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Auckland

Saturday, August 10, 2019 (Room 3)

11:00 - 11:55 WS #87: Approach to Low Testosterone Values

12:05 - 13:00 WS #97: Approach to Low Testosterone Values (Repeated)

Male hypogonadism
What every GP should know

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Disclosures

Research funding from
- Lilly, Novo, MSD, Astra

Speaking bureau for
- MSD, Lilly, Novo, Bayer

Conference support from
- Lilly, Novo, Boeringher, Astra, MSD, Novartis


Nobody has ever accused Craig Titus of being testosterone deficient.
CHRIS LUND
Max Muscle

A 55 year old man presents fatigued , with poor libido and ED. He wonders if his testosterone may be low.

- What other clinical information do you need?
- What do you focus your examination on?

History

- Duration of symptoms
- Other comorbidity
- Medication especially OTC/ internet/ other clinics
- Social factors including alcohol

Exam

- BMI
- Gynaecomastia and virilisation
- Testicular atrophy

His testosterone is 4 nmol/l (8-25)

- What physiologically influences testosterone concentration?
- What other tests do you order?

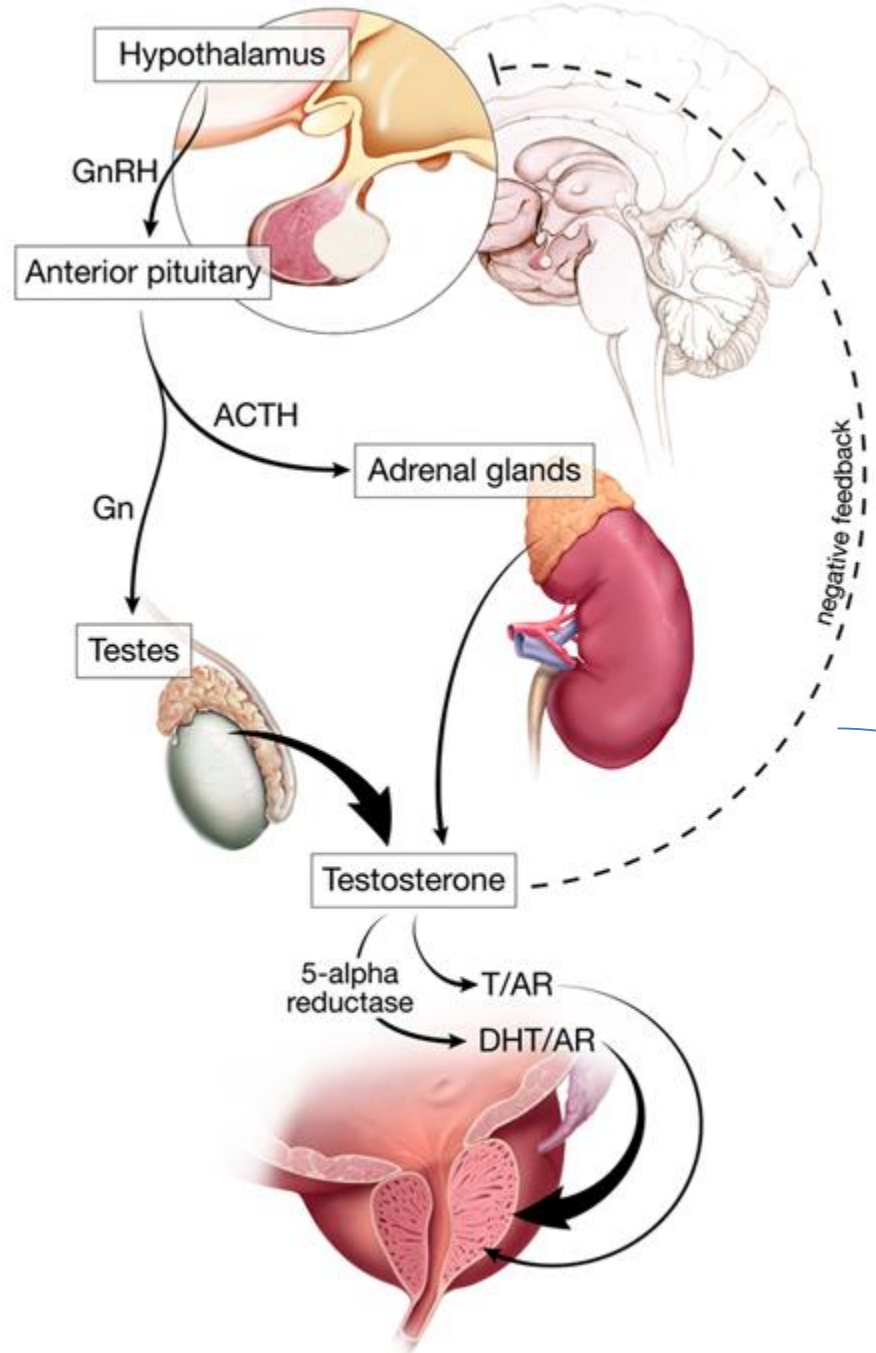
Age –pituitary pulses

Weight -SHBG

Diurnal rhythm

Illness

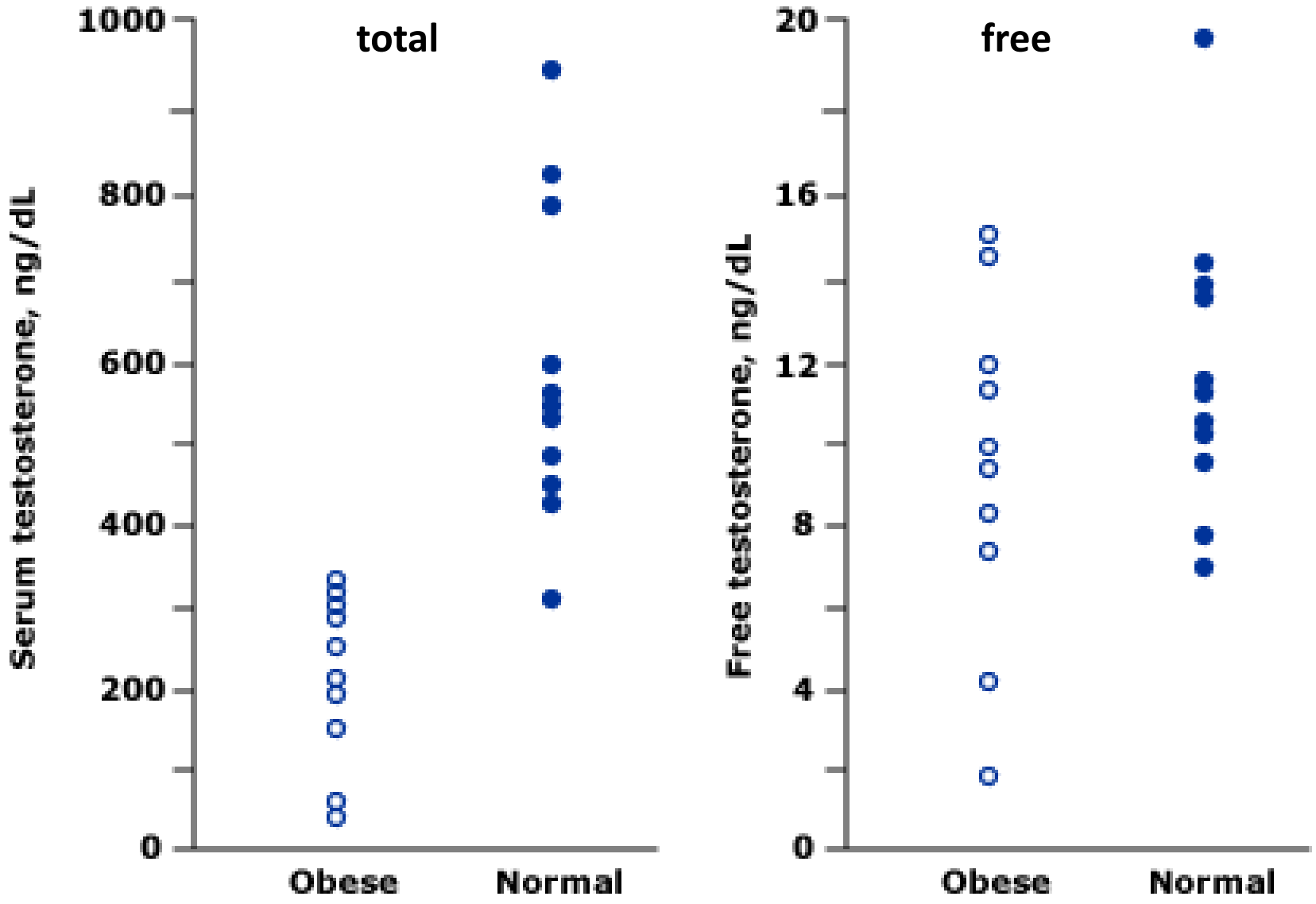
LH/FSH



aromatase

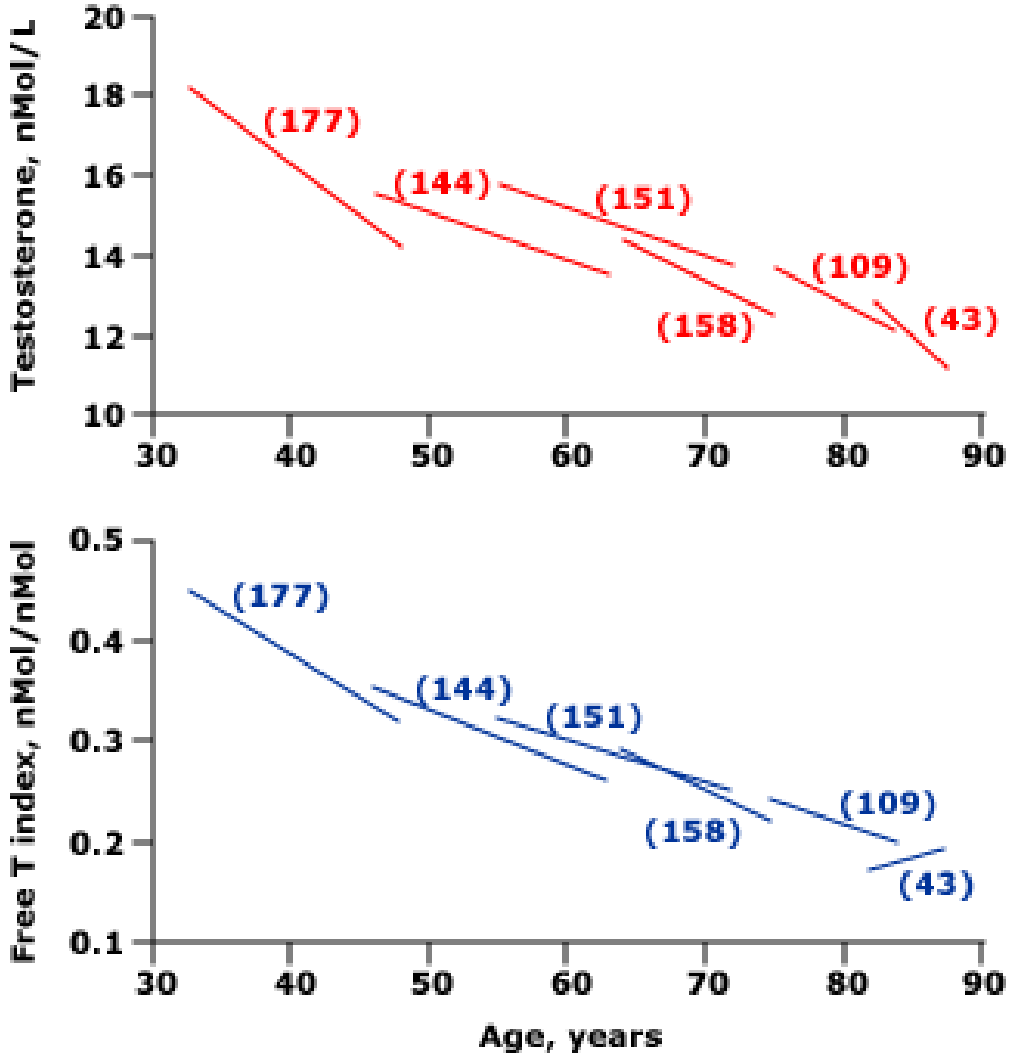
Oestradiol

Serum testosterone concentrations in obesity



JCEM 2001;86:724

Longitudinal effects of aging



His FSH and LH are both in the normal range and repeat morning testosterone is still low at 4.

- Where is the problem?
- What is the biochemical diagnosis?
- What other tests do you order?

Tumour markers

- HCG
- Oestradiol
- alpha fetoprotein

Ferritin

Other pituitary tests especially prolactin

His T4 is 9 (10-20) and TSH 3 (0.4-4)

A morning cortisol is 550 and IGF1 normal

What else should you order?

A prolactin is 25000 (<300)

- What is the diagnosis?
- What other tests does he need?


H
C
P
A
5 cm
A
a
L
b

Cabergoline 0.5mg twice weekly and thyroxine 50ug daily.

8 months later

prolactin normal

testosterone 5 ,normal LH and FSH.

