FACTORS WHICH PREDICT IMPROVEMENT IN DNA FRAGMENTATION ON A SECOND SEMEN SPECIMEN 3 HOURS AFTER THE FIRST.

Michael H. *Dahan, Rabia Khoudja, Abbie Gagnon, Grace Tan, Seang Lin Tan*

OriginElle Fertility Center, Montreal, Canada

Please see our other poster, which will place this poster into context.

OBJECTIVE

High DNA sperm fragmentation is associated with miscarriage rates and may be associated with IVF success rates. If high, methods of dealing with DNA fragmentation include testicular sperm aspiration, Anexin sperm wash and ICSI. These procedures add cost, or pain after surgery. We have demonstrated in a prospective blinded study of 112 males who produced two sperm specimens, one after three days of abstinence, followed by a three hour window until the second ejaculation, that DNA sperm fragmentation improves significantly in the second specimen. When this was done 55% of men with high DNA fragmentation normalized in this ultra fresh second specimen. Sperm DNA-fragmentation occurs in the epididymus while waiting for ejaculation. Shortening the time after ejaculation improved results by an average 23%. This study was undertaken to determine what factors predict at least a 30% improvement in sperm DNA-fragmentation when comparing a first ejaculate after 3-days of abstinence and a second 3-hours after the first.

MATERIAL & METHODS

112 subjects participated in the prospective cohort study where males were requested to wait 3-days without an ejaculation at which point a semen analysis and DNA-fragmentation was performed and repeated 3-hours latter on a 2nd specimen. DNA-fragmentation was evaluated with the halo test by one of two technicians. Technicians were blinded as to whether the specimen was produced after three days or 3 hours of abstinence. Data was compared by intra-subject t-test. Data is presented as mean ±SD. Stepwise multivariate logistic regression was used to model predictors of ≥30% improvement in DNA-fragmentation in the second specimen. An at least 30% cut off was established arbitrarily. However, such an improvement was felt to be clinically significant and as such was selected as a cut off point for our model. Variables included in the model were age, multi-vitamin use, 1st and 2nd ejaculate volume, sperm concentration & motility, smoking status, cannabis used, previous pregnancies and initial specimen DNA fragmentation. Ethics committee approval was obtained for this study.

Note: as per multivitamin use, if taken all subjects were consuming at least one months of Fertil Pro Male (Yadtech, Montreal Canada). None of the authors of this manuscript have any affiliations or conflicts of interest with Yadtech.

RESULTS

Average male age was 36±7 years (range 29-65). When comparing the sperm DNA fragmentation in the specimen after 3-days and 3-hours of abstinence changes noted were significant for all subjects (N=112) (34.6 ±19.4% vs. 23.7 ±16.0%, p=0.0001) and for subjects with an initially high fragmentation rate (N= 49) (52 ± 16% vs. 36 ±17%, p=0.0001), respectively, (23%±30%). 58/112 subjects demonstrated a ≥30% improvement in sperm DNA-fragmentation in the 2nd specimen as compared to the 1st.

Factors Which Predict at Least a 30% Improvement in Sperm DNA Fragmentation in the Specimens Produced After 3 hours of Abstinence as Compared to 3 Days of Abstinence

	< 30% improvement in DNA fragmentation N=54	≥30% improvement in DNA fragmentation N=58	95% CI	p=
Male Age (Years)	42.1 ±8.1	40.3± 6.0	0.84-0.99	**0.03**
Initial Sperm DNA Fragmentation (%)	33.2 ±21.3	35.7 ± 18.4	1.0-1.06	**0.06**
Initial Volume (ml)	2.6 ±1.3	2.8 ±1.2	0.84-2.65	NS
Second Volume (ml)	1.9 ±0.8	1.9 ±0.8	0.23-1.39	NS
Initial Concentration (millions/ml)	44.8 ±37.4	39.7 ±42.8	0.98-1.005	NS
Second Concentration (millions/ml)	37.2 ±28.8	37.1 ± 34.0	0.99-1.03	NS
Initial Progressive Motility (%)	56.1 ±20.7	58.4 ±21.0	0.97-1.03	NS
Second Progressive Motility (%)	58.9 ±23.1	62.7 ±19.1	0.98-1.04	NS
Smoking status (Tobacco)	7% (4)	3% (2)	0.28-15.7	NS
Cannabis Use	6% (3)	10% (6)	0.10-2.45	NS
Use of Sperm Directed Multi Vitamin	17% (9)	34% (20)	1.25-19.8	**0.02**

Two factors predicted at least a 30% improvement in DNA-fragmentation in the second specimen; male age with younger males having more improvement and the use of a sperm directed multivitamin. Initial DNA-fragmentation trended towards being a predictor of improvement, with higher initial levels being more likely to improve by at least 30%.

DISCUSSION

- High DNA sperm fragmentation can often be managed with a second ejaculation 3 hours after the first.
- This is a cost free and risk free mechanism to manage elevated DNA fragmentation. All men with elevated DNA fragmentation deserve a second test with 3 hours abstinence before recommending TESA or ANEXIN separation.
- Younger men and those taking a sperm improvement vitamin supplement were more likely to have at least a 30% improvement in DNA-fragmentation on the second specimen.
- All men should be proscribed a sperm directed multi-vitamin who will undergo this protocol.
- Both smoking tobacco rates and Cannabis use failed to be related to improvement in sperm DNA fragmentation. This was likely due to the small percentage of subjects participating in these vices in each group and further research will be required to elucidate there roles.
- Interestingly, subjects with higher initial sperm DNA fragmentation were more likely to improve by at least 30%, offering hope to the worse cases. It should be noted that the greatest improvement in an individual seen in this study was 97% decreasing to 28% sperm DNA-fragmentation.