

Agreed: Sept 2015

Due for Review: Sept 2017

## **Guidance on the Prescribing of Liothyronine (T3) Containing Products for the Management of Primary Hypothyroidism**

### **Recommendation**

NHS Gloucestershire Clinical Commissioning Group and Gloucestershire NHS Foundation Trust Hospital endocrinologists:

- Do NOT recommend the prescribing of liothyronine or liothyronine containing products for the treatment of primary hypothyroidism.
- DO recommend prescribing of thyroid hormones in line with Royal College of Physicians guidance [2].

### **Rationale**

- Levothyroxine (T4) is a prodrug and is converted to liothyronine (T3) in the body [3]. Prior to the 1970s, synthetic combinations of levothyroxine and liothyronine or desiccated animal thyroid containing varying amounts of thyroid hormones were used, but these have now been replaced with the use of levothyroxine monotherapy [4].
- Levothyroxine is the NHS thyroid hormone of choice as it is cost-effective, suitable for once daily dosing due to its long half-life and provides stable and physiological quantities of thyroid hormones for patients requiring replacement [4].
- Liothyronine is not routinely recommended for prescribing as it has a much shorter half-life and steady-state levels cannot be maintained with once daily dosing [4].
- The combination of levothyroxine and liothyronine, in both non- and physiological proportions, has not consistently been shown to be more beneficial than levothyroxine alone with respect to cognitive function, social functioning and wellbeing. The variation in hormonal content and large amounts of liothyronine may lead to increased serum concentrations of L-T3 and subsequent thyrotoxic symptoms, such as palpitations and tremor [4].
- There is currently insufficient clinical evidence of effectiveness and cost effectiveness to support the use of liothyronine (either alone or in combination) for the treatment of hypothyroidism [5,6].
- Overwhelming evidence supports the use of thyroxine alone in the treatment of hypothyroidism, with this usually being prescribed as levothyroxine [2].
- Liothyronine is available as licensed (and unlicensed) 20microgram tablets and unlicensed 5microgram tablets. Many other liothyronine-containing preparations (eg. Armour Thyroid) are also unlicensed, therefore the safety and quality of these products cannot be assured.

- The amount of active ingredient in different suppliers liothyronine products may not be standardised so can vary from batch-to-batch, providing variable control.
- UK and International guidelines [8-10] found no consistently strong evidence for the superiority of alternative preparations (L-T4 + L-T3 combination therapy or thyroid extract therapy – preparations containing dried animal thyroid extracts, such as Armour Thyroid) over monotherapy with levothyroxine in improving health outcomes.
- It is recognised that some patients on levothyroxine remain symptomatic despite treatment leading to TSH levels in the therapeutic range. The reasons for this are not fully understood and such patients should be under the care of an endocrinologist [2].
- The Royal College of Physicians does not recommend the prescribing of additional liothyronine 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 [2].
- The extract marketed as Armour Thyroid contains an excessive amount of L-T3 in relation to L-T4. Over-treatment with L-T4, when given alone, has similar risks [2].

### **Primary Care Advice on Switching From Liothyronine (T3) to Levothyroxine (T4):**

- Check that the patient has been accurately diagnosed as genuinely hypothyroid (ie. confirmed as biochemistry in accredited NHS lab). If not, stop treatment and show TSH rise.
- Switch from liothyronine (including liothyronine-containing products) to the equivalent dose of levothyroxine, taking into account any other levothyroxine the patient is also co-prescribed and the patient's most recent thyroid function tests.
- The BNF states that 20–25 micrograms of liothyronine is equivalent to 100 micrograms of levothyroxine [7]. Patients should have repeat TFTs 1-2 months after switching to determine the appropriateness of their new dose [7].
- If unsure on dose, switch to a standard dose of T4 and then titrate as usual.
- Secondary care advice should be obtained for any patients under the care of a specialist endocrinologist before switching. This is unlikely to be relevant to many patients as local specialists do not routinely recommend the prescribing of liothyronine containing products for primary hypothyroidism.

This guidance has been agreed by the NHS Gloucestershire Clinical Commissioning Group Drug & Therapeutics Committee in consultation with NHS Gloucestershire Foundation Trust specialists.

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