Symptomatic - testosterone treatment considered

- Other baseline tests?
- Risks and benefits of testosterone therapy?
- Best testosterone therapy?

Clinically

- BMI
- BP
- Prostate
- OSA

Bloods

- Hb
- PSA
- Lipids
- DEXA

Testosterone therapy

Oral

Patch

Gel

Buccal

Injectable –short or long acting

DEXA spine t score -2.5 and hips -2.

PSA is 1, PR normal, Hb 135 and lipids satisfactory.

He has now transitioned to Reandron 1000mg IM 3mthly

- What are the immediate side effects of reandron?
- When should he have his next injection?
- How do you monitor the dose and dose frequency?
- What other tests should you monitor and how often?
- How do you deal with his osteoporosis?

2 months ago had unprovoked multiple PE

- What is association of testosterone with PE or stroke?
- Any issues with reandron and anti-coagulation?

27 year old elite athlete

Tired, low libido, ED

Testosterone <0.4
FSH <0.5 (2-12)
LH < 0.1 (2-9)
Prolactin normal

How can we explain these test results?

SARM-ostarine and probable undisclosed androgen or testosterone

6 weeks later Testosterone 9.1 and FSH and LH normal

- Exercise and hypogonadism
- Exogenous SARM or testosterone

28 year old seeking testosterone treatment under supervison

6 years ago meth user-weight 62 kg
Detox

- + anabolics, testosterone, aromatase inhibitor, and SERM all through the gym
- “Great result” with weight gain 24 kg

28 year old seeking testosterone treatment under supervison

Last injection 3 mths ago
Testosterone 3.5, LH<0.1 and FSH<0.2

Exam BMI 24 very muscular
Testicles 3ml right and 5 ml left

How do we explain the test results and exam findings?

Further history

Normal puberty

Always felt testicles small

In same sex relationship –fertility not at issue

? What diagnostic test

Diagnostic test

47XXY

Long term testosterone commenced

62 year old with marked hypogonadal symptoms

30 year bipolar disorder -lithium 16 years
Now paroxetine 40mg plus valproate 500mg bd

Testosterone 3.3
LH 3, FSH 5
Prolactin 432 (<300)
T4 normal, TSH 8

What are possible causes of the abnormal results?

