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| Paediatric guideline - Thyroidectomy guideline for children and young people: pre and post operative care. |
| **Date effective from:** | 06/10/2021 | **Review date:** | 06/10/2024 |
| **Approved by:** | P&N D&T |
| **Approval Date:** | 06/10/2021 |
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| **Target Audience:** | All staff involved in the pre and post operative care of children and young people undergoing thyroidectomy. |
| **Supersedes:** | Thyroidectomy guideline for children and adolescents: pre and post operative care 2018. |
| **Keywords (min. 5):** | Thyroidectomy, thyrotoxicosis, Grave’s disease, multiple endocrine neoplasia, goitre, parathyroid.  |

Version Control

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| **Date** | **Author** | **Version/Page** | **Reason for change** |
| Dec 2016 | Dr Louise Bath | Previous version | Due for update  |
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1. Purpose

To provide guidance for medical, surgical and nursing staff involved in the care of children and young people undergoing thyroidectomy.

1. Scope

To be used by the endocrine team during pre-operative planning for children and young people due to undergo thyroidectomy.

Also to be used by ward, surgical, medical and nursing teams to support children and young people undergoing thyroidectomy in the immediate pre and post operative period.

1. Definitions

Thyroidectomy is the surgical removal of half or all of the thyroid gland.

In children and young people, total thyroidectomy is generally done because of thyrotoxicosis not responsive to medical management, goitre or large thyroid nodules or a genetic mutation such as MEN 2a or 2b (Multiple Endocrine Neoplasia) which leads to thyroid and other malignancies.

1. Roles and responsibilities

Care will be shared between the surgical and endocrine teams, supported by the surgical, ward, medical and nursing staff.

1. Main content

5.1. Pre-operative planning

Children and young people should be euthyroid at the time of surgery. If a patient has thyrotoxicosis, they will be treated with carbimazole to achieve a euthyroid status, and should continue taking this until the morning of surgery.

If acceptable euthyroid status has not been achieved with carbimazole, then an admission is required for directly observed therapy for one week prior to planned surgery. The child or young person will require:

**1. Carbimazole** as per BNFc: 750 micrograms/kg/day, although some patients do need higher doses (up to 1 mg/kg/day) which may be given in single or divided daily doses. Usual maximum dose is 30 mg daily.

Carbimazole dose should be prescribed to the nearest whole tablet (5 mg) where possible, or tablets can be halved or quartered then crushed and mixed with water for immediate consumption.

**2. Propranolol** as per BNFc: 250 - 500 micrograms/kg every 8 hours; increased if necessary up to 1 mg/kg every 8 hours (max. 40 mg per dose) if thyrotoxic: clinically - tremor, tachycardia, ongoing weight loss, or biochemically - FT4/FT3 >25% above the upper normal reference range.

**3.** **Potassium iodate:** patients who are clinically and biochemically thyrotoxic andhave autoimmune Graves’ disease should receive pre-operative treatment with potassium iodate as it decreases vascularity of the thyroid gland. Potassium iodate should be commenced no earlier than 10 days prior to the date of planned surgery. Potassium iodate 85 mg tablet is equivalent to 50 mg iodine.

Dose:

< 3 years: 42.5 mg potassium iodate once daily

3 - 11 years: 85 mg potassium iodate once daily

>12 years: 85 mg potassium iodate twice daily

All patients, regardless of reason for thyroidectomy, require bloods **prior to** the day of surgery as follows:

* **Blood gas** for ionised calcium (to allow for comparison with post operative levels)
* **U&E, FBC, coagulation screen, group and save** (x2 samples).

If the child or young person has a diagnosis of thyrotoxicosis, add:

* **TSH, T4, total T3 and free T3** - if not checked in the previous 2 weeks.

5.2. Operative care

Location of surgery is age dependent, and a discussion will be had between the relevant clinicians and family as to most appropriate location. In general, children below the age of 12 years or those with additional health concerns will have surgery at RHCYP. Young people over the age of 12 years usually have surgery at SJH, with on-going follow up by the paediatric endocrine team at RHCYP.

