Materials and Methods

Retrospective determination of blastocyst production in standard IVM (Group I) based on standard IVM database and pregnancy outcome Day 3 embryo(s) with good morphological quality come

In women, all of whose embryos were frozen on Day 3 after ICSI, the number of potential blastocysts was predicted by extrapolation from blastocyst/Day 3 embryo(s) with good morphological quality (GQED3) ratio of a larger data set (n = 98) of standard clinical IVM cycles performed at UZ Brussel (VUB) during the same period as our study and evaluated by the same team of embryologists according to similar scoring criteria. To compare the blastocyst development performance of standard IVM with that of the novel method premature culture (PMC) with C-type natriuretic peptide (CNP) + IVM with FSH and amphiregulin (AREG), we scrutinized the embryological data obtained from those standard IVM cycles that yielded at least four GQED3, which were cultured to the blastocyst stage.

In that data set 292 blastocysts were obtained from 862 GQED3 (34%). Based on these data, we estimated that 11 blastocysts would be obtained from the 32 vitrified GQED3 of the clinical sibling data set of the study presented here, if these embryos had been cultured to the blastocyst stage. This would amount to 22 blastocysts in total when the actual number of vitrified blastocysts is included.

As alternative method, pregnancy outcomes for the same pool of women who did a freeze-all protocol of embryos on Day 3 were evaluated. Under the assumption that each pregnancy derived from a good-quality blastocyst, the number of blastocysts obtained from vitrified GQED3 used for deferred ET amounted to 20. This result is comparable with the number of blastocysts determined by extrapolation from a larger data set as described above.

Results

Pregnancy outcome (at time of manuscript submission) after standard IVM (fresh and thawed embryo transfer cycles)

Ten out of 15 patients with polycystic ovary syndrome (PCOS) had a freeze-all protocol, consisting of elective vitrification of good-quality embryos on Day 3 after ICSI, followed by deferred warmed embryo transfer in an artificial cycle, while five patients had fresh blastocyst transfer on Day 5 after ICSI. The freeze-all policy for cleavage embryos was introduced in our clinic after initial pilot studies had shown poor clinical outcomes after non-hCG triggered IVM and fresh embryo transfer (51). For five patients the embryos were cultured to Day 5 because they had at least four good-quality embryos on Day 3. These patients had a blastocyst transferred in their fresh cycle after confirmation of adequate endometrial thickness measurement on ultrasound scan. Of these, three patients became pregnant, of which one had a miscarriage and two had a healthy term live birth.

All patients (n = 10) who did a freeze all protocol on Day 3 after ICSI had a single embryo transfer or double embryo transfer (DET) (depending on age) in artificial endometrium priming cycles. Of those, six healthy children were born at term. In summary, the 15 standard IVM cycles yielded eight live births at the time of writing. In addition, three patients had a first-trimester miscarriage, one miscarried in the second trimester and one patient had an extra-uterine pregnancy.