

Elective single embryo transfer

Akademisk avhandling

som för avläggande av medicine doktorsexamen
vid Sahlgrenska Akademin vid Göteborgs Universitet
kommer att offentligen försvaras i hörsal Arvid Carlsson
Academicum, Medicinaregatan 3, Göteborg
onsdagen den 25 maj 2005 kl.09.00

av

Ann Thurin Kjellberg

Fakultetsopponent:

Professor Allan Templeton
Aberdeen University, United Kingdom

This thesis is based on the following papers:

- I. Thurin A, Hausken J, Hillensjö T, Jablonowska B, Pinborg A, Strandell A and Bergh C. Elective Single-Embryo Transfer versus Double-Embryo Transfer in in Vitro Fertilization. *New England Journal of Medicine* 2004; 351; 23, 2392-2401.
- II. Thurin A, Hardarson T, Hausken J, Jablonowska B, Lundin K, Pinborg A and Bergh C. Predictors of ongoing implantation in IVF in a good prognosis group of patients. Accepted, *Human Reproduction* 2005.
- III. Thurin Kjellberg A, Carlsson P and Bergh C. Randomized single versus double embryo transfer: obstetric and pediatric outcome and a cost-effectiveness analysis. In manuscript.

Elective single embryo transfer

Ann Thurin Kjellberg

Institute of Health for Women and Children, Department of Obstetrics and Gynecology
The Sahlgrenska Academy
Göteborg University, Göteborg, Sweden

Abstract

The aim of the study was to evaluate if the elective single embryo transfer (eSET) strategy could maintain the delivery rates, with at least one live born child, and at the same time decrease the rate of multiple births. A cost-effectiveness analysis was also performed between the elective single embryo transfer (SET) (1+1) and double embryo transfer (DET)(2+0) strategies. Another aim was to investigate if, in a large randomized trial, it is possible to identify specific maternal and/or embryo variables that could independently correlate to ongoing implantation in IVF/ICSI.

The study was a prospective randomised multicentre study performed at 5 Swedish, 4 Danish and 2 Norwegian clinics. Patients under 36 years of age undergoing their first or second in-vitro fertilization cycle, resulting in at least two good-quality embryos were randomised into two groups; one group received a fresh elective SET and if not a live birth, a frozen SET and the other group received a DET at one occasion. Both self-reporting questionnaires and medical records were collected to assess the obstetric and pediatric outcome and the costs. Two questionnaires were used to assess the quality of life of the mothers. In the second paper cycles with 0% or 100% ongoing implantation and with embryos transferred at day two (n=521) were analyzed regarding maternal and embryo variables.

In the SET group a cumulative live birth rate of 128/330 (38.8%) was observed compared to the DET group 142/331(42.9%) (p=0.30; 95% CI -3.4-11.6). The rates of multiple births in the two groups were 1/330 (0.8%) in SET and 49/331(33.1%) in DET (p<0.0001). The complications during pregnancy and delivery were lower in the SET group as was the rate of caesarian sections. The children in the SET group had a statistically higher mean gestational age, lower rate of premature birth (<37 weeks), higher mean birth weight and lower rate of low birth weight (<2500 g) as compared to those in the DET group. Perinatal morbidity was higher in the DET group. The children in the DET group had significantly more days of treatment in neonatal ward. The incremental cost-effectiveness ratio (ICER) was 675 053 Swedish kronor per extra delivery (n=14) in the DET group. In the second paper, in the univariate analysis, first IVF cycle, conventional IVF as fertilization method and four-cell embryos showed a statistically higher ongoing implantation rate than did second IVF cycle, ICSI and non-four cell embryos. In the multivariate analysis the same variables and also ovarian sensitivity correlated independently to ongoing implantation.

In conclusion, the SET group achieved a rate of live births that is not substantially lower than is achievable with DET and a lower rate of maternal and pediatric complications, especially premature birth. The single embryo transfer strategy resulted in higher cost-effectiveness than DET and can be recommended for good prognosis women in order to decrease the twin rate.

Keywords: In vitro fertilization, elective single embryo transfer, multiple pregnancies, randomized controlled trial, prediction of IVF outcome, embryo selection, cost-effectiveness analysis