

Effect of the degree of fragmentation on embryo survival after freeze-thawing

J.H. Check, K. Swenson, W. Yuan, A. Nazari

The University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School at Camden, Cooper Hospital/University Medical Center, Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology & Infertility, Camden, NJ (USA)

Summary

Purpose: To determine if the degree of fragmentation of embryos prior to freezing correlate in a negative manner with survival after thawing. **Methods:** A retrospective review of frozen embryos thawed for purposes of embryo transfer was done. Survival and transferability rates were determined according to degree of fragmentation. **Results:** The chance that an embryo with < 25% fragmentation was deemed good enough for transfer upon thawing was 63.6% compared to 52.8% for embryos > 25% ($p < .05$). **Conclusions:** Though more fragmented embryos have a lower survival rate after freeze thawing, about 50% of embryos with > 25% fragmentation will still survive the thaw and be able to be transferred.

Key words: Fragmentation; Embryo freezing; Survival rate.

Introduction

Evaluation of the effect of embryo morphology on pregnancy outcome following single embryo transfers revealed that an increased blastomere number predicted an improved pregnancy outcome better than the fragmentation index [1].

The present study was conducted to determine if less fragmented embryos have a better chance of survival after freezing/thawing.

Materials and Methods

A retrospective cohort analysis was performed on frozen embryo transfers over a 10-year period. The embryos were all frozen using an alcohol bath rate controlled freezer and a one-step removal of the cryoprotectant 1,2 propanediol [2].

Based on the degree of fragmentation, the percentage of day 3 embryos that survived and were used for transfer or refrozen was evaluated.

Results

A progressive decrease in survival and normal cleavage is associated with increases in fragmentation as seen in Table 1. The chance that an embryo with $\leq 25\%$ fragmentation will be deemed good enough for transfer was 63.6% (2,178/3,421) as compared to 52.8% (261/496) for embryos with $\geq 26\%$ fragmentation ($p < 0.05$).

The effect of the degree of fragmentation at the time of embryo freezing on embryo survival and transferability is given in Table 1. Overall 85.4% (2,920/3,421) of embryos with $\leq 25\%$ fragmentation survived the thaw vs 78.6% (390/496) of embryos with $\geq 26\%$ fragmentation ($p < 0.001$). The transferability rates were 63.7% (2,128/3,421) for $\leq 25\%$ fragmentation vs 52.6% (261/496) for $\geq 26\%$ fragmentation ($p < 0.001$). Thus

Table 1. — The effect of the degree of embryo fragmentation of day 3 embryos on embryo survival and transferability.

	Fragmentation			
	A 0%	B < 25%	C 25-50%	D > 50%
# embryos thawed	305	3116	462	34
# embryos survived	277	2643	365	25
% survived	90.8	84.8	79.0	73.5
# transferred/refrozen	211	1967	246	15
% transferred/refrozen	69.2	63.1	53.2	44.1

using the simplified freezing and thawing technique described only 12.6% (496/3,917) of the embryos had $\geq 26\%$ fragmentation.

Discussion

Survival and transferability rates were significantly greater for those embryos with < 25% fragmentation versus those with > 25%.

Though these data suggest that more fragmented embryos are slightly less likely to result in embryos acceptable for transfer following subsequent freeze/thawing, the difference though statistically significant may not be as clinically important.

References

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Address reprint requests to:
J.H. CHECK, M.D., Ph.D.
7447 Old York Road
Melrose Park, PA 19027 (USA)
e-mail: laurie@ccivf.com

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