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ABNORMALLY-CLEAVED EMBRYOS AT 1ST OR 2ND CLEAVAGE HAD LOW DEVELOPMENTAL POTENTIAL

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Objective: Capturing time-lapse images of human embryo development appeared that human embryos sometimes cleaved abnormally from 1cell to 3cells or more at 1st or 2nd stage. However, the characteristics of abnormally-cleaved embryos and their subsequent development are unknown. Here the developmental competence of embryos which cleaved abnormally at 1st or 2nd cleavage was examined.

Design: Retrospective clinical study

MATERIALS and METHODS: The study included 39 patients who underwent embryo transfer (ET) on day 3 between August 2013 and April 2014 after obtaining the informed consent. Time-lapse images of 282 embryos were taken every 10 min using a time-lapse cinematography (TLC, Vitrolife) after the confirmation of normal fertilization. After day 3 ET, surplus embryos were cultured until day 6. The abnormal cleavage was investigated using the TLC. Effects of abnormalities at 1st and 2nd cleavage on the blastulation and the implantation potential were assessed. Moreover, the time which was required from insemination until 1st cleavage was measured.

Results: The abnormal cleavage was observed in 77 embryos at 1st (27.3%) and in 44 embryos at 2nd cleavages (15.6%). The blastulation, the morphologically-good blastocyst and pregnancy rates were 62.5% (80/128), 43.0% (55/128), and 50.0% (12/24) in embryos which didn't show any abnormalities at 1st and 2nd cleavage, 25.0% (18/72), 8.3% (6/72), and 0% (0/5) in embryos which showed abnormalities at 1st cleavage, and 35.3% (12/34), 14.7% (5/34), and 10.0% (1/10) in embryos which showed abnormalities at 2nd cleavage, respectively. The values in all 3 parameters of embryos which showed abnormalities at 1st or 2nd cleavage were lower than those of embryos showed no abnormalities ($P < 0.05$). The time required from insemination until 1st cleavage of embryos which showed abnormalities at 1st cleavage (31.0±0.6h) was longer than those for others ($P < 0.001$; no abnormalities:25.4±0.3h, 2nd abnormal cleavage:25.2±0.5h).

Conclusion: Half of embryos showed abnormal cleavage at 1st or 2nd cleavage and these embryos had much lower developmental potential. Moreover, embryos showed abnormalities at 1st cleavage took longer time to complete 1st cleavage, suggesting that observation of 1st cleavage timing is a good marker of embryo selection.

These abnormally-cleaved embryos had low implantation potential despite their good morphology on day 3.