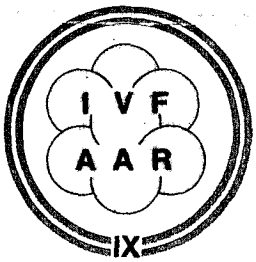
REPRINTED FROM:



IXth

WORLD CONGRESS ON IN VITRO FERTILIZATION AND ASSISTED REPRODUCTION

Vienna (Austria), April 3 - 7, 1995

Editors
A. ABURUMIEH, E. BERNAT, G. DOHR,
W. FEICHTINGER, F. FISCHL,
J. HUBER, E. MÜLLER, S. SZALAY,
W. URDL and H. ZECH

MONDUZZI EDITORE

INTERNATIONAL PROCEEDINGS DIVISION

IX World Congress on
IN VITRO
FERTILIZATION and
ALTERNATED
ASSISTED
REPRODUCTION

Vienna, Austria
3-7 April 1995

Sperm morphology using strict criteria not useful in predicting poor pregnancy rates (PRs) despite adequate fertilization

B.S. SHANIS, D. KATSOFF, J.H. CHECK and L. HOOVER

UMDNJ, Robert Wood Johnson Med. School at Camden (USA)

SUMMARY

Presented herein is a prospective study whose objective was to determine if poor sperm morphology (<4% normals) using strict criteria will result in decreased pregnancy rates (PRs) following in vitro fertilization (IVF) when motile density (MD) is normal. MD of the male partner's sperm was required to be $\geq 10x10^6$/mL. Patients were divided into four groups according to normal morphology using strict criteria and sperm insemination concentration. Mean fertilization rates varied from 72-79% among the four groups and were not significantly different. The group with the worst morphology (<4%) had a non-significant higher clinical and viable PR (26.3% and 26.3%) than the group with the best morphology (>14%) (10.8% and 9.7%). This study determined that poor morphology by strict criteria does not result in poor PRs with adjusted MD.

INTRODUCTION

Sperm morphology is considered by some to be the best semen parameter in predicting fertilization (1). Kruger et al. suggested that using

strict criteria for sperm morphology might be a valid predictor of poor fertility during IVF (2). Poor fertilization and low PRs occurred with <4% normal morphology when strict criteria were used. Oehninger et al. reported that by increasing the number of motile sperm per oocyte, an increased fertilization rate was achieved in the <4% normal morphology group, but pregnancy outcome was not improved (ongoing PR ranged from 3.1% to 6.8% per transfer depending on sperm concentration used) (3). The aim of this study was to either corroborate or refute these previous findings since the mechanism of why poor PRs should ensue despite replacement of seemingly normal embryos is not intuitively clear.

MATERIALS AND METHODS

All patients undergoing IVF-embryo transfer (ET) from November 1991 to July 1993 at the Cooper Center for IVF, who also used the luteal phase leuprolide acetate (LA) - human menopausal gonadotropin (hMG) hyperstimulation regimen were included in the study. Leuprolide acetate 1mg was started subcutaneously (SC) one week after ovulation and continued for at least ten days until the serum estradiol (E_2) was <50pg/mL and the serum progesterone (P) <1mg. At this time the LA was reduced to 0.5mg and hMG (300 IU IM) was started and continued until two follicles with a 20 mm average diameter were demonstrated by sonography and the serum E_2 was $\geq$800pg/mL. Human chorionic gonadotropin (hCG) 10,000 units IM was then given; oocyte retrieval was performed 36 hours later and ET 48 hours after retrieval.

Four groups were established based on percent normal morphology using strict criteria: gr 1 (n=19) normal morphology <4%; gr 2 (n=124) 4$\leq$ normal morphology $\leq$9%; gr 3 (n=73) 10$\leq$ normal morphology $\leq$14%; gr 4 (n=93) normal morphology >14%.

All male partners had a MD $\geq 10x10^6$/mL with a motility >30%. No donor sperm was used. The patients in the first two groups had their oocytes inseminated with $\geq$10,000 motile morphologically normal sperm/oocyte. The maximum concentration of sperm used/oocyte was $1x10^6$. The patients in groups 3 and 4 had their oocytes inseminated with 25,000 sperm/oocyte. No microinsemination, micromanipulation, or other enhancing techniques, e.g., addition of follicular fluid or pentoxyfylline, or cumulus removal was used. Routinely, four oocytes/dish were incubated.

Analysis of variance was used to compare the mean fertilization rates among the four groups. Chi-square analysis was used to compare the clinical and viable PRs.

