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On the difference in the morphokinetic parameters in the blastocysts derived from abnormal cleavage embryos and, their influence on miscarriage and live birth.

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【OBJECTIVE】

We often observed the direct cleavage embryos, that cleavage direct from one cell to three or more cells using time-lapse cinematography (TLC). Then, the blastocyst formation rates and implantation rates of these embryos were remarkably low. However, some direct cleavage embryos developed into blastocysts and gave birth. In this study, we investigated the morphokinetic parameters and implantation potential in the direct cleavage embryos.

【METHODS】

We intended 492 direct cleavage embryos that underwent c-IVF or ICSI from January 2014 to December 2015 using a Primovision system. Study 1: The direct cleavage embryos on the first mitosis was divided into the presence or absence of BL formation and the durations from insemination to the pronuclear disappearance (tPNf), the first mitosis (t1st-CL) and required time for the first mitosis (s1) were compared. Study 2: The direct cleavage embryos on the second mitosis was divided into the presence or absence of BL formation, and time similar to Study 1 and the durations from insemination to the second mitosis (t2nd-CL) were compared. Study 3: the miscarriage and birth rate in the normal cleavage embryos and the direct cleavage embryos in single blastocyst transfer were compared.

【Results】

Study 1: The blastocyst rate of the direct cleavage embryos in first cleavage was 26.7%, and the good quality blastocyst rate was 3.7%. Also, then each time in the blastocyst group was earlier than the non-blastocyst group (tPNf: 23.6 h vs 26.5 h, t1st-CL: 30.8 h vs 34.9 h, s1: 7.1 h vs 8.3 h). Study 2: The BL rate of the abnormal cleavage embryos in second cleavage was 39.7%, and the good quality BL rate was 7.9%. Also, tPNf and t1st-CL in the blastocyst group were earlier than the non-BL group (tPNf: 22.8 h vs 24.6 h, t1st-CL: 27.6 h vs 30.0 h). However, there was no difference in s1 (s1: 4.9 h vs 5.5 h). Moreover, t2-ndCL time was earlier in the blastocyst group (38.2 h vs 43.4 h). Study 3: There was no difference in the implantation rate and the birth rate between the normal cleavage embryos and the direct cleavage embryos.

【Conclusion】

In this study, it was suggested that abnormal embryos in only cytokinesis are present in the direct cleavage embryos. In addition, because they were shorter cleavage division times, it was considered possible that they could be distinguished. However, even in the direct cleavage embryos with fast embryo developmental speed, the good quality blastocyst rates were low, and it is difficult to predict the implantation potential in early embryos. From the above, we considered that the single blastocyst transfer of the direct cleavaged embryos were effective means because they become low the effect on the miscarriage and birth rate.