North of Tyne, Gateshead and North Cumbria Area Prescribing Committee

Liothyronine (T3) for Hypothyroidism - Prescribing Guideline

The North of Tyne and Gateshead APC does not support the routine prescribing of liothyronine (T3) either as monotherapy or in combination with levothyroxine, nor of desiccated thyroid extract (DTE; eg Armour® Thyroid) in the long term treatment of hypothyroidism in line with NHS England guidance. Levothyroxine alone is the treatment of choice, supported by overwhelming evidence; it is a well- tolerated and effective treatment.

> Do not initiate any new patients on liothyronine (T3) or DTE (including Armour® Thyroid) in primary care.
> If symptoms persist, optimise levothyroxine dose aiming for a TSH between 0.1 and 1.0mU/l. Look for alternative causes of symptoms. In line with BTA guidance, endocrinologists providing NHS services may recommend liothryonine (T3) for individual patients after a careful trial of at least three months.
> If a patient requests a supply of liothyronine (T3) or DTE following a private consultation they should be referred to an NHS endocrinology service to assess need for T3 treatment. DTE therapy is unlicensed and non-formulary and should NOT be recommended for prescription at NHS expense.
> If at all possible, switch patients who are already on long standing liothyronine (T3), DTE preparations (including Armour® Thyroid) to an equivalent dose of levothyroxine, prescribed generically. Obtain advice from an NHS endocrinologist if the patient is under their care.
> Do NOT stop liothyronine (T3) or DTE products in existing patients without making provision for a switch to levothyroxine (T4).
> Refer to Tables 1 and 2 below, taking into account the patient's most recent thyroid function tests.
> Refer to PrescQIPP Bulletin 121 for further information on switching here .

Table 1: Approximate equivalent doses

Armour® Thyroid	Levothyroxine (micrograms)
¼ grain (15mg)	25
½ grain (30mg)	50
1 grain (60mg)	75
1 + ½ grains (90mg)	125
2 grains (120mg)	150
3 grains (180mg)	250
4 grains (240mg)	350
5 grains (300mg)	400

Table 2: Approximate equivalent doses

Liothyronine (micrograms)	Levothyroxine (micrograms)
5	12.5
10	25
20	50
30	75
40	100
60	150
80	200
100	250

Round doses to the nearest 25 micrograms. **Repeat thyroid function tests (TSH and T4) 6 weeks after switching to determine the appropriateness of the new dose. Obtain advice from endocrinologist if patient is under their care.**

Liothyronine (T3) is the active thyroid hormone and the majority is produced by peripheral conversion of levothyroxine (T4). There is no consistent evidence of clinical and cost effectiveness to support the use of liothyronine (either alone or in combination) for the treatment of hypothyroidism with respect to cognitive function, social functioning and wellbeing. Armour® Thyroid is an **unlicensed** preparation derived from porcine thyroid glands. It contains T3 and T4, with an excessive amount of T3 in relation to T4.

- **The Royal College of Physicians' Guideline - Prescribing of additional liothyronine (T3) is not recommended in any presently available formulation, including Armour® Thyroid, as it is inconsistent with normal physiology, has not been unequivocally proven to be of any benefit to patients and may be harmful.**
- **The British Thyroid Association - There is no convincing evidence to support routine use of liothyronine (T3) monotherapy, thyroid extracts, compound thyroid hormones, iodine containing preparations, dietary supplementation or over the counter preparations in the management of hypothyroidism. Clinicians have an ethical responsibility to adhere to the highest professional standards of good medical practice, rooted in sound evidence. This includes not prescribing potentially harmful therapies without proven advantages over existing treatments.**
- **NHS England and NHS Clinical Commissioners - Liothyronine (T3) should not routinely be prescribed in primary care.**

> It is harder to select, monitor and adjust the dose of T3 containing preparations.
> There are potential risks from liothyronine (T3) therapy on bone (osteoporosis) and the heart (arrhythmia).
> Variation in hormonal content and large amounts of liothyronine (T3) in combination preparations may lead to increased serum concentrations of T3 and subsequent thyrotoxic symptoms, such as palpitations and tremor.
> Liothyronine (T3) 20 microgram tablets cost £101.29/28 tablets (levothyroxine 100 microgram tablets: £1.16/28).

Exceptional Circumstances

Specialist NHS endocrinologists may initiate liothyronine (T3) for:

1. Patients treated with levothyroxine who continue to suffer with symptoms despite adequate biochemical correction. In such cases, primary care prescribing is only appropriate if the following criteria apply[1]:

   a) The specialist has prescribed liothyronine (T3) for a trial period of at least 3 months duration.
   b) The trial is carefully audited by the specialist and liothyronine (T3) is found to benefit the patient.
   c) The patient is clinically unable to take levothyroxine (eg levothyroxine induced liver injury), as confirmed by the specialist NHS endocrinologist with supporting biochemistry from an accredited NHS lab.

2. Patients requiring short term 'rescue' treatment while awaiting onset of action of thyroxine (e.g. profound hypothyroidism following radioactive iodine treatment / thyroidectomy for hyperthyroidism or following cardiac revascularisation where previously significantly hypothyroid)

3. Cancer patients, post thyroidectomy

   Patients that need to receive radioactive iodine treatment (Radioiodine Remnant Ablation RRA) after their surgery will initially be started on liothyronine due to its shorter half-life and therefore faster decline and onset of action than levothyroxine. These patients will remain on liothyronine until the oncologist is confident that they will not need any more radioactive iodine at which point they are switched over to levothyroxine. Short term prescribing of liothyronine (T3) in these circumstances should remain the responsibility of secondary care.

