

Effect of Anabolic-Androgenic Steroids on Semen Parameters and Serum Sex Hormonal Levels in Egyptian Male Bodybuilders

Thesis

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List of Contents

Title	Page No.
List of Tables.....	Error! Bookmark not defined.
List of Figures.....	Error! Bookmark not defined.
List of Abbreviations.....	Error! Bookmark not defined.
Introduction	1
Aim of the Work	6
Review of Literature	
▪ Testosterone.....	7
▪ Anabolic-Androgenic Steroids.....	17
Subjects and Methods.....	39
Results.....	44
Discussion	58
Summary.....	66
Conclusion	69
Recommendations	70
References	71
Arabic Summary	

INTRODUCTION

First recognized 1935, testosterone foremost hormone controlling improvement androgenic-masculinizing impacts male body, alongside its anabolic properties expansion fit bulk (Dotson Brown, 2007).

The anabolic androgenic steroids (AAS) are testosterone subordinates utilized since 1950s trying amplify anabolic impacts testosterone, diminish pace its hepatic inactivation, abatement its aromatization estradiol (Kickman, 2008).

Anabolic androgenic steroid details might act naturally regulated orally, parenterally by intramuscular infusion, transdermally fix topical gel. Observational proof past recommended AAS were generally utilized by top-level serious competitors particularly weightlifters, jocks, track competitors (Stromme et al., 1974).

As now, AAS are broadly utilized, not just by competitors engaged recreational small time sports yet additionally by non-competitors. Strikingly, at any rate four out five AAS clients are not serious competitors yet rather men

who want what they see be an "upgraded" appearance. worldwide lifetime pervasiveness pace AAS use 3.3%, higher pace 6.4% male people contrasted 1.6% female people. What's more, AAS use shows up increasingly predominant among youngsters contrasted people matured more established than 19 years; quite, 4–6% secondary school young men have utilized AAS (Sagoe et al., 2016).

Temporarily, AAS use brings about hardly any genuine clinical outcomes, however their long haul use been related few weakening physical mental unfavorable impacts even expanded mortality. Unfavorable impacts may go advancement skin break out gynecomastia, genuine perilous impacts, for example, an expanded danger cardiovascular malady hepatic carcinoma (Nieschlag Vorona, 2015).

Typical gonadal capacity relies upon nearness unblemished hypothalamic pituitary gonadal hub action through discharge gonadotropin-discharging hormone (GnRH) by arcuate core nerve center, just gonadotropins by pituitary organ [follicle-animating hormone (FSH) luteinizing hormone (LH)]. Anabolic androgenic steroid use produces portion subordinate despondency gonadotropin discharge either by direct activity pituitary organ by concealment hypothalamic

GnRH discharge. male people, diminished gonadotropin discharge brings about diminished intra-testicular fringe testosterone levels, prompting AAS-actuated hypogonadotropic hypogonadism showing testicular decay, oligospermia, azoospermia, other sperm anomalies (Fronczak, 2012).

Some male AAS abusers experience an absence moxie, erectile brokenness, even gynecomastia. Impacts prostate organ incorporate hyperplasia, hypertrophy, perhaps malignancy (Vorona Nieschlag, 2015).

In Egypt, spite fact there are signs AAS are utilized by competitors, yet extent specialist realize it isn't recorded. Accordingly, there need research impacts maltreatment these medications male conceptive wellbeing an end goal make ready for considers later constrain size this issue Egypt arrange powerful instructive program about harming impacts these medications may have soundness clients.

AIM WORK

We aim at studying influence anabolic androgenic steroids semen parameters serum sex hormonal levels Egyptian male bodybuilders.

Chapter (1)

TESTOSTERONE

I. Introduction

Testosterone an anabolic steroid essential male sex hormone. male people, testosterone assumes key job improvement male regenerative tissues, for example, testicles prostate, just advancing optional sexual attributes, for example, expanding muscle bone mass, body hair. Also, testosterone associated wellbeing prosperity, anticipation osteoporosis (Snyder et al., 2016).