5.3 Post-surgical management

The risks of biochemical disturbance post surgery are:

1. **Hypothyroidism**.

After a total thyroidectomy (i.e. removal of the entire thyroid gland), there will be resulting hypothyroidism. Levothyroxine sodium should therefore be started on the first morning after surgery.

**Levothyroxine dose: 100 micrograms/m2/day**.

Dose should be prescribed to the nearest whole tablet (12.5 micrograms) where possible, or tablets can be halved or quartered then crushed and mixed with water for immediate consumption.

Following surgery, bloods for TSH and FT4 should be repeated on **day 3** and **day 7**, then **weekly** until one month post-surgery.

1. **Hypoparathyroidism and hypocalcaemia.**

Identification and mobilisation of the parathyroid glands during total thyroidectomy can cause hypoparathyroidism and hypocalcaemia. Hypocalcaemia occurs more frequently, and quickly, in children than adults. Children and young people therefore require frequent monitoring for biochemical and clinical signs of hypocalcaemia post-operatively. The majority of patients who develop hypocalcaemia have transient hypoparathyroidism, which can last from two weeks to a few months. However, in up to 4% of cases it is permanent, requiring long-term treatment.

In most cases, if calcium supplements are required they can be weaned to stop by around two weeks post-surgery.

Following thyroid lobectomy (i.e. removal of half of the thyroid gland), two parathyroid glands remain unaffected. Therefore, hypocalcaemia almost never occurs.

At **six hours** post-surgery, blood should be taken for **ionised calcium** (via capillary or venous blood gas) and **parathyroid hormone** (PTH) measurement. If PTH is detectable, this excludes post-operative hypoparathyroidism therefore ongoing calcium testing is not required.

In the absence of a PTH result, or if PTH is undetectable post-operatively, ionised calcium levels should be checked (via capillary or venous blood gas) **every 12 hours until at least 48 hours post-surgery** or until calcium has normalised.

For interpretation of calcium results, or the patient is symptomatic of hypocalcaemia, follow the flow-chart in Figure 1 below.

5.4. Follow up

The patient’s GP and local endocrine consultant, if the patient resides out with NHS Lothian, must be informed at discharge of the ongoing need for monitoring of calcium and thyroid status.

***Figure 1. Flow chart guiding assessment and management of hypocalcaemia.***

***If patient requires IV calcium please refer to separate drug monograph - patient will require monitoring in Critical Care.***

**Check ionised calcium (and PTH)**

**6 hours post-operatively**

**>1.0 mmol/l and asymptomatic**

**0.8 – 1.0 mmol/l**

or mild symptoms:

**Paraesthesia**

**Peri-oral numbness**

**Muscle cramps**

**Carpo-pedal spasm**

**<0.8 mmol/l**

or severe symptoms:

**Tetany**

**Arrhythmia**

**Seizures**

**Stridor**

**Re-check ionised calcium every 12 hours until 48 hours post-operative, or until post-operative PTH is seen to be normal.**

**🡪 Move patient to critical care unit for cardiac monitoring.**

**🡪Check Ca, Mg, PO4, Vitamin D & PTH.**

**🡪Give IV calcium gluconate 10% bolus then continuous infusion.**

🡪**Oral calcium** 0.2mmol/kg (max 10 mmol) 6 hourly. 🡪**Alfacalcidol**

0–11 years: 25-50 nanogram/kg (max 1 microgram) once daily

>12 years: 1 microgram once daily.

**Start oral calcium then wean IV calcium gluconate over 24-48 hours, guided by ionised calcium.**

**→Re-check ionised calcium 12 hourly. →Adjust calcium dose as necessary, aiming for >1.0 mmol/l.**

1. Associated materials

N/A.

1. Evidence base

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1. Stakeholder consultation

N/A.

1. Monitoring and review

This guideline will be updated if significant new evidence or national guidance is presented. Otherwise, it will be due for review in March 2024.