RESULTS AND CONCLUSIONS

There was no difference in the mean fertilization rates in the four groups; 72%, 74%, 79%, and 76%, respectively (Table I). There were very few cases of poor fertilization (<30%); gr 1: 2/19 (10.5%), gr 2: 7/124 (5.6%), gr 3: 3/73 (4.1%), gr 4: 6/93 (6.4%).

The clinical PRs (ultrasound evidence of pregnancy)/retrieval in groups 1-4 respectively were: 26.3%, 19.3%, 23.3%, and 10.8%. The viable PRs (12 week ultrasound demonstrating viability) were 26.3%, 17.7%, 19.2%, and 9.7%, respectively in groups 1-4. There was no difference in the clinical or viable PRs in the four groups (p>.05). The

Table I - Motile density and fertilization rates in strict criteria groups

	Gr 1 (NM* <4%) Insem. 10,000 normal forms (n=19)	Gr 2 (NM 4-9%) Insem. 10,000 normal forms (n=124)	Gr 3 (NM 10-14%) Insem. 25,000 motile sperm (n=73)	Gr 4 (NM >14%) Insem. 25,000 motile sperm (n=93)
% Fertilization of Mature Oocytes				
mean ±SD	72.4±24.7	74.4±22.6	78.9±21.7	76.0±23.3
median	78	78	83	82
MD ($x10^6$)[a]				
Mean ±SD	38.3 ±31.7	43.2 ±31.0	65.4 ± 43.2	66.5 ± 42.3
Median	29.1	35	55	58

[a] $p<.05$, ANOVA grps 1 and 2 compared to grps 3 and 4.

* NM = normal morphology

only significant difference among the four groups was that the mean MD of group 1 and group 2 (38.3 and 43.2x10^6/mL) was lower than group 3 and group 4 (65.4 and 66.5x10^6/mL) (Table I). The incidence of polyspermy in the four groups was 3.2%, 9.0%, 5.6%, and 5.9%. There is a significantly lower polyspermy rate in group 1 and a higher rate in group 2 than in groups 3 and 4 (chi-square, $p<.05$).

It is interesting that the group with the best percent normal morphology had PRs of less than half of the group with the worst percent normal morphology, though the differences were not significant. Patients with strict morphology scores <10% whose oocytes were inseminated with 10,000 motile normal forms achieved the same fertilization and PRs as those with scores ≥10% who had 25,000 motile sperm inseminated with their oocytes, though the PR in group 4 (the group with the best percent normal morphology) was less than half of any of the other three groups. The difference was not statistically significant and there is no logical reason to consider this as a trend, rather than merely being fortuitous.

Since there was no consistent trend with polyspermy by increasing sperm concentrations (group 1 with significantly lower and group 2 with significantly higher polyspermy rates) these data do not suggest a significant complication of polyspermy using higher insemination concentrations.

Since only conventional sperm-oocyte insemination techniques were used, teratozoospermia, at least using strict morphologic criteria, should not be an indication for micromanipulation procedures (4). The concentration of sperm was adjusted to 10,000 normal motile sperm/oocyte in the two groups with the lowest percent normal morphology. The study design, however, allows no conclusions as to whether this adjustment is necessary. Thus, though the data presented

herein refute Oehninger et al.'s conclusion that PRs are low with strict morphology <4% (even if one adjusts the sperm concentration to improve fertilization rates), our results neither support nor refute the contention that increasing the sperm concentration for oocyte insemination is needed to improve fertilization rates with poor morphology.

REFERENCES

1. Rogers BJ, Bentwood BJ, Van Campen H, Helmbrecht G, Soderdahl D, Hale RW. Sperm morphology assessment as an indicator of human fertilizing capacity. J Androl 4:119-125;1983.
2. Kruger TF, Acosta AA, Simmons KF, Swanson RJ, Matta JF, Oehninger S. Predictive value of abnormal sperm morphology in in vitro fertilization. Fertil Steril 49:112-117;1988.
3. Oehninger S, Acosta AA, Morshedi M, Veeck L, Swanson RJ, Simmons K, Rosenwaks Z. Corrective measures and pregnancy outcome in in vitro fertilization in patients with severe sperm morphology/abnormalities. Fertil Steril 50:283-287;1988.
4. Cohen J, Alikani M, Malter HE, Adler A, Talansky BE, Rosenwaks Z. Partial zona dissection or subzonal sperm insertion: microsurgical fertilization alternatives based on evaluation of sperm and embryo morphology. Fertil Steril 56:696-706;1991.

MONDUZZI EDITORE
VIA FERRARESE, 119/2
40128 BOLOGNA
TEL. (051) 370337 - FAX (051) 370529
TELEX 512654 MONDBO I