P-138 When is low quality really low? Should we transfer low-grade blastocysts?

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Study question: What is the live birth rate after single, low-grade blastocyst (LGB) transfer?

Summary answer: The live birth rate for LGBs is 28%, ranging between 15-31% for the different inner cell mass (ICM) and trophectoderm (TE) subgroups of LGBs.

What is known already: Live birth rates following LGB transfer are varied and have been reported to be in the range of 5-39%. However, these estimates are inaccurate as studies investigating live birth rates following LGB transfer are inherently limited by sample size (n=10-440 for LGB transfers) due to LGBs being ranked last for transfer. Further, these studies are heterogenous with varied LGB definitions and design. Collating LGB live birth data from multiple clinics is warranted to obtain sufficient numbers of LGB transfers to establish reliable live birth rates, and to allow for delineation of different LGB subgroups, including blastocyst age and female age.

Study design, size, duration: We performed a multicentre, multinational retrospective cohort study in 9 IVF centres in China and New Zealand from 2012 to 2019. We studied the outcome of 6966 single blastocyst transfer cycles on days 5-7 (fresh and frozen) according to blastocyst grade, including 875 transfers from LGBs (<3bb, this being the threshold typically applied to LGB studies). Blastocysts with expansion stage 1 or 2 (early blastocysts) were excluded.

Participants/materials, setting, methods: The main outcome measured was live birth rate. Blastocysts were grouped according to quality grade: good-grade blastocysts (GGBs; n=3849, aa, ab and ba), moderate-grade blastocysts (MGBs; n=2242, bb) and LGBs (n=875, ac, ca, bc, cb and cc) and live birth rates compared using the Pearson Chi-squared test. A logistic regression analysis explored the relationship between blastocyst grade and live birth after adjustment for the confounders: clinic, female age, expansion stage, and blastocyst age.

Main results and the role of chance: The live birth rates for GGBs, MGBs and LGBs were 45%, 36% and 28% respectively (p<0.0001). Within the LGB group, the highest live birth rates were for grade c TE (30%) and the lowest were for grade c ICM (19%). The lowest combined grade (cc) maintained a 15% live birth rate (n=7/48). After accounting for confounding factors, including female age and blastocyst characteristics, the odds of live birth were 2.33 (95% CI = 1.88-2.89) for GGBs compared to LGBs and 1.56 (95% CI = 1.28-1.92) for MGBs compared to LGBs following fresh and frozen blastocyst transfers (p<0.0001, odds ratios confirmed in exclusively frozen blastocyst transfer cycles). When stratified by individual ICM and TE grade, the odds of live birth according to ICM grade were 1.31 (a versus b; 95% CI = 1.15-1.48), 2.82 (a versus c; 95% CI = 1.91-4.18) and 2.16 (b versus c; 95% CI = 1.48-3.16; all p<0.0001). The odds of live birth according to TE grade were 1.33 (a versus b; 95% CI = 1.17-1.50, p<0.0001), 1.85 (a versus c; 95% CI = 1.45-2.34, p<0.0001) and 1.39 (b versus c; 95% CI = 1.12-1.73, p=0.0024).

Limitations, reasons for caution: Despite the large multicentre design of the study, analyses of transfers occurring within the smallest subsets of the LGB group were limited by sample size. The study was not randomised and had a retrospective character.

Wider implications of the findings: LGBs maintain satisfactory live birth rates (averaging 28%) in the general IVF population. Even those in the lowest grading tier maintain modest live birth rates (15%; cc). It is recommended that LGBs not be universally discarded, and instead considered for subsequent frozen embryo transfer to maximize cumulative live birth rates.

Trial registration number: Not applicable