Improving testosterone testing in people living with HIV

V. Kopanitsa[1], S. Flavell[2], J. Ashby[2], I. Ghosh[2], S. Candfield[2], U. Srirangalingm[2], L. Waters[2]

1. University College London (UCL) Medical School; 2. Central and North West London NHS Foundation Trust

Introduction

Symptomatic testosterone (T) deficiency is more common in people living with HIV (PLWH) than the HIV negative male population; despite this, specific guidelines are lacking. [1,2]

Patients with T deficiency can experience a number of symptoms such as erectile dysfunction (ED) and reduced libido, and also less specific symptoms including low mood, fatigue and reduced muscle mass [1,2,3].

Total T (free and protein-bound) is the most common measurement reported when a testosterone test is requested. In PLWH, raised sex hormone binding globulin (SHBG) levels are common, and so calculation of free T more accurately reflects T levels in this group. SHBG and Albumin tests are needed for this for this calculation, which is done via an online calculator [4].

T also varies by circadian rhythm and should be measured at peak time in the morning [5]. There is insufficient evidence to support measurement and replacement of T in asymptomatic males, so investigation should also be limited to those with symptoms of deficiency.

At a London HIV clinic, assessment for hypogonadism has historically been ad hoc, based on clinical suspicion.

Aims

1. Review local practice in the clinic
2. Introduce a local guideline with investigation and management pathways for assessing T deficiency in PLWH with a view to earlier diagnosis and more efficient use of resources
3. Re-audit after guideline implementation

Methods

1. A retrospective notes review was completed on all patients who had a T test between 01/06/17 and 30/11/17, and 17/09/18 to 14/12/18, before and after guideline implementation, respectively. The following outcomes from the guideline were assessed:

2. T test should be performed in PLWH with symptoms suggestive of T deficiency (experiencing erectile dysfunction, low desire, fatigue, low mood and/or reduced muscle mass)

3. T test should be performed before 10:30am

4. Calculated free T should be documented in the notes

PLWH: androgen deficiency guideline

Fasting serum testosterone, albumin (liver profile or bone profile)and SHBG measured **before 10:30am** (not to be measured when acutely unwell as this can cause a falsely low testosterone)

N.B. If they have a **sexual problem** refer the patient to the Sexual Problem Assessment and Treatment Service (SPATS) where appropriate investigation will occur. If no reported sexual problem follow below protocol:

Calculate free testosterone levels on each occasion using an online calculator：
Enter albumin, testosterone and SHBG into: **http://www.issam.ch/freetesto.htm**

NB. Ensure correct units (see table below)

Testosterone circulates in two forms：as protein bound to SHBG／albumin or as free testosterone. Alterations to SHBG can lead to misleading serum testosterone measurements results and SHBG levels are often abnormal in PLWH.

If free testosterone ABNORMAL or borderline low (**see normal values in table below**) AND no sexual problem.

If free testosterone NORMAL (**see normal values in table below**)

1. Repeat tests on at least 1 further occasion (ideally at least 4 weeks after the first sample).
2. Also test FSH, LH, prolactin

Evaluate for other causes of their symptoms.

N.B. If sexual difficulty ensure SPATS referral has been made.

