

INFERTILITY

What is the probability of conception for couples entering an IVF program?

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SUMMARY

The outcome of 4225 couples undergoing 8207 in vitro fertilisation (IVF) cycles over a six year period has been analysed using life table analysis. Pregnancy was expressed as a 'clinical pregnancy - fetus visible on ultrasound' per stimulated cycle oocyte collection, with pregnancies obtained from frozen embryos being referred to the cycle where

they were collected. We found that only 1 in 200 patients proceeded beyond six cycles and the cumulative per cent pregnant was 20.7% after the first cycle, with nearly half pregnant within three and over two-thirds being pregnant within six cycles. We find this is a useful way to present the chance of pregnancy to prospective couples.

INTRODUCTION

One of the most common questions asked by couples prior to commencing treatment by reproductive technology is 'What are our chances of success?' Initial series of patient treatments were expressed as 'pregnancy per treatment cycle' and indeed even large series such as the Australian National Perinatal Statistic Unit (NPSU)¹ and the results from the Human Fertilisation and Embryology Authority² are presented in this way. However, this does not take into consideration that some couples may have only one attempt whereas others may try many times. In order to correct for this, the use of 'life table' analysis has been introduced in Australia³ as well as in the United Kingdom,⁴ Canada,⁵ and the United States.^{6,7} Expressing results in this manner gives the best estimation of the chance of outcome.⁸ Tan's group has recently updated its results for 1993 to 1995, but only considered treatment for up to three cycles.⁹ The Brussels group have recently reported on a similar cumulative analysis for nearly 500 patients in 963 cycles commencing intra-cytoplasmic sperm injection between 1992 and 1993.¹⁰

As oocyte collection is the most expensive, most stressful and most time-consuming part of IVF procedure and is also responsible for the risks of hyperstimulation, plus that of the surgical procedure, we

believe that oocyte collection should be the denominator for the prediction of outcome. We have therefore decided to analyse the outcome of all couples who commenced treatment with stimulated cycles in our in vitro fertilisation program (including gamete intrafallopian transfer) at Monash IVF between January 1992 and December 1997, and to life table their outcomes for treatment during the following five years. All pregnancies that were obtained with frozen embryo transfer were referred to the cycle of stimulation when the oocytes were collected.

PATIENTS AND METHODS

During the six year period, a total of 4225 new couples entered the Monash IVF program, commencing their first stimulated cycle. If a pregnancy occurred in the first cycle or from frozen embryo transfers (FET) with embryos created in that cycle, then this was considered to be a conceptional cycle. Pregnancy for the purpose of the analysis was defined as a 'clinical pregnancy' if a fetus was present at ultrasound. There is much debate about how to express 'pregnancy'¹¹ and this definition was used to have consistency with NPSU reports. Couples who did not return for a second cycle of treatment were then sent a questionnaire to determine why they did not continue. The analysis of these questionnaires is the subject of a separate report.

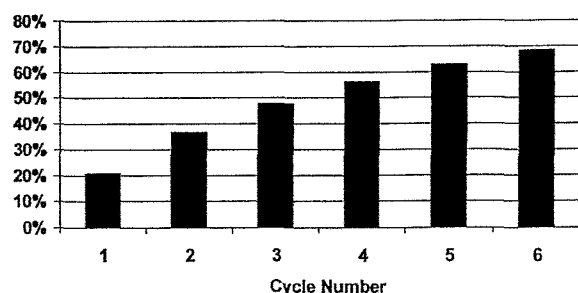
Couples then entered the second treatment cycle, and the analysis was repeated as above. This was calculated for up to 10 cycles of treatment. The life table was then graphed up to six cycles, as only twenty (0.5%) of couples proceeded beyond six cycles, accounting for 34 out of a total 8207 cycles (0.5%). (Table 1, Figure 1)

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Table 1 Outcome of treatment on life table analysis

Cycle no	Couples started	Pregnant (fresh transfer)	Pregnant with thawed embryos	Total pregnancies	Cumulative per cent pregnant
1	4225	777	99	876	20.7
2	2156	393	42	435	36.7
3	1016	159	19	178	47.8
4	470	71	5	76	56.3
5	225	31	3	34	62.9
6	81	12	0	12	68.4
7	20	2	0	2	71.5
8	9	1	0	1	74.7
9	4	0	0	0	74.7
10	1	1	0	1	100

Figure 1 Life table of compounded outcome

RESULTS

Of the 4225 patients who had their first stimulated cycle in 1993–1997, 777 conceived with fresh embryos/oocytes, and 99 conceived with frozen embryos obtained in their first stimulated cycle. This means that 20.7% of patients conceived after their first oocyte collection. Although it is possible that they may still do so in the future, 1193 patients have not returned for further treatment. Details of couples started, fresh and frozen conceptions and cumulative life table pregnancy rates are summarised in Table 1 for up to 10 cycles of treatment.

DISCUSSION

One of the difficulties of assessing the outcome of treatment by IVF is that there will always be some women who have not completed their treatment. This is best compensated for by life table analysis, which takes into consideration what is likely to happen to those subjects if they undertake further treatment. Analysis beyond six cycles is not meaningful as so few couples have had treatment. In Australia, Medicare funding continues for up to six stimulated cycles making further cycles of treatment far more expensive. By including all women who underwent oocyte collection during the study period, we avoided selection bias of only considering favourable time periods.¹² The inclusion of frozen embryo transfers results in a compounded life table and gives a better understanding of the chance of pregnancy per oocyte collection

For several reasons, the outcomes expressed by this analysis are still somewhat an underestimation. The first reason is that there are still many frozen embryos remaining from the reported treatment cycles which, when thawed and transferred, will add to the total number of pregnancies. The second reason for underestimation is that sometimes more than one pregnancy results from the one oocyte collection. This occurs when a woman conceives from a fresh embryo transfer and after birth conceives from the transfer of thawed embryos created for the same treatment cycle. But this is only recorded as one pregnancy for the relevant cycle of oocyte collection.

Couples who have returned from treatment after a successful outcome have not been included in the analysis for their subsequent courses of treatment and they probably have a better prognosis. This is the subject of a future report.

Finally, as our data includes results from the early 1990s, the outcome is probably an under-estimate when compared to a study carried out from the late 1990s. The success rate of IVF has steadily improved over these years. However, in order to have a large enough follow-up, we felt that we had to go back several years. We plan to repeat the analysis in the future, analysing cycles commenced from 1998 onwards.

We have also resisted breaking down the group into too many sub-groups (according to aetiology and age) and this would make the report too complicated. While we agree that there are differences in these sub-groups, we also believe there is a danger in analysing too small a sample.

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