American Society for Reproductive Medicine 2018 Scientific Congress & Expo
October 6 to 10, 2018 ● Denver, Colorado, USA

Title:

FERTILE PATIENTS UNDERGOING IVF FOR PGT-M REQUIRE MORE OOCYTE RETRIEVALS THAN INFERTILE COUNTERPARTS, BUT ACHIEVE COMPARABLE OUTCOMES

Authors:
Cacchione TA[1], Herlihy N[2], Nazem T[1, 2], Gounko D[1], Lee J[1], Copperman AB[1,2]

Affiliations:
1. Reproductive Medicine Associates of New York, 635 Madison Ave 10th Floor New York, New York, United States, 10022

2. Obstetrics, Gynecology and Reproductive Science, Mount Sinai School of Medicine, Klingenstein Pavilion 1176 Fifth Avenue 9th Floor New York, New York, United States, 10029.

Objective:

Couples at risk for having children with a genetic disorder are frequently using Preimplantation Genetic Testing for monogenic disorders (PGT-M) to decrease the risk of having an affected child. The use of PGT-M requires undergoing in vitro fertilization (IVF) treatment even though a majority of PGT-M couples do not suffer from infertility, and thus many assume their lack of an infertility diagnosis entails higher success rates than those using IVF for infertility. However, due to the necessary exclusion of affected embryos, it is not uncommon for couples utilizing PGT-M to have fewer euploid embryos available for transfer than their infertile IVF counterparts[1]. As a result, predicting outcomes for fertile patients who use PGT-M is often challenging, particularly when counseling the couple on the number of cycles needed to achieve a pregnancy. While a number of prior studies have looked at outcome data for PGT-M cycles, few have included concurrent pre-implantation genetic testing for aneuploidy (PGT-A).[2, 3] This

study aimed to determine multiple outcome measures for couples without a diagnosis of infertility who underwent IVF with PGT-M and PGT-A.

Design:

Retrospective cohort analysis

Materials and Methods:

The study included infertile patients who underwent IVF with PGT-A and patients presenting at our clinic solely for IVF for PGT-M with PGT-A between 2014-2018. Patient age, anti-mullerian hormone (AMH), basal antral follicle count (BAFC), number of oocytes retrieved, number of blastocysts biopsied, number of euploid embryos and number of affected/unaffected/carrier embryos were determined. The number of vaginal oocyte retrieval (VOR) cycles and number of frozen embryo transfer (FET) cycles needed to achieve a pregnancy were also evaluated. Clinical pregnancy, ongoing pregnancy and early pregnancy loss rates were determined. A clinical pregnancy was defined as sonographic evidence of a gestational sac. Patients were grouped according to type of PGT utilized: PGT-A with PGT-M vs. PGT-A alone. Student's t-test and chi square were used for statistical analysis.

Results:

A total of 992 patients who underwent IVF with PGT-A were included for analysis: 90 patients without an infertility diagnosis who pursued PGT-M with PGT-A (dual testing) and 902 patients with infertility who pursued PGT-A alone. Patients were interested in PGT-M for a variety of monogenic disorders, most commonly for Cystic Fibrosis, Fragile X, and BRCA1/2. Patients who underwent dual testing were significantly younger than those who underwent PGT-A alone; otherwise both groups had comparable AMH, BAFC, number of oocytes retrieved and fertilized,

and number of blastocysts biopsied (Table 1). Patients who underwent dual testing required significantly more VOR cycles than those who pursed PGT-A alone (1.5 +/- 0.85 vs. 1.2 +/- 0.27, p 0.002) but ultimately both groups underwent a similar number of FET cycles. The rate of clinical pregnancy and ongoing pregnancy per FET was comparable between groups before and after adjusting for confounders.

Conclusions:

Due to the growth of expanded carrier screening panels and increased utilization and appreciation for personalized medicine, PGT-M will likely become another routine aspect of treatment for the modern IVF patient. Our study shows that patients who sought IVF solely for the purposes of PGT-M had comparable IVF and pregnancy outcomes to their counterparts who underwent similar procedures. However, these patients should be informed that it may require approximately 20% more VOR cycles to reach their goals of obtaining embryos that are both euploid and unaffected. Couples interested in utilizing IVF with PGT-M can thus be counseled that while they may require more VOR cycles, the published IVF with PGT-A success rates for their age bracket are representative of their own probability of success and that ultimately the most important factor influencing chance of pregnancy is the transfer of a euploid embryo. With more targeted counseling, clinicians can better equip couples for the emotional and financial undertakings of IVF with PGT-M with PGT-A and better guide them to realizing their goals of conceiving a healthy child.

Support:
None

References:

1. Goldman KN, Nazem T, Berkely A, Palter S, Grifo JA. Preimplantation Genetic Diagnosis

(PGD) for Monogenic Disorders: the Value of Concurrent Aneuploidy Screening. J Genet Couns. 2016. 25(6): 1327-1337.

2. Chang J, Boulet SL, Jeng G, Flowers L, Kissin DM. Outcome of in vitro fertilization with preimplantation genetic diagnosis: an analysis of the United States Assisted Reproductive Technology Surveillance Data, 2011-2012. Fertil Steril. 2015. 105(2); 394-400.

3. Verpoest W, Haentjens P, De Rycke M, Staessen C, Sermon K, Bonduelle M, Devroey P, Liebaers I. Cumulative reproductive outcome after preimplantation genetic diagnosis: a report on 1498 couples. Hum Reprod. 2009. 24(11): 2951-2959.

Table 1:

Patient demographics and cycle characteristics based on type of PGT Testing

	PGT-M + PGT-A (n=90)	PGT-A Alone (n=902)	P value
Age (y)	30.6 ± 3.3	32.2 ± 2.3	<0.0001
Anti-Mullerian Hormone (ng/mL)	3.42 ± 3.23	4.6 ± 5.0	0.006
Basal Antral Follicle Count	14.4 ± 6.4	15.1 ± 7.9	0.38
# Ooctyes Retrieved	19.1 ± 9.0	18.0 ± 10.3	0.33
# Oocytes Fertilized	12.3 ± 6.2	11.3 ± 7.2	0.20
# VOR Cycles - 1 - 2 - 3 - ≥4	 58 (64.4%) 23 (25.6%) 6 (6.7%) 3 (3.3%)	 742 (82.3%) 134 (14.9%) 15 (1.7%) 11 (1.2%)	<0.0001
# Embryos Biopsied for PGT	7.2 ± 4.4	6.5 ± 4.5	0.14
PGT-M - Unaffected - Affected - Carrier	 2.2 ± 3.0 2.2 ± 2.0 4.3 ± 3.7	 --	 --
# FETCycles	1.6 ± 0.85	1.5 ± 0.92	0.63
# Clinical Pregnancies - 0 - 1 - 2 - ≥3	 9 (13.0%) 52 (75.4%) 7 (10.1%) 1 (1.5%)	 115 (15.5%) 556 (74.7%) 64 (8.6%) 9 (1.2%)	 0.93
# Ongoing Pregnancies - 0	 15 (21.7%)	 162 (21.8%)	 0.41

- 1 - 2	49 (71.0%) 5 (7.3%)	553 (74.3%) 29 (3.9%)	