

A prospective comparison of two commercially prepared culture media in human in vitro fertilisation (IVF)

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INTRODUCTION

This study compares the outcome of therapeutic in vitro fertilisation (IVF) and intracytoplasmic sperm injection (ICSI) following the use of two culture media: Universal IVF Medium (Medi-Cult) or P-1 (Irvine Scientific).

Medi-Cult is an Earle's based medium, P-1 is a modification of human tubal fluid (HTF) without phosphate and glucose.

A total of 484 cycles, comprised of 218 IVF and 266 ICSI cycles (Table 1), were assessed for fertilisation and cleavage rates, embryo morphology, implantation and clinical pregnancy rates.

METHOD

All couples undergoing IVF or ICSI at this unit were included provided the female partner was aged ≤ 37 years and had undergone no more than two previous failed treatment cycles. Couples were randomised by random sampling with replacement, prior to egg collection and following pituitary suppression and ovarian stimulation¹.

Oocytes and embryos were cultured either in Medi-Cult, or in P-1 medium supplemented with 10% (v/v) human albumin solution (Immuno).

For IVF, oocytes were inseminated in 1ml of medium under oil at 40 h post HCG, checked for fertilisation 17-19 hours later, when fertilised eggs were moved to 30 μ l drops of the same medium under oil for a further 24-28 hours prior to embryo transfer. For ICSI, injected oocytes were transferred to 1ml of medium under oil, checked for fertilisation 19-21 hours post injection, and fertilised eggs were left in the same dish until embryo transfer.

Up to 3 embryos were transferred on day 2 after egg collection.

The results were analysed using multiple linear regression or multiple logistic regression.

RESULTS

- For ICSI and IVF cycles taken together, there are no significant differences between the Medi-Cult and P-1 groups in terms of:
 - fertilisation rates (Table 2)
 - the number of cycles that failed to reach ET (Table 2)
 - the rate at which the embryos underwent cleavage (data not shown)
 - the implantation or clinical pregnancy rate (Table 3)
- Among the ICSI cycles, significantly more embryos implanted following culture in P-1 compared with Medi-Cult, leading to a significantly higher clinical pregnancy rate in P-1 compared with Medi-Cult (Table 3).
- Significantly more embryos developed with good morphology (grades 1&2: Figure 1) following culture in P-1 compared with Medi-Cult (Table 4), and consequently more cycles resulted in embryo cryopreservation in P-1 (n=15) than Medi-Cult (n=8).

TABLE 1
Treatment Cycles Included in Study

No. of Cycles	Medi-Cult	P-1	P value
Total	249	235	NS
ICSI	143	123	NS
IVF	106	112	NS

TABLE 2
Fertilisation Outcome

	Medi-Cult	P-1	P value
No. Oocytes Inseminated	2799	2790	NS
% Fertilised (All Cycles)	65.6	60.6	NS
% Fertilised (ICSI)	66.4	62.0	NS
% Fertilised (IVF)	64.7	59.7	NS
No. of Cycles Failed Fertilisation/No Embryo Transfer	11	8	NS

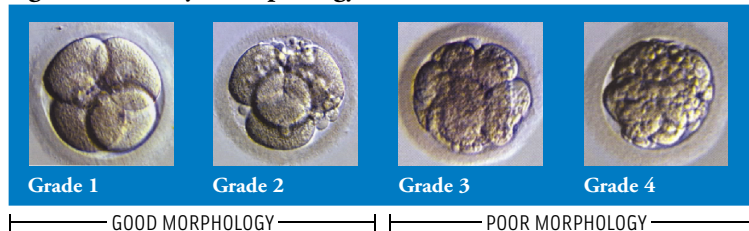
TABLE 3
Clinical Pregnancy and Implantation Rates Following ICSI and IVF in Different Culture Media

	Medi-Cult n=249	P-1 n=235	
% Implantation Rate (all cycles)	14.0	15.6	NS
ICSI	12.9	18.3	P=0.02
IVF	15.6	12.3	NS
% Clinical Pregnancy (all cycles)	22.9	26.4	NS
ICSI	21.6	33.3	P=0.02
IVF	24.5	18.8	NS

TABLE 4
Morphology of Cleavage Stage Human Embryos Following Culture in Different Media

Embryo Morphology	Medi-Cult n=1634		P-1 n=1497			P Value			
	ICSI	IVF	ICSI	IVF	IVF				
Good	% Grade 1	33.7	32.9	31.9	41.0	38.2	35.3	P=0.01	P=0.05
	% Grade 2	41.2	44.7	49.3	39.2	44.0	49.2	NS	
Poor	% Grade 3	21.3	19.6	17.3	17.0	15.9	14.8	P=0.01	P=0.001
	% Grade 4	3.7	2.7	1.6	2.7	1.7	0.7	P=0.05	

Figure 1 - Embryo Morphology



DISCUSSION/CONCLUSION

Overall there was no difference between the clinical pregnancy and implantation rates when using Medi-Cult or P-1.

However, among the ICSI cycles, implantation and clinical pregnancy rates were significantly higher following cycles where P-1 was used as the culture medium compared with those using Medi-Cult. This may be because P-1 is indeed a more favourable culture medium for human embryos, but its effects are so slight that they are only manifested in embryos subjected to the additional trauma of the ICSI procedure.

In order to determine whether this is the case, the study is being extended. Following randomisation, Medi-Cult or Irvine Scientific products, including flushing medium and oil, will be used throughout the IVF and ICSI procedures, rather than just doing the insemination and culture phases, as in the present study.

The embryos that were cultured in P-1 medium developed with better morphology than those in Medi-Cult, which led to more cycles with cryopreserved embryos. However, this did not translate into a higher pregnancy rate. This finding is common with several other studies^{2,3} comparing different culture media, none of which have demonstrated clear benefits in terms of pregnancy rate of one culture medium over others, despite differences in embryo morphology.

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