

## Relationship between the periods required for the first mitosis of embryos and their developmental potential

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### Objective

Although extending embryo culture to the blastocyst stage increases the pregnancy rate. On the other hand, the extension of culture time has been suggested to cause the epigenetic modifications. If high potential embryos could be selected at days 2 or 3 of culture, problems associated with extended incubation might be reduced. To select an embryo with high implantation potential on day 3, the relationship between the period required for the first mitosis of embryos and their developmental potential was assessed.

### Methods

We intended 70 patients who underwent single embryo transfer (ET) on day 3 between August 2013 and September 2014 after obtaining the informed consent. After confirmation of normal fertilization, time-lapse images of 453 embryos were taken every 10 minutes using a time-lapse imaging system. After single ET was performed based on classical morphological observation on day 3, surplus embryos were cultured until day 5. Effects of period required for the first mitosis on the development to the blastocyst stage and the implantation potential were assessed retrospectively.

### Results

The blastulation rate in surplus embryos was 44.6%. The implantation rate after day 3 single ET was 35.7%. The blastulation and the implantation rates of embryos which required 90-210 min between their pronuclear disappearance and the completion of first mitosis was higher ( $P < 0.05$ ) than those of embryos which required longer than 220 min.

### Conclusions

These results suggest that the period required for first mitosis of an embryo with high implantation potential are short.

Key words: day 3 embryo transfer, single embryo transfer, mitosis, time-lapse image