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IS PARENTAL CONSANGUINITY ASSOCIATED WITH LOW OVARIAN RESERVE AND HIGHER RATE OF ANEUPLOIDIES?

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INTRODUCTION

Consanguineous marriage is defined as marriage between second-degree cousins or closer, with high prevalence in the Middle East societies. As consanguine couples are biologically related individual, the increased incidence of autosomal recessive diseases, which are at least ten-fold more prevalent, have been well described. Hence, parental consanguinity has also been associated with reduced ovarian reserve, which have been recently correlated with increase rate of aneuploid embryos.

OBJECTIVE

This study assessed whether women descending from consanguineous unions have a reduced ovarian reserve and an increased rate of aneuploid embryos as compared to daughters of non-consanguine couples.

MATERIAL AND METHODS

Retrospective observational study including couples who performed IVF/ICSI treatment with preimplantation genetic testing for aneuploidy (PGT-A), between January 2017 and December 2018.
PGT-A was performed on trophectoderm cells, using next generation sequencing (NGS). The ovarian reserve was evaluated by Antral Follicle Count (AFC) measurement with transvaginal ultrasound on day 2/3 of cycle and Anti-Müllerian Hormone (AMH), measured with automated assay Elecsys® (Roche).

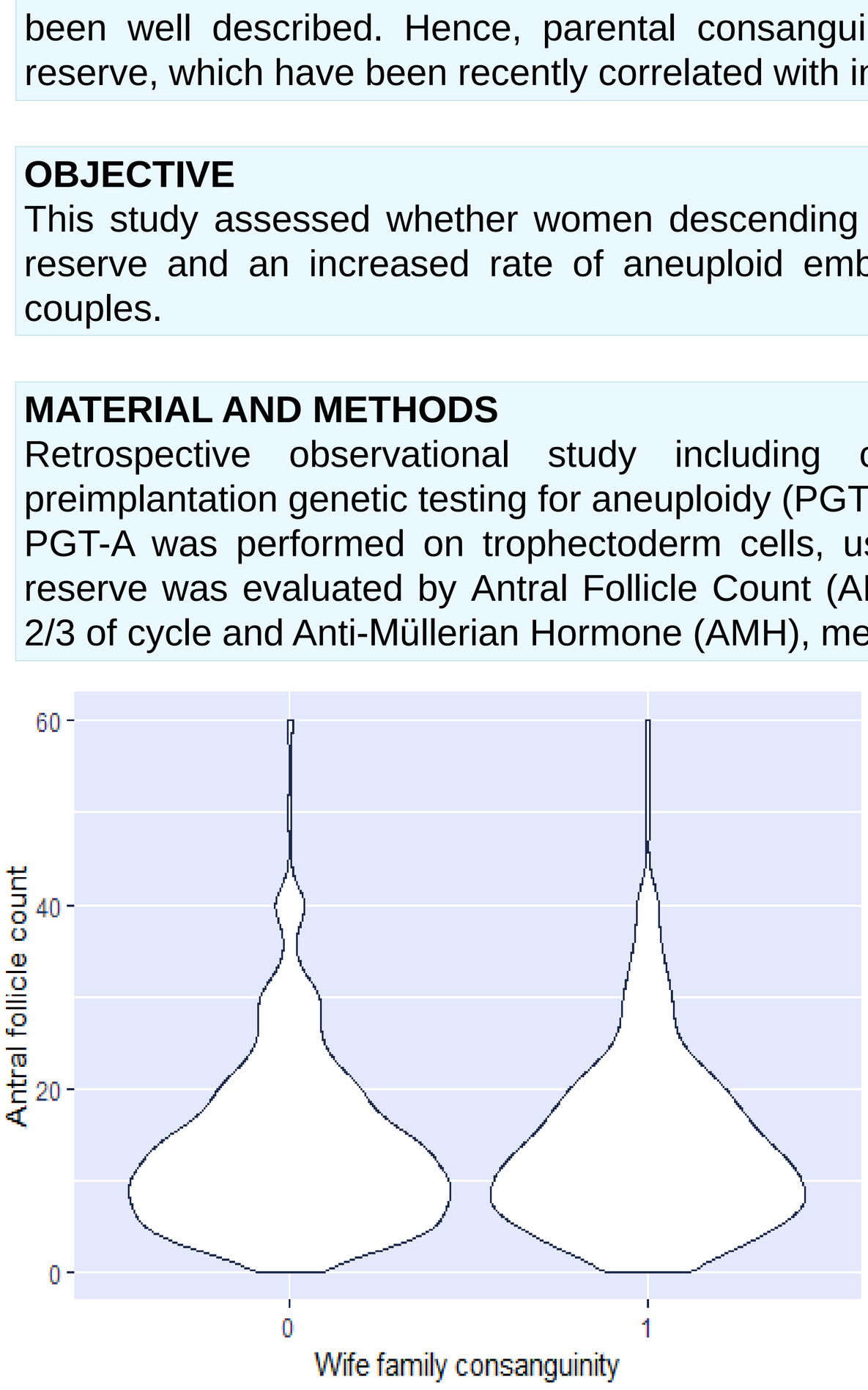

Figure 1. Violin plot of AFC and wife family consanguinity, where 0 represents ”no consanguinity” and 1 “consanguinity”, including first and second degree cousins. In each of the “violins”, the wider zones represent those AFC values more common in each of the groups. We can observe that the group with no consanguinity has more cases of high AFC values than the consanguinity group.

