

# Abstract

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## Role of total antioxidant capacity in the differential growth of human embryos in vitro.

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**OBJECTIVE:** The objective of this study was to examine the relationship of early human embryonic development parameters with day 1 culture media **total antioxidant levels** (day 1 **TAC**).

**DESIGN:** Prospective study.

**SETTING:** Patients undergoing assisted reproduction (ART) in a teaching hospital.

**PATIENT:** Patients undergoing conventional IVF (n = 153; 167 cycles) and intracytoplasmic sperm injection (ICSI; n = 105; 116 cycles) were included. Both fertilization and early cultures were performed in human tubal fluid (HTF) with 5% serum substitute supplement.

**INTERVENTION:** Levels of total antioxidants in the central well (sample) and the outer well (control) of each embryo culture dish were measured.

**MAIN OUTCOME MEASURE:** Fertilization rate and embryo quality at days 3 and 5 were recorded for each cycle. Age, parity, and demographic features were also compared.

**RESULT:** After controlling for all demographic and clinical variables, **day 1 TAC was related to fertilization rates in both groups of patients.** Day 1 TAC was significantly related to high (>7) day 3 cell number, low (<10%) fragmentation rate, and blastocyst development rate in both conventional IVF and ICSI cycles. Day 1 TAC was related to pregnancy in ICSI but not conventional IVF cycles.

**CONCLUSION:** **Day1 TAC appears to be an important biochemical marker for early embryonic growth. Decreased embryonic fragmentation, enhanced cleavage rate, and increased blastocyst development rate may be partially related to day 1 TAC in the culture media.** Whether this relationship is a cause or effect needs further assessment.

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