INFLUENCE OF SPERM DNA DAMAGE ON PREGNANCY AFTER IVF AND ICSI: A PROSPECTIVE STUDY

ANNICK COURCHESNE[1-2], GILLES BLEAU[2], SIMON PHILLIPS[1], JACQUES KADOCH[1-2], MARIA SAN GABRIEL[3] AND ARMAND ZINI[1-3].

[1]OVO FERTILITY, MTL, QC, CND. [2]OBGYN CHUM, MTL, QC, CND. [3]UROLOGY RESEARCH MCGILL UNIVERSITY, MTL, QC, CND.

Canadian Fertility and Andrology Society

55TH ANNUAL MEETING

19TH – 21ST NOVEMBER 2009

MONTREAL (QUEBEC)

ABSTRACT

Introduction: Sperm DNA damage is common in infertile men and has been associated with reduced pregnancy rates in IVF. We sought to further examine the relationship between sperm DNA damage and pregnancy rates after IVF and ICSI.

Methods: We conducted a prospective study of 60 infertile couples undergoing IVF and/or ICSI at a single fertility clinic. A small aliquot of whole semen was taken from the sample to be used for IVF-ICSI. Assessment of standard semen parameters and sperm chromatin structure assay (SCSA) parameters (%DFI - DNA fragmentation index and % HDS - high DNA stainability) was conducted. Couples were sub-grouped according to the sperm %DFI results (Group 1: 0-15%; Group 2: >15%). All couples gave signed informed consent prior to participation in the study.

Results: There were no significant differences in the 2 groups with regard to maternal age, day 3 FSH, sperm parameters or fertilization rate. The biochemical and clinical pregnancy rates were higher in Group 1 than Group 2 but the differences were not significant (48% vs. 20%, P=0.14 and 40% vs. 10%, P=0.13, respectively,).

Conclusions: These preliminary data suggest that sperm DNA damage can adversely impact on clinical pregnancy after IVF and ICSI.

OBJECTIVE

The aim of the study was to examine the relationship between sperm DNA damage and pregnancy rates after IVF and ICSI.

METHODS

A prospective study was performed on 60 infertile couples undergoing IVF and/or ICSI at a single fertility clinic. A small aliquot of whole semen was taken from the sample to be used for IVF-ICSI and the remaining was used for semen analysis and DNA fragmentation. Semen analysis was carried out according to WHO criteria[1] for concentration, motility and morphology. The sperm samples were frozen in liquid nitrogen for later assessment of DNA damage.

We have previously shown that testing fresh or frozen-thawed samples gives comparable results (<5% variability).[2]

Sperm DNA damage was assessed by the sperm chromatin structure assay (SCSA) and the results were expressed as sperm %DFI (DNA fragmentation index: an index of DNA damage) and %HDS (high DNA stainability: an index of chromatin compaction).[3] At least 5000 cells were counted from two aliquots of each sample and a mean of the two sperm %DFI and %HDS values is reported. The variability of the repeat SCSA measures was <5%. Couples were sub-grouped according to the sperm %DFI results (Group 1: 0-15%; Group 2: >15%). All couples gave signed informed consent prior to participation in the study.

STATISTICS

Results are expressed as mean ± SD. Statistical analysis was performed using T-test and Fisher exact test as applicable.

RESULTS

The biochemical and clinical pregnancy rates were higher in Group 1 than Group 2 but the differences were not significant.

	Group 1	Group 2	Group 3
n	50	10	
Biochemical Pregnancies (%)	24 (48)	2 (20)	0.14 (NS)
Clinical Pregnancies (%)	20 (40)	1 (10)	0.13 (NS)

*Comparison between group 1(DFI=0-15%) and group 2 (DFI>15%) samples by Fisher exact test; NS (not significant) = P>0.05

There was no significant difference between the group1 and group 2 for patient age, day 3 FSH, sperm parameters or fertilisation rate.

	Group 1	Group 2	*P*-value*
n	50	10	
Male age	36 ± 5 ‡	39 ± 5	NS
Female age	34 ± 4.9	35 ± 3.5	NS
day 3 FSH	7.2 ± 2.2	7.1 ± 2.6	NS
Sperm concentration	137 ± 134	65 ± 51	NS
Sperm progressive motility (%)	34 ± 19	44 ± 19	NS
Sperm Strict morphology	5.3 ±4.4	5.4 ± 3.7	NS

*Comparison between group 1(DFI=0-15%) and group 2 (DFI>15%) samples by T-test; NS (not significant) = P>0.05
‡ Mean ± SD

CONCLUSIONS

In this prospective study of 60 infertile couples undergoing an IVF cycle, our preliminary data suggest that sperm DNA damage can adversely impact on clinical pregnancy after IVF and ICSI.

Our study is limited by the number of cases in each group but our findings highlight an interesting area for further research with larger groups of patients.

REFERENCES

1. WHO Manual for the Examination of Human Semen and Sperm-Cervical Mucus Interaction. 4th Edition. Cambridge University Press. 1999.
2. Zini A et al. Fertil Steril 2001;75:674-77
3. Evenson DP, et al. Hum Reprod 1999;14:1039-49

OVO FERTILITY