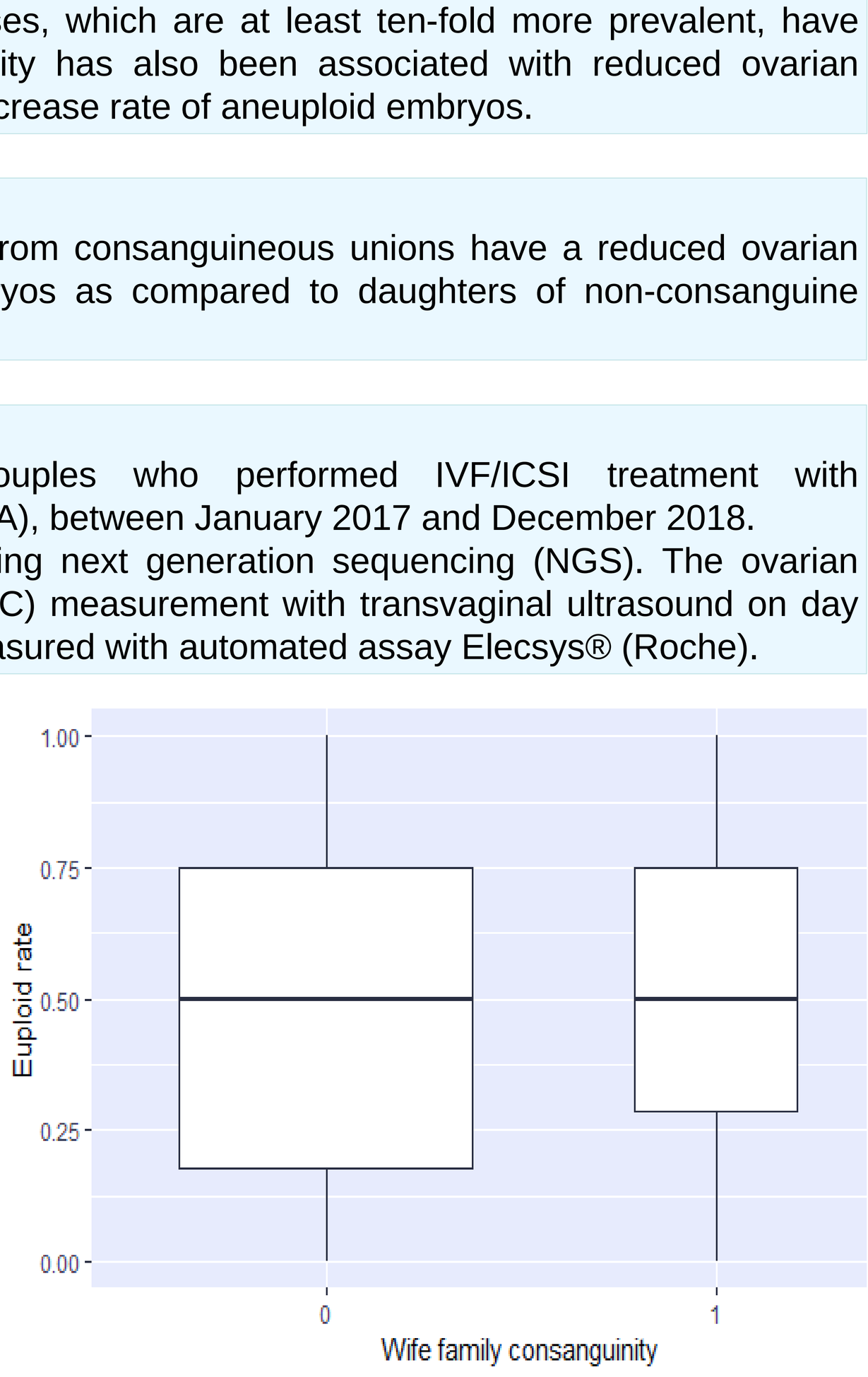

Figure 2. Boxplot of euploid rate vs family consanguinity, where 0 represents ”no consanguinity” and 1 “consanguinity”, including first and second degree cousins.

RESULTS

A total of 1476 couples aged 20 to 50 years were included. 1119 patients (76%) reported non-consanguineous kinship of their parents and 357 (24 %) were descendants from first- or second-degree consanguineous unions. No differences between groups were found regarding age and BMI. In a multivariant model, age and wife family consanguinity showed a strong significant impact in ovarian reserve. AFC of women descending from consanguineous unions was 6% lower compared with women at same age with no parental consanguinity (p=0,003401) (Figure 1).
4945 embryos were analyzed for PGT-A. In a multivariant Poisson regression model including female parental consanguinity as the exposure variable and age and BMI as the control variables, only age showed a significant negative effect on the euploid rate (p=6.877e-20), with a decrease of approximately 5% the mean number of euploid embryos per each additional year. No significant correlation was observed between euploidy and female parental consanguinity (p=0.7873) (Figure 2).

CONCLUSIONS

Parental consanguinity of the female partner is strongly associated with a significant reduced ovarian reserve; however, no significant reduced euploid embryo rate was observed in couples with a history of consanguinity on the side of the female partner. Due to the retrospective nature of this analysis, future prospective studies should evaluate a possible deeper association between parental consanguinity and infertility.