conducted in South Africa. This study also draws its main findings per ART cycle which reduce patient bias.

The findings of this study support the use of PGT-A across all maternal age groups as the odds of achieving a clinical pregnancy with the transfer of a euploid embryo is significantly higher than in the group that used morphological assessment alone.

Conclusion

This study shows that PGT-A is an effective tool for embryo selection which promotes single embryo transfers and improves clinical outcomes.