

Blastocysts collapse as an embryo marker of low implantation potential a Time-Lapse study

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Context: The process of hatching in mammalian embryo, involving the escape of the blastocyst from the zona pellucida (ZP) and was first observed by Lewis and Gregory in 1929. **Objective:** This study investigated the correlation between blastocyst collapse and pregnancy/implantation rates following elective single transfer at blastocyst stage (eSET). **Methods:** This study was carried out between January 2016-August 2017 at EFREC, RIE-Edinburgh. Following transfer, each blastocyst was retrospectively allocated to one of two groups (collapsed or not collapsed). Pregnancy and implantation rates were analysed. **Patient(s):** 197 couples having an eSET on day 5 were included in the study. Embryos were cultured individually in an EmbryoSlide™, using an EmbryoScope™ imaging system in 6% CO₂, 5% O₂, 89% N₂, using single step medium (G-TL™ Vitrolife). **Intervention(s):** Morphological assessment was made by examining a video of development using the associated EmbryoViewer software. **Main Outcome Measure(s):** Blastocyst were analysed by measuring the maximum volume reduction during development and defined as having collapsed if there was >50% of the surface of the TE was separated from the ZP. **Result(s):** A total of 197 cycles were analyzed. 16 blastocysts collapsed once or more (8.1%), the remaining 181 either contracted minimally or neither contracted during development (91.9%). A significantly higher pregnancy rate (BhCG>5) of 72% (142/197) was observed when blastocysts which had not collapsed were replaced compared to cycles in which collapsed blastocysts were replaced (pregnancy rate 38.9%; 14/36). This trend was repeated when considering the implantation and clinical pregnancy rates of both groups 62.4% (123/197) and 56.3% (111/197) in the no collapse group compared to 19.4% (7/36) and 16.6% (6/36) in the collapsed group. **Conclusions:** The pattern of blastocyst collapse could improve IVF/ICSI outcome following eSET at blastocyst stage, therefore we suggest to include as a negative marker for embryo selection.

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