62 year old with marked hypogonadal symptoms

Normal testicles, no gynaecomastia

MRI pituitary normal

hCG and alpha fetoprotein negative, ferritin normal

62 year old with marked hypogonadal symptoms

Started on testosterone with improved hypogonadal symptoms but still exhausted
Testosterone, pituitary function and routine blood tests all normal.

A diagnostic test was done….

62 year old with marked hypogonadal symptoms

OSA

70 year old intolerable hypogonadal symptoms

Age 56 primary hypogonadism

Testosterone for 12 years

Presented 2014 prostate cancer Gleason 3+4 PSA 2.3

Radical prostatectomy and local radiotherapy (T3aNoMO)

Testosterone stopped and commenced biclutamide

70 year old intolerable hypogonadal symptoms

3 years after treatment of prostate

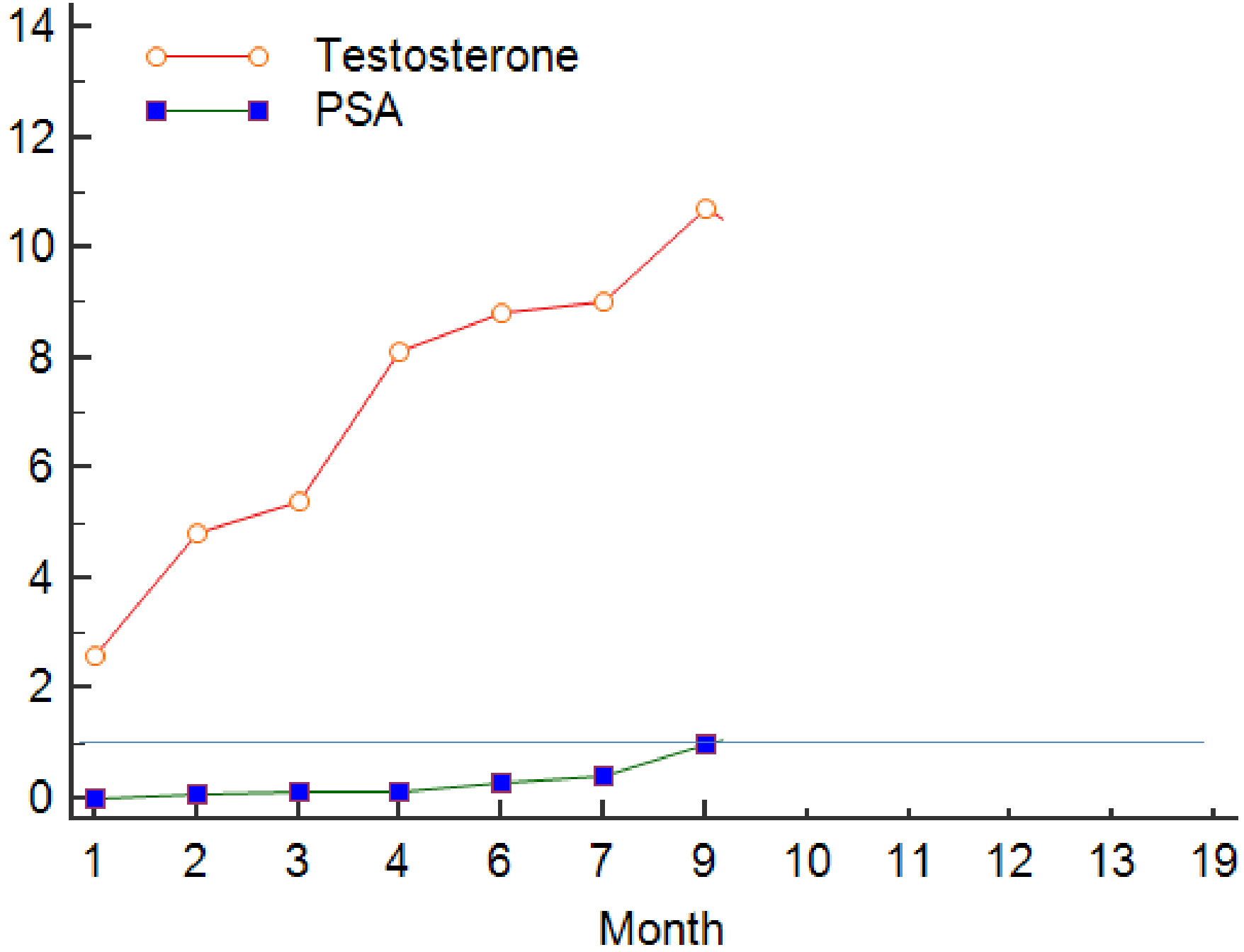
Testosterone 2.9 ,LH 20 and FSH 19
PSA <0.01

