Abstract Details

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Abstract title:

Seminal oxidative stress and sperm DNA fragmentation in men from couples with idiopathic recurrent pregnancy loss or infertility

Biography

Education:
Bachelor of medicine, Aalborg University, Denmark, September 2014 – June 2017
Master of medicine, Aalborg University, Denmark, September 2017 – June 2020

Occupational experience:
Medical student, intravitrale injections, Department of Ophthalmologi, Aalborg University Hospital, October 2016–October 2017
Medical student, assistant in surgery, Department of Orthopaedic surgery, Aalborg University Hospital, Farsø, July 2019–June 2020

Voluntary work:
Committee member, GOP Aalborg, union of students with interest in Gynaecology, Obstetrics and Paediatrics , April 2016– April 2020

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Study question:

Are seminal oxidative stress (OS) and sperm DNA fragmentation (SDF) correlated, and can they explain idiopathic infertility or recurrent pregnancy loss (RPL)?

Summary answer:
OS and SDF levels are not different between case groups and fertile controls and OS correlates to SDF in infertile but not in RPL cases.

What is known already:
Around 15% of all couples experience infertility while 1-2% experience RPL. Approximately 25% of infertility and 40% of RPL cases are considered idiopathic. Studies have reported that seminal OS and SDF appear frequently in men from couples with infertility or RPL. Furthermore, the use of sperm with a high level of SDF has been associated with poor artificial reproductive technology outcome. However, there is no consensus on the impact of and whether to test for seminal OS or SDF in cases of idiopathic RPL or infertility.

Study design, size, duration:
This clinical case-control study aimed to include 30 men in each of the two case groups and 30 fertile controls. The data collection and assessments were according to the protocol planned between June 2019 and July 2020 at a tertiary university centre for infertility and RPL treatment.

Participants/materials, setting, methods:

Semen samples from male partners of couples with idiopathic infertility (n=23), idiopathic RPL without concomitant infertility (n=20), and fertile men (n=29) were assessed for SDF using sperm chromatin dispersion test, concentration, motility and morphology by the Sperm Class Analyzer (Microptic S.L., Spain) computer aided sperm analysis (CASA) system. Seminal OS was measured as static oxidation-reduction potential (sORP) using Male Infertility Oxidative System (MiOXSYS, Aytu BioScience Inc, USA). sORP were normalised to semen concentration.

Main results and the role of chance:
The infertile and RPL groups, showed no significant difference in the levels of OS (p=0.59 and p=0.67, respectively) or SDF (p=0.85 and p=0.11 respectively) when compared to fertile controls. There was a significant correlation between OS and SDF in the infertile group (R=0.404, p=0.028) but not in RPL group (R=0.225, p=0.18). Additionally, in the infertile group 84.6 % of men with a high level of OS (normed sORP >1.38mV/106 sperm mL) had a high level of SDF (> 15 %), whereas 60 % with low OS had a low level of SDF. The infertile men were from couples diagnosed with idiopathic infertility based on traditional (manual) semen analysis, but nevertheless analysed by CASA 78.3% had a motility below the World Health Organisation (WHO) reference values.

Limitations, reasons for caution:
Several of the men diagnosed with idiopathic infertility had a motility below the WHO reference values. Thus, this study had not only examined men from couples with idiopathic infertility as intended but also men who may have occult male factor infertility.

Wider implications of the findings:
OS determined as normed sORP may be useful to evaluate the risk of SDF in men with infertility. Several men diagnosed with idiopathic infertility had low motility when samples were assessed using CASA, indicating that these men had been misdiagnosed with idiopathic infertility instead of male factor infertility.

Keywords:
Infertility
Recurrent pregnancy loss
semen
DNA Fragmentation
oxidative stress