

Treatment of idiopathic asthenozoospermia and oligoasthenozoospermia with Alpha lipoic acid: a placebo-controlled, cross over study.

Thesis

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List of Abbreviations

ALA	alpha lipoic acid
ALH	Amplitude lateral head displacement
ART	assisted reproductive techniques
ATP	adenosine triphosphate
AZF	azoospermia factor
AZS	asthenozoospermia
BCF	Beat-cross frequency (Hz)
CAD	coronary artery disease
cAMP	cyclic adenosine monophosphate
CASA	computer assisted semen analysis
CASMA	computer-aided sperm morphometric Assessment
CFTR	cystic fibrosis transmembrane conductance regulator
C-max	concentration maximum
CRLA	controlled release alpha lipoic acid
DEPs	differentially expressed proteins
DHLA	dihydrolipoic acid
DMSA	dimercaptosuccinic acid
FSH	follicle stimulating hormone

G3PD	glyceraldehyde- 3-phosphate dehydrogenase
GSH-Px	glutathione peroxidase
IBT	Immuno beed test
IVOS	Integrated video optical system
KS	kartagener syndrome
LH	leutinizing hormone
LIN	Linearity
MAD	Mean angular displacement (degrees)
MAGI	male accessory gland infection
NO	nitric oxide
NOS	nitric oxide synthase
NTSC	National Television Standards Committee standard
ODAs	outer dynin arms
OSF	oral submucous fibrosis
PAL	phase alternating line
PCD	primar ciliary dyskinesia
PCOs	polycystic ovary syndrome
PDH	pyruvate dehydrogenase
PRM1	protamine 1
PRM2	protamine 2
R-ALA	R lipoic acid

ROS	reactive oxygen species
S-ALA	S lipoic acid
SFA	Seminal fluid analysis
Se	Selenium
SNPs	Single-nucleotide polymorphisms
SQA-V	Sperm Quality Analyzer
STR	Straightness
TNF	tumor necrosis factor
TRP	transient receptor potential
VAP	The average path velocity
VCL	The curvilinear velocity
VSL	The straight line velocity
WHO	world health organization
WOB	Wobble

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ABSTRACT

In the first section of the study 60 patients complaining of infertility, with the chief etiology is idiopathic asthenozoospermia (either isolated or associated with oligozoospermia) group I received 600 mg/day of alpha lipoic acid as an antioxidant (Alpha lipoic acids were selected for this purpose for their efficient free radical scavenging properties, and solubility in lipid and aqueous phases.

ALA does not cause a major shift of pH into acidic regions, because the acid is categorized as a weak acid. Recent findings have also indicated that ALA is able to enter the Krebs cycle, thus assisting in the production of ATP, which is required in viable sperm.), while group II received placebo for 3 months duration, and semen was assessed monthly using CASA.

The study had been conducted in a double blind, placebo controlled; after wash out period for 3 months, the crossover section of the study started by 41 patients. All the 3 main semen parameters (count, motility & abnormal forms) monitored and compared for every patient and between both groups pretreatment, after 3rd month and after the second section.

The results revealed improvement with active drug intake regarding total motility (group I), after cross over section placebo improved both progressive & total motility.

While group II received placebo; there was improvement in count, progressive & total motility, but when active drug was taken for 3 months later, there was no more improvement in the cross over section and all the results regressed.

Conclusion: From the results of this study, alpha lipoic acid adds no more than placebo in idiopathic asthenozoospermia. We recommend further study on larger group of patients to reach final conclusions.

Key words: Asthenozoospermia - Alpha lipoic acid – Antioxidants – CASA.

INTRODUCTION

Infertility is an important human health problem that affects ~15% of couples worldwide (Infertility touches 1 in 6 couples), and the underlying cause in half of these cases can be traced to men (**Flaherty, 2014**).

The infertile population has been increasing over the past few decades. However, treatment efficacy is poor because the underlying causes are unknown in 40-50% of cases (**Kretser & Baker, 1999**).

Oxidative stress is a common feature of compromising factors such as environmental pollutants, chemicals, drugs, smoke, toxins, radiation, and diseases related to infertility (**Smith et al, 2006**). In such conditions, vital cell components, such as proteins, lipids, and DNA, are oxidized (**Halliwell et al, 2007**).

Reactive oxygen species (ROS) - mediated damage to sperm is a significant contributing factor in 30-80% of infertile men (**Agarwal et al, 2006**), DNA fragmentation and oxidation of bases, low mitochondrial membrane potential (**Gallon et al, 2006**).

The oxidative stress, a condition resulting of an excessive production of ROS and/or a decrease in the antioxidant defense system, may cause serious cell injury and even cell death (**Halliwell et al, 2007**).