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What effect does testosterone gel have on female steroid levels?

Submission date
09/01/2019

Recruitment status
No longer recruiting

Registration date
11/01/2019

Overall study status
Completed

Last Edited
31/03/2025

Condition category
Nutritional, Metabolic, Endocrine

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
In the context of sport, steroids, principally testosterone, are the most used drugs for doping. However, since it is also a molecule produced by our own body, its detection is challenging and therefore requires new detection method development. In addition, the off-label use of clinical testosterone in women is increasing for the treatment of low libido. However, there is little information on the woman's metabolism response resulting from testosterone administration. This study should allow us to know to what extent the administration of transdermal testosterone influences the steroidal profile (blood and urine) of the healthy woman. Indeed, this route of administration is recognized to be the most frequently used for doping purposes.

Who can participate?
Healthy women, aged between 20 and 40 years, and not using hormonal contraception will be recruited for this study.

What does the study involve?
The study is an open-label trial, in which all participants will receive the same treatment. The study takes place over a period of 12 weeks divided into three main phases. Each phase corresponds to a menstrual cycle. The first phase is a follow-up phase during which no treatment is administered but with regular blood and urine collections to establish a baseline. It corresponds to the control phase. The second phase is that of intervention during which a testosterone gel (Tostran) will be applied daily (28 days) on the skin (abdomen and inner thighs) of the volunteers. The daily dose will be 0.5 g of gel corresponding to 10 mg of testosterone administered. Tostran is a testosterone gel approved and marketed in Switzerland. It is used in the substitution treatment of testosterone in adult men during various health problems caused by a deficiency of testosterone (male hypogonadism). The blood and urine samples are collected as in phase I. This phase is followed by phase III, called post-treatment, which is similar to phase I. No intervention is administered and only urine and blood samples are collected.

What are the possible benefits and risks of participating?
Participation in the study is a help for the fight against doping and for the improvement of female metabolism comprehension. The most frequently reported side effects linked to Tostran administration are local skin reactions due to the presence of butylhydoxytoluene (E321) in the

drug. It also happens that a long-term treatment causes swelling of the hands and / or feet, hair loss, hypertension, increased body hair, impaired biological balance, cutaneous hypersensitivity, acne , and oily skin.

Since the doses administered will be 6 times lower than those recommended for substitution treatment in humans, these adverse effects will be limited.

Where is the study run from?
This pilot study is conducted only in Switzerland, in Lausanne at the Centre Hospitalier Universitaire Vaudois (CHUV).

When is the study starting and how long is it expected to run for?
The study is supposed to start 01/03/2019 and will last approximately until 31/10/2019.

Who is funding the study?
The World Anti-Doping Agency (WADA).

Who is the main contact?
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Contact information

Type(s)
Public

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Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
2018-02106

Study information

Scientific Title
Establishment of the female steroid profile and impact of transdermal testosterone administration on the steroidal metabolism: open-label trial

Acronym
TestoFem

Study objectives
Transdermal testosterone administration influences the female steroid metabolism.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 04/06/2019, Canton de Vaud Human Research Ethics Commission (Av de Chailly 23, 1012 Lausanne, Switzerland; +41 213161830; Secretariat.CER@vd.ch), ref: 2018-02106

Study design
Single-centre open-label trial

Primary study design
Interventional

Secondary study design
Open-label trial

Study setting(s)
Hospital

Study type(s)
Other

Participant information sheet
Not available in web format, please use contact details to request a participant information sheet

Health condition(s) or problem(s) studied
Steroid metabolism

Interventions
The trial is an open-label trial which means that every participant will receive the treatment and will know what is the treatment. A treatment with testosterone gel will be administered for 28 days. The product used for the study is Tostran 20 mg/g and 0.5 g of the product corresponding to 10 mg of testosterone will be applied daily on the skin of participants.

Intervention Type
Drug

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Tostran (testosterone gel)

Primary outcome measure
Serum testosterone concentration will be measured using UHPLC-MS/MS during the whole study.

