

Clinical efficiency and perinatal outcome of ART cycles following embryo culture in the presence of GM-CSF in patients with miscarriage or early pregnancy loss history

Mignini Renzini M, Dal Canto M, Coticchio G, Comi R, Brigante C, Caliarì I, Brambillasca F, Merola M, Lain M, Turchi D

Abstract

Study question To evaluate, in IVF patients presenting with a history of previous miscarriage or biochemical pregnancy, the clinical efficiency and perinatal outcome of assisted reproduction cycles in which embryos were cultured in Embryogen® (EG), a commercially available medium containing granulocyte macrophage-colony stimulation factor (GM-CSF).

Summary answer Embryo culture in the presence of GM-CSF is positively associated to a reduction in abortion rate and a consequent increase in live birth rate. The perinatal outcome of embryos exposed to GM-CSF during in vitro development is apparently normal.

What is known already GM-CSF is a trophic factor for the embryo and assists the process of implantation. It has been described that embryo culture in the presence of GM-CSF can improve ongoing pregnancy rate in women with a previous history of miscarriage. However, data on live birth rates are not conclusive and the perinatal outcome of ART cycles in which embryos were cultured in the presence of GM-CSF is not known.

Study design, size, duration Retrospective observational study including 350 women with a past experience of miscarriage or biochemical pregnancy and treated by standard IVF or ICSI between January 2011 and May 2012. Embryos were cultured in Embryogen (Origio, Måløv, Denmark) or control media, i.e. IMS1 and BlastAssist (Origio).

Participants/materials, setting, methods Female mean age was 38.9 ± 3.6 and 38.4 ± 3.6 years in control and treatment groups, respectively. Oocyte collections were 227 and 149 in control and EG groups, respectively. Embryo transfer was carried out on day 2 or 3. A level of $P < 0.05$ was adopted to consider differences statistically significant.

Main results and the role of chance Mean number of inseminated oocytes and replaced embryos were comparable. Clinical pregnancy rates per transfer were similar, 20.3% (29/143) and 18.8% (36/192) respectively, in the EG and control groups. However, at the 12th gestational week, a lower abortion rate was observed in the EG group (13.8% vs. 44.4%), resulting in a higher live birth rate per recovery (19.5% vs. 9.5%). EG pregnancies resulted in 18 single, 4 twin and 1 triplet deliveries, while 17 single and 2 twin births were achieved in the control group. In single births, gestational age and birth weight were 37.8 ± 1.8 vs. 36.4 ± 3.2 weeks and 3068.5 ± 461.8 vs. 2801.4 ± 632.6 g, in control and treatment groups, respectively. No major or minor birth abnormalities were detected.

Limitations, reason for caution The number of live births from embryos exposed to GM-CSF is still small. Objective evaluation of obstetric and perinatal outcome will require larger studies.

Wider implications of the findings The study suggests that embryo ability to establish a full term viable pregnancy may be enhanced in vitro by the use of a cytokine involved in embryo development and implantation. This could open novel prospects concerning the use of growth factors and other signalling molecules for the culture of human embryos.

Study funding/competing interest(s) None