Comparison of Global Medium and GI/G2 cleavage /blastocyst sequential media for culture of human embryos after IVF

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Introduction

In the past decades the majority of embryos conceived through *In Vitro Fertilization* (IVF) have been transferred between day 1 and day 3-post insemination. The primary reason for this scheme of practice was that the past culture systems were unable to consistently support the development of blastocysts at acceptable rates. In the last few years, with the development of sequential culture systems, culture of blastocyst(s) and transfers have become a common practice in many assisted reproduction clinics (Gardner *et al.*, 1998, Behr *et al.,* 1999). The efficacy of a one-step system involving potassium simplex optimized medium (KSOM(AA)) has also been investigated. This medium has been very successful in supporting high rates of blastocyst development in outbred and inbred mice (Lewitts and Biggers 1993, Biggers *et al.,* 2000). It has been also been shown that this simplex medium is able to support preimplantation development in human blastocysts (Biggers *et al.,* 2002)

Only by culturing embryos to the blastocyst stage, does it become possible to identify those embryos with limited or no potential development (Menezo *et al.,* 1990, Lopata *et al.*, 1992, Gardner *et al.,* 1998). The aim of this study was to compare two commercially available IVF and embryo culture media systems, Global (LifeGlobal) a modified simplex medium containing amino acids, and GI/G2 (Vitrolife) a sequential system. Amino acids stimulate cell proliferation in both trophectoderm and inner cell mass cells and have no effect on the incidence of apoptosis or oncosis (Biggers *et al*., 2000). A cost analysis will also be performed between the two media.

Material and Methods

A retrospective study comprising a total of 110 patients undergoing IVF and having a moderate to a good response to gonadotrophin stimulation at a University-based IVF clinic was conducted. Patients were distributed either in Group 1-G1/G2 supplemented with 10% Synthetic Serum Substitute (SSS) (n =55) or in Group 2- Global media supplemented with 10% SSS (n=55). Each oocyte was cultured individually until the embryo reached a full blastocyst (day 5/ 6). Embryo(s) transfer was performed as per standard protocol. Embryo development, pregnancy and implantation rates were compared between groups.

Results

There was no significant difference in patient ages in the two groups (34.5$\pm$ 4.13 vs.35.2 $\pm$3.74) or in stimulation parameters. The number of oocytes retrieved in Group 1 (18 $\pm$ 6.24) and Group 2 (16 $\pm$ 7.26) were also similar as was fertilization rate. The number of embryo(s) transferred per cycle was also similar in the two groups (2.0 vs. 1.96).

A significantly higher proportion of the embryos incubated in Global medium reached the blastocyst stage compared to those cultured in G1/G2 (53% vs. 38%, $p = < 0.0001$) and at a faster rate, giving patients a transfer with full blastocysts on day 5 instead of day 6 (70% vs. 24%, $p = < 0.0001$). However, pregnancy and implantation rates were similar in Group 1 (42%, 25%, respectively) and Group 2 (43%, 26%, respectively). The cost of using a sequential media was 4 times higher than that of Global medium.

Conclusion

The results demonstrate that pregnancy and implantation rates with both media are comparable. Embryonic development is enhanced when the embryos were cultured in Global medium. Global medium also had a greater impact when we compared the cost and simplicity of using one culture medium throughout the whole culture system of embryos.

By switching from a sequential to a simplex media, pregnancy and implantation rate was not compromised.