If repeat free testosterone ABNORMAL

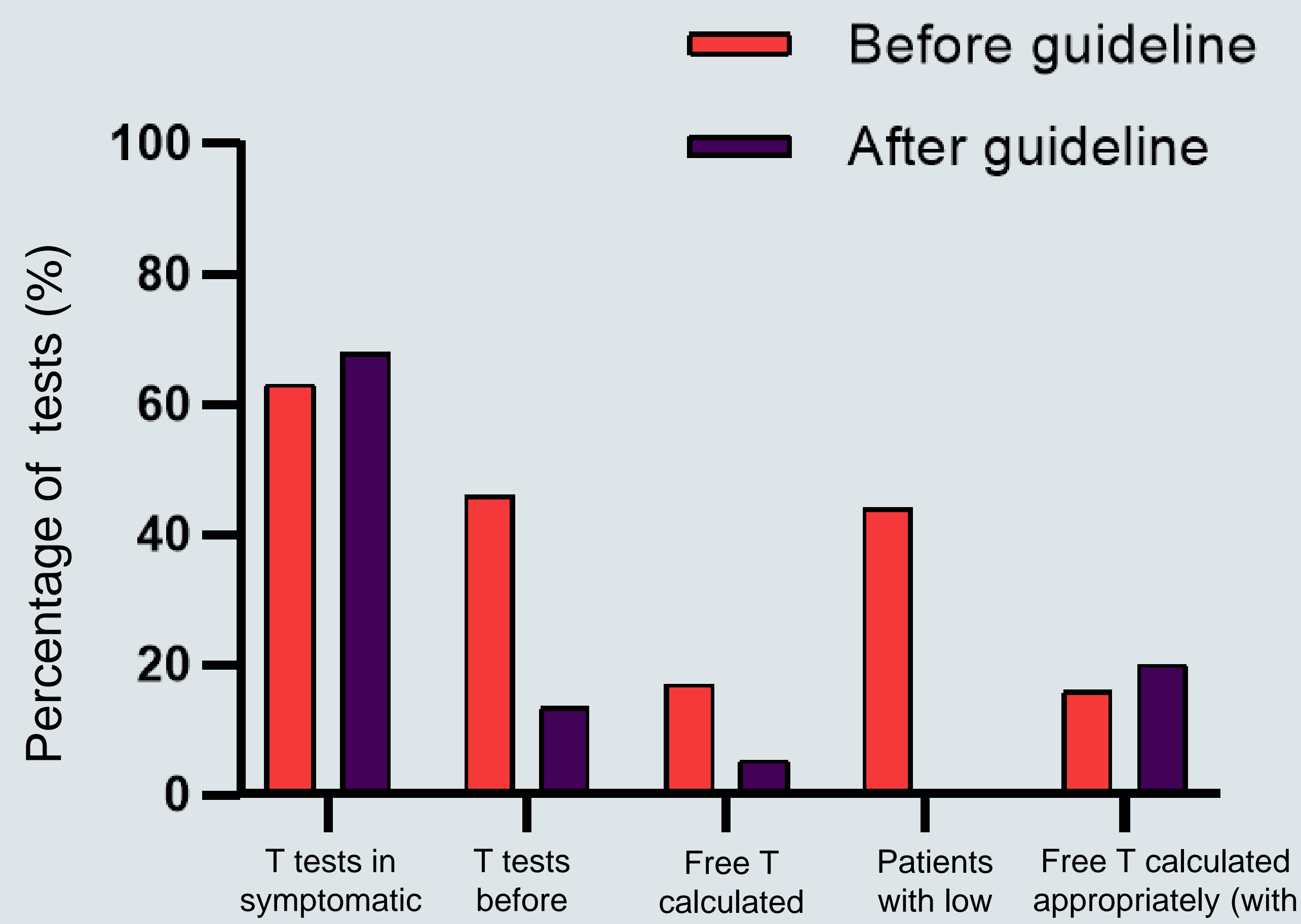**If repeat free testosterone NORMAL**

Refer to **Endocrinology**

1. Evaluate for other causes of their symptoms.
2. If borderline normal results and symptomatic discuss with endo.

	Free testosterone	
Age	5th centile	95th centile
years	nmol/l	nmol/l
20-29	0.274	0.795
30-39	0.243	0.736
40-49	0.212	0.691
50-59	0.173	0.569
60-69	0.156	0.468
70-79	0.115	0.458
80+	0.101	0.323

Free testosterone age-related reference [3]

Results

Bar chart legend: Before guideline (red), After guideline (purple). Y-axis: Percentage of tests (%), 0–100. Categories: T tests in symptomatic men; T tests before 10:30am; Free T calculated; Patients with low total T (<11nmol) before 10:30am; Free T calculated appropriately (with up to date albumin and SHBG on the same day before 10:30am in symptomatic men).

	Before guideline	After guideline
Referrals of patients with low T who had a T test before 10:30am	1 referred to endocrinology, 1 to andrology and 2 to the GP.	No referral yet.

Conclusion & discussion

Review of local practice of testosterone testing for androgen deficiency identified timing inaccuracies, frequent testing in asymptomatic patients, and a lack of free T calculation, limiting the interpretation of T results. Consequently, a MDT of Sexual dysfunction, HIV and endocrinology specialists developed new guidance for investigation and management of hypogonadism. Referral pathways were agreed and guidance was disseminated to the HIV team.

An audit of practice was conducted following launch of the new guidance. Following guideline implementation, practice has not improved although the numbers analysed were small.

Additionally, apparent lack of symptoms may be driven by poor documentation. Further education of staff groups, and guideline promotion is required, and we are planning to implement alerts within the electronic patient record prior to re-audit.

References

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