What is the diagnosis?

How safe is testosterone treatment in established prostate cancer patients?

70 year old intolerable hypogonadal symptoms

Started low dose testosterone by injection


Testosterone
PSA
14
12
10
8
6
4
2
0
1
2
3
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6
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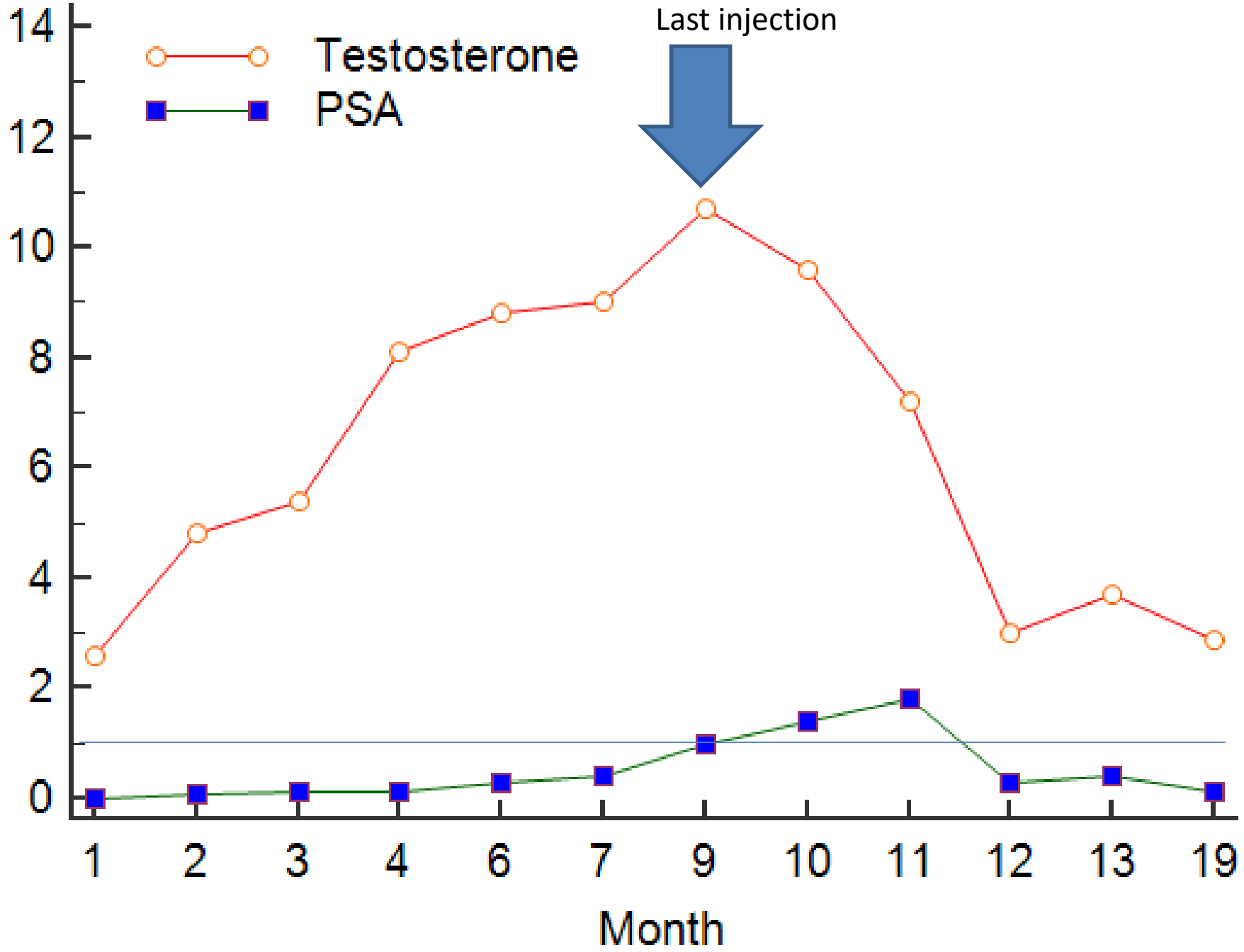
9
10
11
12
13
19
Month


