PREIMPLANTATION GENETIC TESTING (PGT) AND VIABILITY OF BLASTOCYST STAGE EMBRYOS DEVELOPED FROM ABNORMALLY FERTILIZED (0PN OR 1PN) OOCYTES

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Background: Little information exists regarding viability of blastocysts developing from oocytes initially assessed as "abnormally fertilized" (i.e., 0PN or 1PN) at post-insemination fertilization check. Limited evidence from mostly small and heterogeneous case series indicates that while oocytes with abnormal pronuclei are substantially less likely to grow to blastocysts, those that do may be chromosomally normal and successfully implant, leading to healthy live birth [1-3].

Objective: To evaluate one IVF center's experience with PGT and transfer of blastocysts derived from 0PN and 1PN oocytes

Materials and Methods: All treatment cycles during 2021-2023 in which blastocyst stage embryos that developed from oocytes initially classified as 0PN or 1PN following insemination underwent trophectoderm biopsy and next generation sequencing (NGS) PGT for aneuploidy were reviewed. Evaluated outcomes of embryo transfers included biochemical pregnancy (defined by a positive maternal serum hCG test), clinical pregnancy (defined by an ultrasound confirmed gestational sac), and live birth.

Results: A total of 367 abnormally fertilized oocytes developed to the blastocyst stage and underwent biopsy and PGT. PGT diagnoses were distributed similarly for both 0PN (Figure 1) and 1PN (Figure 2) blastocysts, with nearly two-thirds diagnosed as euploid, more than one-fifth diagnosed as aneuploid (either monosomic or trisomic), and 7% diagnosed as euploid/aneuploid mosaic. Complex abnormalities, deletions or duplications were rare.