Secondary outcome measures
1. Urinary and serum steroid profile with GC-MS and UHPLC-MS/MS before, during and after treatment.
2. Untargeted metabolomics study with UHPLC-HRMS for discovery of potential biomarkers of testosterone abuse with comparison of metabolic profile before, during and after treatment.
3. Analyses of urine samples with IRMS during the treatment phase.
4. Body composition measurement with DEXA scan before and after treatment.
5. Hematological profile with Sysmex XN-1000 during the whole study.
6. Endocrinological profile (LH, FSH, hCG, SHBG) during the whole study measured with clinical chemistry.
7. Self-esteem and quality of life using specific questionnaires (Rosenberg self-esteem scale and SF-96 questionnaire) before and after treatment.

Overall study start date
14/02/2018

Completion date
06/08/2020

Eligibility

Key inclusion criteria
1. Female
2. Aged 20-40 years old
3. Body mass index between 18 and 30 kg/m2
4. Hemoglobin concentration between 12 and 16 g/dL
5. Negative pregnancy test at screening
6. Basal testosterone concentration ≤ 1.5 nmol/L

7. Regular menstrual cycles (26-32 days)
8. Normal biological balance (complete blood count, liver function (ASAT / ALAT), CRP, renal function (creatinine))
9. Normal hormone balance (LH, FSH, SHBG, cortisol, prolactin)

Participant type(s)
Healthy volunteer

Age group
Adult

Lower age limit
18 Years

Sex
Female

Target number of participants
14

Total final enrolment
14

Key exclusion criteria
1. Hypertension (SBP> 140 and DBP> 90 mmHg)
2. Regular intake of tobacco (max 1 cigarette / day) or alcohol (max 1 drink / week)
3. Regular intake of anabolic or ergogenic drugs
4. Holder of a license in a sports discipline
5. Current acne or hirsutism deemed clinically significant
6. Dyslipidemia or hypercholesterolemia
7. Hyperprolactinaemia
8. Endocrine or metabolic disease
9. Tumor of pituitary gland or hypothalamus
10. Contraindications to the class of the substance administered (hypersensitivity or allergy to the active substance or to any of the excipients)
11. Treatment with synthetic anti-thyroid or thyroid hormones
12. Treatment with ketoconazole, anticoagulants, ACTH, corticosteroids
13. Cardiovascular, hepatic, renal or biliary disease
14. Current use of hormonal contraceptives or during the two months preceding the study
15. Pregnancy present or envisaged within 6 months after the end of the study
16. Breastfeeding
17. Eating disorders
18. Previous participation in another study in the last 30 days
19. Sports competition scheduled within 9 months after the end of the study
20. Donation of blood during the last 3 months
21. Migraine
22. Neoplasia or history of neoplasia

Date of first enrolment
01/03/2019

Date of final enrolment
31/03/2020

Locations

Countries of recruitment
Switzerland

Study participating centre
Centre de recherche clinique de la Faculté de biologie et médecine et du CHUV
Rue du Bugnon 44
Lausanne
Switzerland
1011

Study participating centre
Service d'endocrinologie, diabétologie et métabolisme du CHUV
Avenue de la Sallaz 8
Lausanne
Switzerland
1011

Sponsor information

Organisation
Research and Expertise in antiDoping sciences - Université de Lausanne

Sponsor details
Research and Expertise in antiDoping sciences-REDs
ISSUL-Institut des Sciences du sport
Synathlon-Quartier Centre
Lausanne
Switzerland
1015

Sponsor type
University/education

Website
https://www.unil.ch/reds/fr/home.html

ROR
https://ror.org/019whta54

Funder(s)

Funder type
Other

Funder Name
World Anti-Doping Agency

Alternative Name(s)
l'Agence mondiale antidopage, WADA, AMA

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Canada

Results and Publications

Publication and dissemination plan
Planned publication in a high-impact peer-reviewed journal.

Intention to publish date
31/05/2021

Individual participant data (IPD) sharing plan
The datasets generated and/or analysed during the current study during this study will be included in the subsequent results publication.

IPD sharing plan summary
Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article			11/05/2021	Yes	No
Results article		29/03/2025	31/03/2025	Yes	No