Last injection
Testosterone
PSA
14
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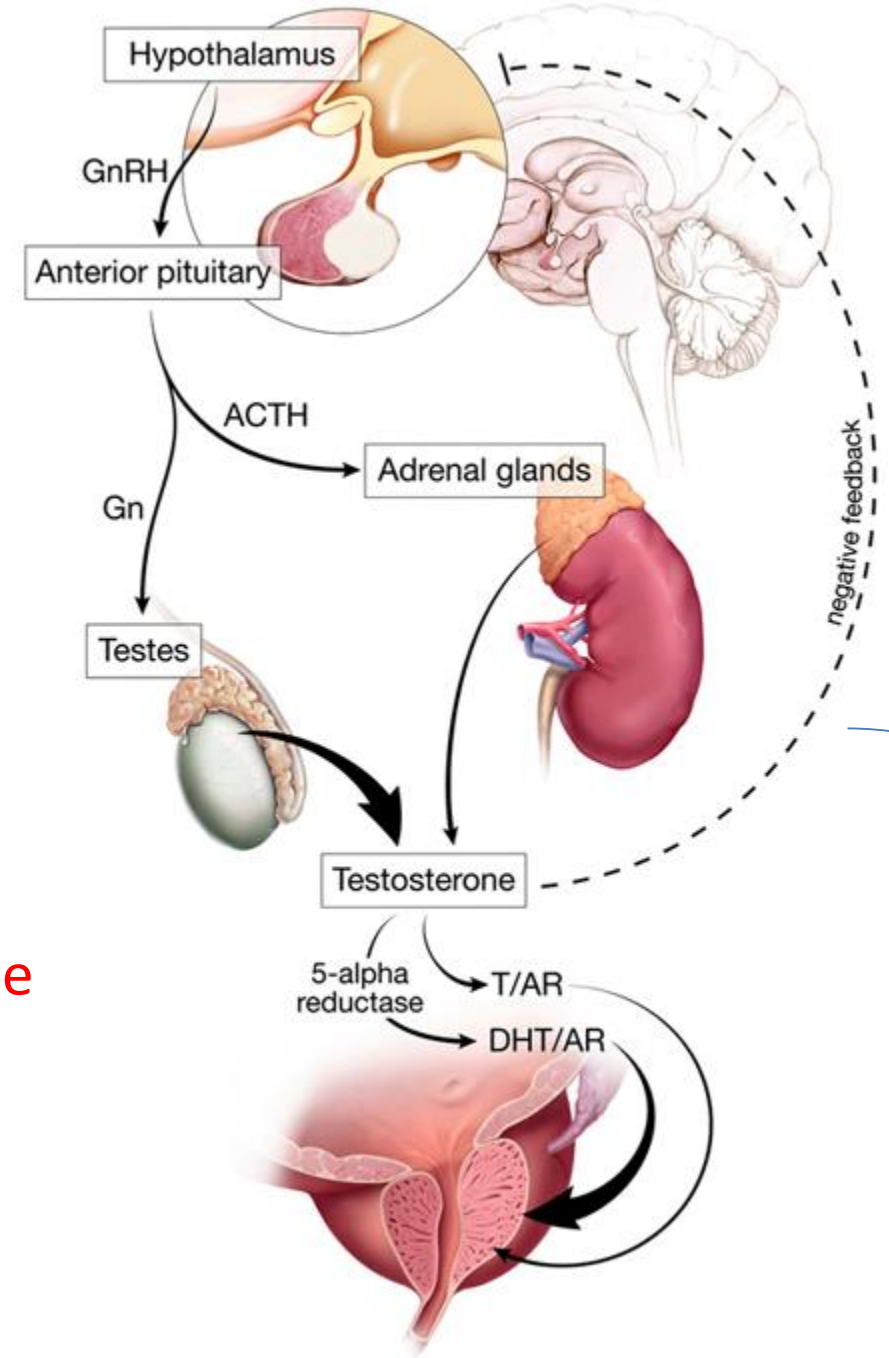
19
Month