Testosterone steroid androstane class containing keto hydroxyl bunches at three seventeen positions separately. It biosynthesized few stages cholesterol changed over liver into inert metabolites. It applies its activity through authoritative enactment androgen receptor. people most different vertebrates, testosterone discharged fundamentally by gonads guys and, lesser degree, ovaries females. By large, grown-up guys, levels testosterone are around 7 multiple times more prominent than grown-up females. digestion testosterone guys progressively articulated, day by day creation around multiple times more prominent men (Kloner et al., 2016).

Notwithstanding its job characteristic hormone, testosterone utilized medicine, for example treatment low testosterone levels men bosom malignant growth ladies. Since testosterone levels decline men age, testosterone at times utilized more established men balance this insufficiency (Betageri et al., 2018).

II. Medical use

Hypogonadism, testosterone inadequacy (TD), increasingly regular all together age men. Ongoing investigations have evaluated almost 5 million new instances hypogonadism men between ages 49 60 years course most recent decade. simultaneous ascent showcasing by pharmaceutical organizations, testosterone substitution treatment (TRT) maturing male expanded significantly. Various terms have been utilized order age-related hypogonadism, including andropause, male climacteric disorder, lateonset hypogonadism, androgen inadequacy maturing male. American Urological Association (AUA) characterizes hypogonadism "biochemically low testosterone levels setting bunch clinical manifestations, which may incorporate diminished sexual want (drive) movement, diminished unconstrained erections, diminished vitality discouraged state mind". Also, men burdened by hypogonadism may encounter decreased bulk, physical quality, bone mineral

thickness, just sickness expanded muscle fat ratio. Numerous men determined have TD do profit by TRT. There clashing proof regards impact TRT cardiovascular framework. Some ongoing investigations ensnare TRT expanding cardiovascular occasions, while others report TRT having defensive impact. an approach explanation gave February 2014, AUA perceived contention encompassing TRT, supported its utilization treatment men enduring hypogonadism "after full conversation potential unfriendly impacts." AUA proceeded express authoritative examinations have not been performed, and, thusly, impacts TRT cardiovascular sickness are not completely clarified (Jones et al., 2015).

It perceived androgens have an erythrogenic impact hematologic framework. Heights hemoglobin (Hb) hematocrit (Hct) levels are much time depicted outcomes TRT late meta-examinations have affirmed blood profile changes are most widely recognized unfriendly medication occasions seen this treatment. It been suggested longterm height Hb Hct may build danger venothromboembolism (VTE), however this theory isn't all around settled upon. utilization exogenous testosterone treatment for hypogonadism maturing male relied upon increment increasingly more indicative testing

led. Considering this, understanding security evasion unfriendly symptoms ought be need for all medications (Jones et al., 2015).

Three significant unfriendly occasions coming about because TRT: polycythemia, an expansion prostate-related occasions, slight decrease serum high-thickness lipoprotein cholesterol (Jia et al., 2015).

III. Biological movement

- Steroid hormone movement

The impacts testosterone people different vertebrates happen through numerous systems: by actuation androgen receptor (legitimately DHT), by change estradiol enactment certain estrogen receptors. Androgens, for example, testosterone have likewise been found tie initiate layer androgen receptors (Cunningham et al., 2016).

Free testosterone (T) shipped into cytoplasm target tissue cells, where it can tie androgen receptor, can be decreased 5 α -dihydrotestosterone (DHT) by cytoplasmic protein 5 α -reductase. DHT ties similar androgen receptor significantly more firmly than testosterone, goal its androgenic intensity around multiple times T. T-receptor DHT-receptor complex experiences an auxiliary change permits it move into cell core tie legitimately explicit nucleotide groupings chromosomal DNA. territories restricting are called hormone reaction components (HREs), impact transcriptional movement specific qualities, creating androgen impacts (Cheetham et al., 2017).

