IS IT WORTH CULTURING POOR QUALITY DAY-3 EMBRYOS TO THE BLASTOCYST STAGE IN CYCLES WITHOUT ANY HIGH QUALITY EMBRYOS?

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INTRODUCTION

In recent years, more and more IVF centers have chosen to culture all embryos until the blastocyst stage, in order to increase implantation rates. Therefore, it is important to inform couples of the strategy and to estimate their chances of getting a good quality blastocyst; especially if the entire embryo cohort is of poor quality. The objective of this study was to evaluate the usable blastocyst rate and the live birth rate (LBR), in couples undergoing an IVF/ICSI who obtained only poor quality day-3 (D3) embryos.

MATERIALS & METHODS

This retrospective cohort study, carried out between 2012 and 2016 at a University-affiliated private ART clinic in Montreal, analyzed 59 cycles of IVF/ICSI that resulted in at least one D3 embryo without any high quality embryos.

Cycles in which all D3 embryos were of poor quality were included. All embryos were cultured until day 5 or 6 and were either transferred, cryopreserved or discarded. Exclusion criteria were egg donors, patients performing fertility preservation or modified natural cycle IVF. The embryo quality was scored according to the classification of the Istanbul consensus (Alpha / EHSRE 2011). Thus, D3 embryos were considered of poor quality if the blastomeres had a fragmentation rate > 25% (= grade 3 embryos) or if the number of cells was less than 6 (= slow-development embryos). The “usable blastocyst rate” was defined as the ratio of the number of transferred or cryopreserved blastocysts (if Gardner score 2BB) to the total number of D3 embryos. All transfers were single embryo transfers. Blastulation rate, usable blastocyst rate, pregnancy rate (PR) and LBR were expressed as a percentage and compared between the "Grade 3 embryos" and “slow-development embryos" groups by the Chi2 test.

RESULTS

In a total of 136 poor quality D3 embryos (from 59 patients), the blastulation rate was 23.5% (compared to a mean blastulation rate of 62% in our laboratory), the usable blastocyst rate was 11.0%, the PR was 40% and the LBR was 26.7% per embryo transfer **(Figure 1)**. Groups of patients with and without usuable blastocyst were comparable for maternal age, body mass index, anti-mullerian hormone, antral follicular count and infertility duration **(Table 1)**. The usable blastocyst rate was significantly lower if they originated from grade 3 embryos compared to slow-development embryos (6.8% vs 24.2%, p = 0.0054). The LBR were comparable by origin of blastocysts **(Table 2)**.

Figure 1: Results of the study group composed of 136 poor quality D3 embryos from a cohort without any good quality D3 embryo

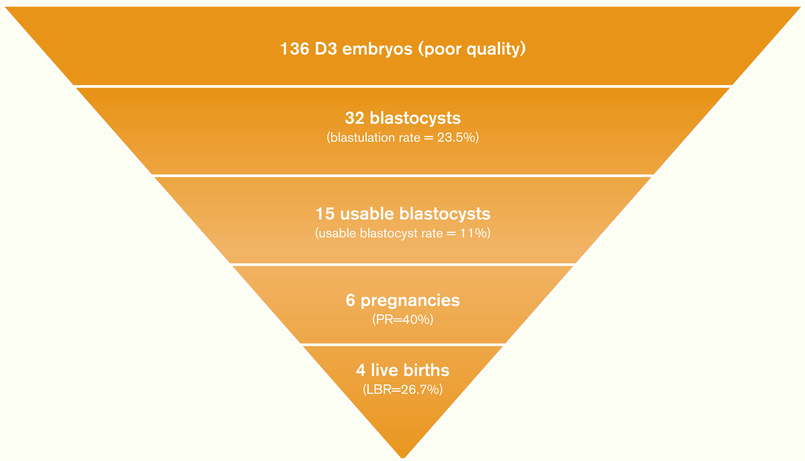

Table 1 : Comparison of the maternal descriptive characteristics between the cycles with a usable blastocyst or not

Usable blastocyst?	YES (N=14)	NO (N=45)	P
Maternal age	35.2 ± 3.6	35.3 ± 4.3	0.94
Body Mass Index (BMI)	24.8 ± 5.1	25.5 ± 4.7	0.64
AMH (ng/mL)	2.60 ± 1.77	2.56 ± 2.59	0.96
Antral Follicle Count (AFC)	15 ± 10.4	18 ± 12.7	0.43
Duration of infertility (years)	3.0 ± 2.1	3.8 ± 3.6	0.43

Table 2 : Comparison of blastulation rate, PR and LBR between grade 3 and slow-development embryos in the study group

	Grade 3 Embryos (N=103)	Slow-development Embryos (N=33)	P
Blastulation rate	22.3% (N=23)	27.3% (N=9)	0.56
Usable blastocyst rate	6.8% (N=7)	24.2% (N=8)	**0.0054**
PR per embryo transfer	57.1% (N=4)	25.0% (N=2)	0.20
LBR per embryo transfer	42.9% (N=3)	12.5% (N=1)	0.18

DISCUSSION

D3 embryos with high fragmentation rate are more likely to be aneuploid, accounting for lower rates of usable blastocysts[(1)]. However, the embryo would have a repair capacity with reabsorption of cellular fragments by the blastomere, explaining the possibility of live births from grade 3 embryos[(2)]. Beyond the amount of fragmentation, it would appear that other criteria for this fragmentation are important such as stage of onset, duration and distribution in the embryo, which can be described by time-lapse[(3)].

CONCLUSION

Despite the absence of good quality D3 embryos, a cohort composed entirely of "rejected" embryos can result in a transferable blastocyst and live birth. It appears that the high fragmentation rate of blastomeres is associated with a poorer prognosis than the decreased number of cells on D3. This study could improve the counseling of couples facing this situation.

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