Table 3: Cost Comparison
September 2021 – prices accurate at the time of writing, for up to date prices see https://www.nhsbsa.nhs.uk/pharmacies-gp-practices-and-appliance-contractors/drug-tariff

Formulation and strength	Cost of 28 tablets
Levothyroxine tablets 12.5 micrograms	£12.49
Levothyroxine tablets 25 micrograms	£1.29
Levothyroxine tablets 50 micrograms	£1.15
Levothyroxine tablets 75 micrograms	£2.58
Levothyroxine tablets 100 micrograms	£1.16
Liothyronine (T3) tablets 20 micrograms	£101.29
Liothyronine (T3) tablets 10 micrograms	£148.00
Liothyronine (T3) tablets/capsules 5 micrograms	£98.00
Liothyronine (T3) tablets/capsules 2.5 micrograms	£505.87*
Levothyroxine oral solution 100micrograms/ 5mL	£164.99/ 100mL

*Unlicensed special, not listed in the Drug Tariff. Price from ePACT data Sept 2021

References
1. Items which should not be prescribed in primary: Guidance for CCGs. https://www.england.nhs.uk/wp-content/uploads/2017/11/items- which-should-not-be-routinelv-precscribed-in-pc-cca-guidance.pdf
2. PrescQIPP bulletin 121, February 2016: Switching liothyronine (L-T3) to levothyroxine (L-T4) in the management of primary hypothyroidism. https://www.prescaipp.info/-liothvronine/send/225-liothvronine/2359-b121-liothvronine-drop-list
3. The Diagnosis and Management of Primary Hypothyroidism, Royal College of Physicians 2011 http://www.thvroiduk.ora.uk/tuk/auidelines/RCP statement 20111.pdf
4. British Thyroid Association Guidelines http://www.british-thyroid-association.org/
5. NICE Clinical Knowledge Summaries - Hypothyroidism (last revised April 2016) https://cks.nice.ora.uk/hvpothvroidism
6. NHS Drug Tariff, July 2018 http://www.drugtariff.nhsbsa.nhs.uk/#/00518510-DA/DA00518492/Home

Dear.....

Information about changes to medicines or treatments on the NHS: Changes to liothyronine (T3) prescribing (click here to access)

The NHS has asked doctors to stop or greatly reduce the prescribing of some medicines from December 2017. This is because the medicines are:

- Not as safe as other medicines OR
- Not as good (effective) as other medicines OR
- More expensive than other medicines that do the same thing.

One of these medicines is liothyronine (T3) (including Armour Thyroid and other desiccated animal thyroid extracts). We understand that you are currently receiving an NHS prescription for this.

What is liothyronine (T3)?

Liothyronine (sometimes known as T3) is used to treat an underactive thyroid gland. “Underactive” means that the thyroid gland does not work as well as it should. The recommended treatment for an underactive thyroid gland is a medicine called levothyroxine. Your body converts liothyronine (T3) to levothyroxine naturally.

Why does the NHS want to reduce prescribing of liothyronine (T3)?

There is no evidence to support routinely using liothyronine (T3) in the treatment of an underactive thyroid gland. There is a lot of evidence for using levothyroxine.

Risks associated with liothyronine (T3) use include

- It is harder to monitor and adjust the dose of liothyronine (T3) containing preparations.
- There are potential risks from liothyronine (T3) therapy on bone (osteoporosis) and the heart (disturbances of heart rate and rhythm).
- Levels of liothyronine vary widely through the day and do not provide consistent effects.
- Variation in hormonal content and large amounts of T3 in combination preparations may lead to increased serum concentrations of T3 and subsequent thyrotoxic symptoms, such as palpitations and tremor.

At current prices, liothyronine (T3) is very expensive. 20 microgram tablets cost £101.29/28 tablets

whilst levothyroxine 100 microgram tablets cost £1.16/28. This additional cost cannot be justified where scientific evidence does not demonstrate that it offers any advantage for most people with an underactive thyroid.

Because of these considerations The British Thyroid Association (BTA), which is the national organisation that sets standards around the treatment of thyroid problems, recommends that liothyronine (T3) is only considered for treatment of thyroid under-activity if a person has been reviewed by an NHS consultant endocrinologist who is confident that, for that individual, there is clear benefit.

As you are currently receiving a prescription for liothyronine (T3) or a desiccated thyroid extract (DTE) we are writing to you to inform you that

(Delete as appropriate)

- Your GP wishes to discuss your ongoing treatment plan in line with current recommendations and will not issue another prescription for liothyronine (T3) or DTE until that discussion has taken place. Please make an appointment. You may then be referred to an NHS endocrinologist for review of your treatment.
- You are being referred to an NHS endocrinologist for review of your treatment

In exceptional cases, where levothyroxine has not worked, and in line with national and BTA guidance, an NHS consultant endocrinologist may recommend liothyronine (T3) for individual patients after a three month trial of treatment.

This approach to implementation of national guidance has the support of NHS consultant endocrinologists across the North of Tyne and Gateshead areas.

Practice signature

Appendix/Additional information

Where can I find more information and support?

- You can speak to your local pharmacist, GP or the person who prescribed the medication to you
- British Thyroid Association (BTA) Management of hypothyroidism FAQ: http://www.british-thyroid-association.org/current-bta-guidelines-
- The Patients Association can also offer support and advice: https://www.patients-association.org.uk/ or call 020 8423 8999
- Healthwatch: www.healthwatch.co.uk

Find out more about the medicines that are being stopped or reduced:

https://www.england.nhs.uk/wp-content/uploads/2018/03/otc-guidance-for-ccgs.pdf

If you have any questions about liothyronine prescribing please email them to:

england.medicines@nhs.net