Objective: To determine if independent quality grades (QG) for blastocyst (BL) inner cell mass (ICM) and trophectoderm (TE) can predict early embryo euploidy. To develop a comparison chart for SET preference based on BLQG of both ICM and TE.

Patients: Patients electively chose TE biopsy-PGS for aneuploidy determination with subsequent vitrification. Retrospective analysis of over 1200 screened BL was compared for independent (e.g., A) and combined (e.g., AB) morphologic QG.

Methods: Patients had all embryos laser hatched on D3, continued to D5/6 for TE biopsy and vitrified utilizing the microSecure method. D5/6 BL ICM and TE were independently graded from A (high) to B (fair) quality. All BL attained full blastocele expansion prior to grading. Combined QG determined an overall BL grade and predictability of euploideness comparatively assessed. ICM and TE grades were then stratified and compared independently. Fisher’s exact test was used to determine significance (P<0.01).

Main Outcome Measurements: Euploidy determination.

Results: The total BL euploid rate was significantly affected by the combined BLQG, with more (P<0.01) AA (62%) and BA (62%) grade euploid embryos than AB (41%) or BB (33%). Individually, when assessing ICM or TE more euploid embryos result for “A” QG (56% and 62%, respectively) than “B” quality (43% and 37%, respectively).

Conclusion: BL grades are predictive of potential euploidy, yet the morphological quality assessment is not absolute and some poor morphological graded BL may be euploid. Both ICM and TE grades show significance for euploidy predictability. When combining grades to access overall blastocyst quality, TE grade is more predictive. If a TE is graded as A, that embryo consistently has a higher euploidy predictability and should be chosen for transfer, if available.