Predicting the likelihood of embryo transfer following Pre-implantation Genetic Testing for Aneuploidy (PGT-A)

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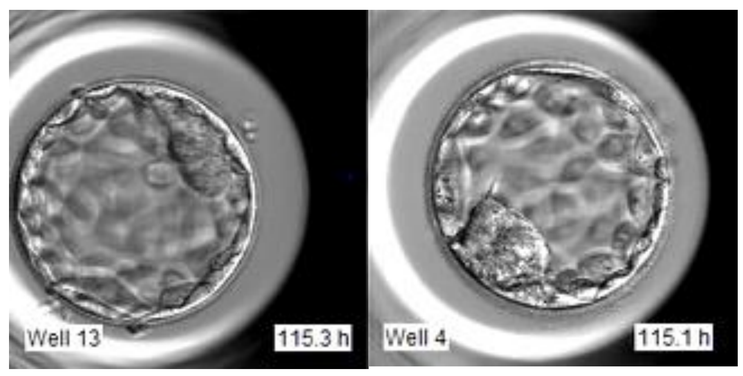
1 INTRODUCTION

Number of embryos available for transfer has been reduced in Pre-implantation Genetic Testing for Aneuploidy (PGT-A) cycle compared to non-PGT-A cycle as some embryos might not make it to blastocyst stage for biopsy or have been shown to be aneuploid after being tested. This can be found commonly in patient with advanced maternal age. This is one of the reasons that some patients did not choose PGT-A because they might not have any suitable embryo for transfer at the end of the cycle.



2 OBJECTIVE

This study was carried out to predict the likelihood of having an euploid blastocyst or low risk mosaic aneuploid blastocyst for embryo transfer following PGT-A.

3 METHODOLOGY

A total of 847 PGT-A cycles (VeriSeq kit, Illumina) (n = 3694 blastocysts) from January 2016 to March 2018 were analysed. The probability where there was at least one euploid blastocyst for transfer (**P1E)** and the probability of having at least one euploid blastocyst and / or low risk mosaic aneuploid blastocyst (utilizable) for transfer (**P1U**) were evaluated. The data were stratified by oocyte age (≤ 29, 30 - 34, 35 - 39 and ≥ 40 years) and number of blastocysts biopsied (≤ 2, 3 – 5, 6 – 8 and ≥ 9).

Next-Generation Sequencing

Trophectoderm biopsy was performed on either Day 5 or Day 6. PGT-A using Next-Generation Sequencing (Veriseq Protocol, Illumina) was used for aneuploidy screening.

4 RESULTS AND DISCUSSION

With increasing oocyte age, there was a trend towards lower chance of having at least one blastocyst for transfer. While there was a less than 50% chance of at least one euploid blastocyst in oocyte age between 35 - 39 years, there was a minimum of 80% chance of at least one blastocyst for transfer. With increasing number of blastocysts biopsied, there was also a higher chance of at least one blastocyst for transfer. If less than 3 blastocysts were biopsied, the chances of at least one blastocyst for transfer were 63.2% and 31.9% for oocyte age between 35 - 39 and above 40 years. However if 3 - 5 blastocysts were biopsied, the chances of at least one blastocyst for transfer were 88.6% and 64.1%. When 9 or more blastocysts were biopsied, at least one blastocyst can be transferred across all age groups..

Oocyte age (years)	Number of blastocyst biopsied			
	> 9	6 - 8	3 - 5	< 2
< 29	**94.44** (n = 51/54)	**88.3** (n = 68/77)	**60.2** (n = 80/133)	**45.9** (15/32)
30 – 34	**92.3** (n = 12/13)	**85.7** (n = 30/35)	**67.3** (n = 35/52)	**41.4** (n = 12/29)
35 – 39	**80.0** (n = 4/5)	**80.6** (n = 29/36)	**49.5** (n = 52/105)	**26.3** (n = 25/95)
> 40	**100.0** (n = 1/1)	**54.5** (n = 6/11)	**44.9** (= 35/78)	**23.1** (n = 21/91)

Table 1: Probability of having at least one euploid blastocyst (P1E) for transfer according to oocyte age (years) and number of blastocyst biopsied.

Oocyte age (years)	Number of blastocyst biopsied			
	> 9	6 - 8	3 - 5	< 2
< 29	**100.0** (n = 54/54)	**100.0** (n = 77/77)	**97.7** (n = 130/133)	**81.3** (n = 26/32)
30 – 34	**100.0** (n = 13/13)	**97.1** (n = 34/35)	**98.1** (n = 51/52)	**65.5** (n = 19/29)
35 – 39	**100.0** (n = 5/5)	**100.0** (n = 36/36)	**88.6** (n = 93/105)	**63.2** (n = 60/95)
> 40	**100.0** (n = 1/1)	**81.8** (n = 9/11)	**64.1** (n = 50/78)	**31.9** (n = 29/91)

Table 2: Probability of having at least one euploid blastocyst and / or low risk mosaic aneuploid blastocyst (utilizable) for transfer (P1U) according to oocyte age (years) and number of blastocyst biopsed.

5 CONCLUSION

Patients above 35 years old were shown to have a relatively good chance to have a transfer in PGT-A cycles if between 3 -5 blastocysts were biopsied. This study provides a guide for counseling patients who are deciding on PGT-A as an adjunct to IVF, minimising the risk of having no blastocyst for transfer.

6 REFERENCES

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