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Title

1 + 1 > 2: A Cost Effectiveness Analysis of SET with PGS in Two Successive Cycles vs a DET With PGS in One

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Objective:
Infertile couples seek ART treatment with the goal of achieving the birth of a healthy child. A growing number of clinicians propose an IVF, PGS and freeze-all plan, a strategy that has shown to be efficient in improving the efficiency of the treatment process and the chance of a successful pregnancy. Amid these benefits, a pivotal question lingers when ≥2 euploid embryos are available for transfer: transfer 2 embryos in one cycle, or transfer 2 single embryos in sequential cycles. This study analyzed retrospective outcomes and cost-effectiveness of these two strategies.

Design:
Retrospective observational study performed at a single IVF center.

Materials and Methods:
A total of 1,907 autologous IVF cycles were identified, of which 832 met the inclusion criteria of use of a freeze-all protocol with trophectoderm biopsy and PGS testing in 2010-2015. Cohorts were segregated into: Group 1) two SET cycles (663 cycles); Group 2) one DET cycle (169 cycles). Cycle outcome (no pregnancy, biochemical pregnancy, clinical loss (after detection of gestational sac) and ongoing pregnancy (OP)) and the multiples rate were calculated, along with the empirical cumulative percentage of patients who achieved OP on each treatment path. 95% CI were reported for all calculations. The average cost of live birth for each path was computed as the sum of the cumulative costs associated with having a singleton ($26,922) or twins ($115,238) weighted by their respective probabilities of occurring conditional on a live birth occurring, along with the weighted cost of miscarriages ($596), PGS use ($5,000), and the weighted cost of FETs ($2,800) required in each path.

Results:
There was no statistical difference between age, BAFC, AMH, day 3 FSH and BMI between groups. The cumulative ongoing pregnancy rate (OPR) in Group 1 was 75% [71-80] with a 97.3% [96-99] singleton rate. Per cycle, the OPR in cycle 1 was 52% [48-56], and in cycle 2 was 49% [42-56]. The cumulatively achieved singleton OPR was 73% [69-78]. From the 48% that did not achieve a OP in the 1st cycle, 44% had a loss (biochemical loss 24% [19-28]; clinical loss 20.7% [17-25]) and 56% [51-61] were not pregnant. From the 51% that did not achieve an OP in the 2nd cycle, 53% had a loss (biochemical loss 31% [23-40]; clinical loss 22% [14-30]) and 47% [38-56] were not pregnant. The expected cost for a live birth in this group was $38,063 and for no live birth: $10,852. In Group 2 59% [52%-66%] achieved OP, with 38% [31%-46%] of patients achieving a singleton gestation. Among those who had OP, 35% [26%-45%] had twins. From the 41% that did not achieve a LB, 46% had a loss (biochemical loss 28% [20-36]; and clinical loss 19% [12-26] and 54% [45-63] were not pregnant. The expected cost for a live birth was $65,910 and for no live birth: $7,911.

Conclusions:
It is well established that SET with PGS reduces multiple births and improves neonatal end points, while providing suitable live-birth rates. However, there is a paucity of data when considering economic impact of such decisions. Compared to one DET cycle with PGS, this study showed patients who pursued two SET cycles with euploid embryos achieved 16% higher cumulative OPR, 35% higher singleton OPR, 32% lower multiple rate and $27,847 less dollars spent on a live birth when ≥2 euploid embryos were available for transfer. The current study demonstrates that in the modern era of ART, patients should be counseled that sequential transfer of single frozen-thawed PGS screened embryos results in higher cumulative rates of singleton ongoing pregnancies than DET with PGS.

Support:
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