Androgen receptors present many body framework tissues, two guys females react comparatively comparable levels. Enormously varying measures testosterone prenatally, at adolescence, all through life represent portion organic contrasts among guys females (Hackett, 2017).

Bones cerebrum are two significant tissues people where essential impact testosterone by aromatization estradiol. bones, estradiol quickens hardening ligament into bone, prompting conclusion epiphyses end development. focal sensory system, testosterone aromatized estradiol. Estradiol instead testosterone

fills most significant input signal pituitary (particularly influencing LH discharge) (Atlantis et al., 2016).

- Neurosteroid movement

Testosterone, by means its dynamic metabolite 3 α -androstenediol, an intense positive allosteric modulator GABAA receptor. Rather than testosterone, DHEA DHEA sulfate have been found go about high-proclivity agonists these receptors (Kumagai et al., 2015).

The groupings testosterone required for restricting receptor are far above even all out coursing centralizations testosterone grown-up guys (which run somewhere range 10 35 nM) (Büttler et al., 2015).

IV. Biochemistry

- Biosynthesis

Figure (1): Human steroidogenesis, indicating testosterone close base (Ferro et al., 2017).

Like other steroid hormones, testosterone gotten cholesterol see figure (1). initial phase biosynthesis includes oxidative cleavage side-chain cholesterol by cholesterol side-chain cleavage protein (P450_{scc}, CYP11A1), mitochondrial cytochrome P450 oxidase loss six carbon iotas give pregnenolone. following stage, two extra carbon iotas are evacuated by CYP17A1 (17 α -hydroxylase/17,20-lyase) protein endoplasmic reticulum yield an assortment C19 steroids. Likewise, 3 β -hydroxyl bunch oxidized by 3 β -hydroxysteroid dehydrogenase create androstenedione. last rate constraining advance, C17 keto bunch androstenedione diminished by 17 β -hydroxysteroid dehydrogenase yield testosterone (Ferro et al., 2017).

The biggest measures testosterone (>95%) are created by testicles men, while adrenal organs represent majority rest of. Testosterone additionally incorporated far littler absolute amounts ladies by adrenal organs, thecal cells ovaries, and, during pregnancy, by placenta. testicles, testosterone delivered by Leydig cells. male generative organs, Sertoli cells, require testosterone for spermatogenesis. Like most hormones,

testosterone provided target tissues blood where quite bit it moved bound particular plasma protein, sex hormone-restricting globulin (SHBG) (Nguyen et al., 2015).

Criteria ordinary semen investigation

(Alshahrani et al., 2018)

- Regulation

Figure (2): Hypothalamic–pituitary–testicular pivot (Büttler et al., 2016).

The measure testosterone orchestrated controlled by hypothalamic–pituitary–testicular pivot. At point when testosterone levels are low, gonadotropin-discharging hormone (GnRH) discharged by nerve center, which thus invigorates pituitary organ discharge LH. These last two hormones animate testis blend testosterone. At long last, expanding levels testosterone through negative criticism circle follow up nerve

center pituitary repress arrival GnRH FSH/LH, separately (Yeap et al., 2019).

In guys, testosterone incorporated fundamentally Leydig cells. Leydig cells thus managed by luteinizing hormone (LH). Also, measure testosterone created by existing Leydig cells heavily influenced by LH, which controls statement 17 β -hydroxysteroid dehydrogenase (Hofer et al., 2016).

Components influencing testosterone levels include:

Components expanding testosterone level

- Exercise: Resistance preparing builds testosterone levels, any case, more established men, expansion can be kept away by protein ingestion. Aerobic exercise men may prompt lower testosterone levels (Kumagai et al., 2015).
- Weight misfortune: Reduction weight may bring about an expansion testosterone levels. Fat cells combine compound aromatase, which changes over testosterone, into estradiol.