62 year old man
Routine bloods included FSH and LH and testosterone

FSH 20 (2-12)
LH 18 (2-9)
Testosterone 31 (8-26 young)
In retrospect testosterone above normal for 20 years.

What are possible causes?



LH/FSH

+Finasteride

+AI

aromatase

Oestradiol

+Tamoxifen

Testosterone and 5 ά reductase inhibitors

Finasteride (type 2)

N=70 age >65 testosterone <12
3 year study
200mg sustanon /placebo 2 weekly plus placebo/finasteride

Addition of finasteride attenuated rise in PSA and prostate size
No change in improved BMD,LBM,strength,lipids vs testosterone alone

JCEM 2005;90:1502-1510
JCEM 2004 ;89:503-510

DHT

- Prostate expresses high levels androgen receptor
- High type 2 reductase in prostate-95% of testosterone converted to DHT
- Receptor for testosterone and DHT same
    - Affinity for DHT 4x higher and dissolution 5x lower than testosterone
    - Prenatal conversion to DHT essential for genitals and prostate
    - Adults DHT not necessary (long term finasteride safe no BMD change)
    - No 5 ά reductase in skeletal muscle so testosterone more important

DHT

- Prostate expresses high levels androgen receptor
- High type 2 reductase in prostate-95% of testosterone converted to DHT
- Receptor for testosterone and DHT same
- DHT transdermal or oral seems effective (and does not ↑ prostate volume-? Poorly transferred in plasma to prostate)?muscle effects

Oestrogens

- Testosterone and adrenal androgens aromatised to estradiol
- Adipose tissue most important but also muscle,bone,liver,breast
- Total oestrogen concentration stable with age (fat mass rises,aromatase activity rises with age)
    - but binds SHBG -free oestrogen falls -may account ↓BMD
- Important +ve effects on vasculature, brain,lipids,bone
- –ve prostate (?why DHT treatment ok for prostate)

SARMS

Don’t undergo 5 ά reductase –safety ok if DHT not needed
Nil in human use yet but available on internet

Essentially no difference in any positive or negative effects of testosterone with dutasteride add on
Suggests that DHT not required in adult men for androgenic effects of testosterone
Uncertain effect then on “sparing” the prostate in men treated with testosterone

SHBG

60% testosterone bound SHBG, 38% albumin and 2 % free

Increased

- Age
- Oestrogens
- Thyrotoxicosis
- Cirrhosis
- Anticonvulsants

- Decreased
  - Obesity
  - Insulin resistance (diabetes)
  - Hypothyroidism
  - Steroids
  - Androgens

Testosterone and aging

- Testosterone decreases
  - LH pulses
  - testicles age

- SHBG rises
  - Free T falls 1.7-2.8% per yr
  - Oestrogen falls-?↓BMD

- Androgen receptor number decrease

SHBG

60% testosterone bound SHBG, 38% albumin and 2 % free

Increased

- Reduces free testosterone

Decreased

- Reduces total testosterone