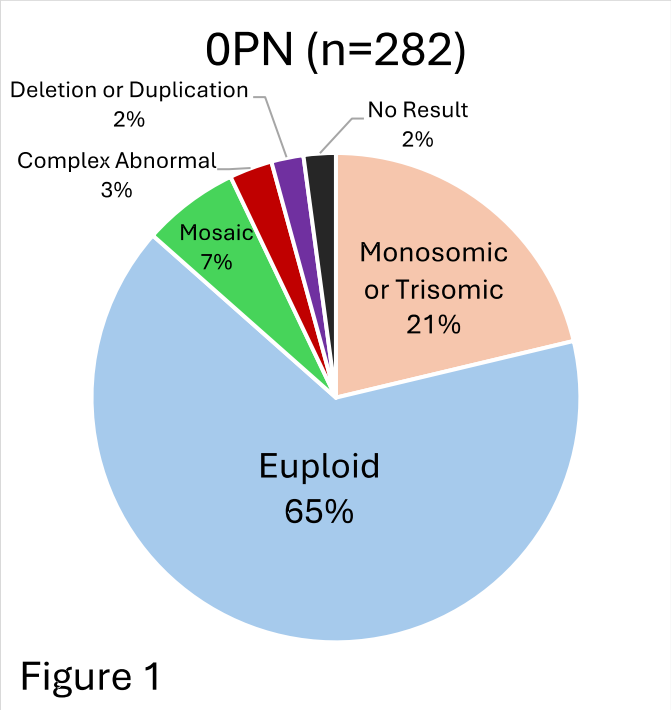

Figure 1

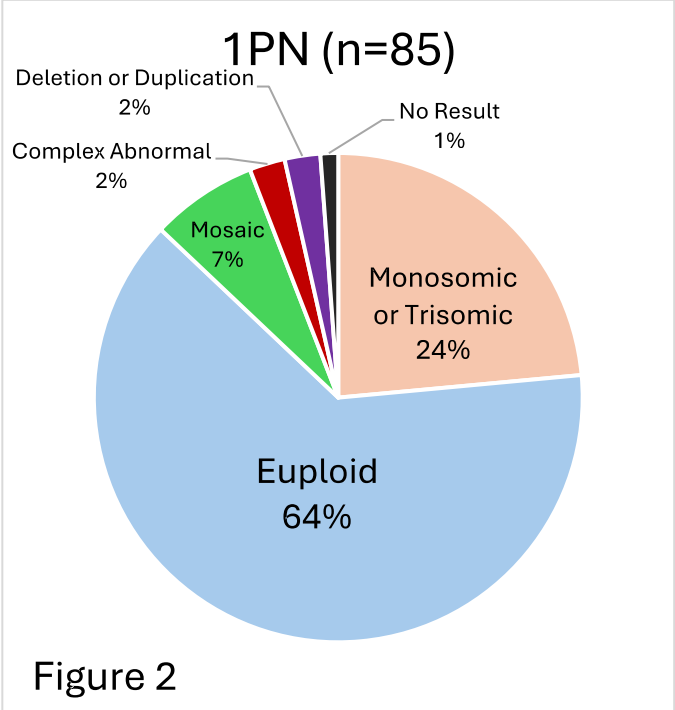

Figure 2

Interestingly, among blastocysts developed from 0PN oocytes, monosomies were 50% more common than trisomies (odds = 3:2). In contrast, among blastocysts developed from 1PN oocytes, monosomies were less than half as frequent as trisomies (odds = 3:7). This difference was statistically significant ($p<.02$, χ^2).

Thirty-two euploid blastocysts derived from 0PN (n=25) and 1PN (n=7) oocytes were transferred individually, resulting in 16 healthy live singleton births (12 from 0PN and 4 from 1PN) with a mean birth weight of 3537 grams (range=2948-4054g), one clinical pregnancy loss, and three biochemical pregnancy losses. One transfer of two euploid 0PN blastocysts to another patient resulted in an additional twin birth: a healthy 2211-gram girl and a 2240-gram boy with bilateral club feet. Initial implantations, clinical pregnancies, and live births from these 34 transferred embryos are summarized in Figure 3, including 95% binomial confidence intervals.

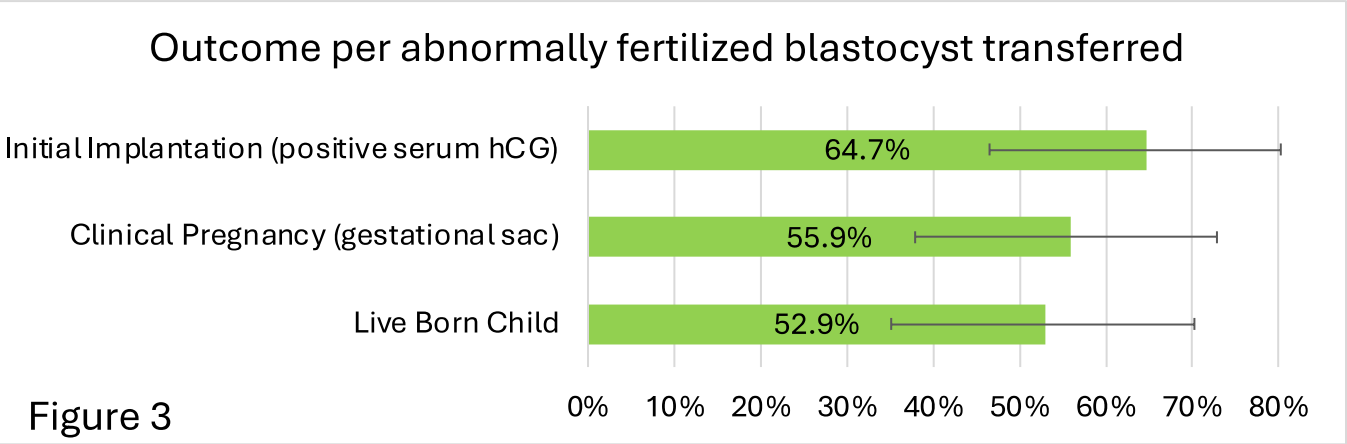

Figure 3

Conclusions: This review and evaluation of one center's clinical experience indicates that blastocysts developing from oocytes originally assessed as being abnormally fertilized (i.e., 0PN or 1PN) are likely to be chromosomally normal. Furthermore, transfer of such embryos results in satisfactory success rates, with greater than 50% estimated lived birth per embryo transferred. Blastocysts developing from presumably abnormally fertilized oocytes should therefore be considered for possible PGT and/or transfer when normally fertilized (i.e., 2PN) oocytes developing to euploid blastocysts are unavailable.

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References:

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