Abstract

Supplementation of freezing media with alpha lipoic acid preserves the structural and functional characteristics of sperm against cryodamage in infertile men with asthenoteratozoospermia

Supported by: GREEN, IAS, AIC

Background

This study carried out to examine the effects of alpha lipoic acid (ALA) supplementation during semen cryopreservation on the sperm quality, chromatin integrity, oxidative stress, and expression level of BAX, BCL2, HSP70 and iNOS genes in semen samples obtained from infertile men with asthenoteratozoospermia.

Methods

Twenty freshly ejaculated semen samples were cryopreserved with sperm freezing medium supplemented with 0.00, 0.02, 0.05, 0.1, 0.5, and 1 mmol/mL of ALA. The samples were analyzed according to the WHO guidelines before and after freezing. Sperm ROS production level, DNA fragmentation and cryo-capacitation were assessed using flow cytometry, TUNEL assay and chlortetracycline (CTC) test, respectively. Expression level of stress protein (HSP70), pro-apoptotic Bax, anti-apoptotic Bcl-2, and iNOS genes was assessed by real-time PCR assay.

Results

The effective concentrations of ALA (0.02 and 0.5 mM) significantly improved the motility, viability and morphology of the frozen-thawed sperms compared to the control group treated with 0.00 mM of ALA. During cryopreservation, treatment of semen with 0.02 mM of ALA, as the optimal concentration, significantly decreased DNA fragmentation and oxidative stress level ($P < 0.05$), protected the acrosome integrity, and led to insignificant reduction in BAX gene expression level and significant increase in expression level of BCL2, HSP70, and iNOS genes compared with control group.

Conclusion

Our findings revealed that the adding ALA to semen samples obtained from infertile men with asthenoteratozoospermia plays a significant protective role against cryodamage by preserving the sperm functional parameters.

Supported by: *Global Research Education and Event Network (GREEN), International Association of Scientists (IAS), Avicenna International College (AIC)*