

Parathyroidectomy Management in Renal Patients

Failure to control the secondary hyperparathyroidism in Chronic Kidney Disease (CKD) patients by Medical management are candidates for subtotal parathyroidectomy. Post-operative hypocalcaemia is the most common complication following parathyroidectomy in dialysis patients with a reported incidence of up to 95%. Calcium replacement is required to prevent symptomatic hypocalcaemia.

This guideline gives brief recommendations on calcium replacement and monitoring of dialysis patients and CKD patients undergoing parathyroidectomy. Any deviation from the guideline will require Consultant Renal Physician to Consultant Surgeon discussion.

1. Clinical manifestations of Hypocalcaemia

1.1. Mild Hypocalcaemia

1.1.1. This is often asymptomatic. Early features include peri-oral and peripheral paresthesia.

1.2. Moderate Hypocalcaemia

1.2.1. Neuromuscular irritability including muscle twitching leading to carpo-pedal spasm.

1.3. Severe Hypocalcaemia

1.3.1. Cardiovascular instability leading to hypotension, cardiac arrhythmia or heart failure. Severe neuromuscular irritability can cause tetany, laryngospasm or seizures. This is a life-threatening emergency.

2. Aims of this Protocol

2.1.1. To standardise the management of patients with CKD undergoing Parathyroidectomy across metropolitan Perth.

2.1.2. To medically prepare patients in a way to minimise the severity of hypocalcaemia.

2.1.3. To stop the reliance on peripheral IV Calcium Gluconate infusion. Close monitoring and oral Caltrate and Calcitriol replacement is effective in the majority of these patients.

2.1.4. Peripheral IV Calcium Gluconate infusion should only be used in consultation with the Consultant Surgeon or the Consultant Renal Physician.

2.1.5. Early recognition of patient who are at risk of severe hypocalcaemia and to anticipate those who need Surgical insertion of Central Venous Catheter (CVC). This will be done at request of the Consultant Renal Physician to the Surgical team.

3. Medical management

3.1. Pre-operative medication adjustments

3.1.1. Cease cinacalcet (if applicable) 10 to 14 days prior to surgery.

3.1.2. Continue regular dose of phosphate binders (i.e. calcium carbonate, magnesium, sevelamer, lanthanum, and/or sucroferoxyhydroxide)

3.1.3. Start or increase dose **of Calcitriol to 1.5 microg (2x 0.25microg) tds** for at 7 days prior to surgery unless the adjusted serum calcium is $>2.7\text{mmol/L}$ on a recent blood test (must be done within 7 days).

3.1.4. Refer to the FSFHG "Guideline for Pre-operative and Pre-Intervention Management of Medications" document with regard to anticoagulation/ antiplatelet medication.

3.1.5. Once a surgical date is set, surgical booking team will inform the patient, renal team, and dialysis CNS to arrange for preoperative dialysis planning (home or hospital).

3.2. Day of Surgery

3.2.1. Ensure patient has been dialysed on the day prior to surgery.

3.2.2. Check biochemistry: corrected Calcium (Ca), Phosphate (PO₄), Parathyroid Hormone (PTH), Magnesium (Mg), Vitamin D, EUC.

3.2.3. Renal transplant recipients should receive their usual immunosuppressant medications.

3.2.4. Assess need for type of surgery including risks of hypocalcemia and need for CVC insertion (**ONLY considered after direct request to Surgical team from Renal Physician**).

- High risk of Hungry Bone Syndrome
- Poor venous access
- Anticipated need for frequent blood sampling.
- Urgent intravenous (IV) medication administration access.

3.3. Post-operative calcium replacement

3.3.1. Oral replacement

- Prescribe **Caltrate®** (calcium carbonate) 600 mg tablets. Suggested starting dose is 2 tablets three times daily (**2tds**) of calcium 3600 mg. Increase, if required, to 3 tablets three times daily (2 tds) of calcium 5400 mg.
- Continue **Calcitriol** 1.5 microg daily (**2tds**). Increase, if required, to 3 tds of Calcitriol 2.25 microg.
- Doses to be titrated according to corrected serum calcium, phosphate, bicarbonate and/or clinical need as per medical officer.

3.3.2. Blood monitoring

Post-operative biochemical monitoring schedule

Day	Investigations required:	Treatment required:
Immediate Postoperative	Ca, Mg, iPTH, EUC	
Postoperative	Ca, PO ₄ , Mg, EUC	Recommend check every 6hrs for 48hrs postoperatively
48 hrs post-operatively until discharge OR 12hrs post cessation of IV Calcium replacement	Ca, Mg, PO ₄ , EUC	Twice daily until stable

3.3.3. Indications for Postoperative Intravenous Calcium Infusion:

Patient is symptomatic with hypocalcaemia with

- Corrected Serum Ca (adjusted) on monitoring is:
 - <1.8mmol/L AND/OR
 - 1.8 – 2.1mmol/L and symptomatic of hypocalcaemia AND/OR
 - >2.1mmol/L but falling rapidly (>10% in 4 - 6 hours) – on 2 consecutive blood levels not maintained by oral replacement

Protocol for IV Calcium Gluconate Infusion for Post-op Hypocalcaemia:

Calcium gluconate is the preferred agent over calcium chloride due to reduced toxic effects on peripheral veins.

This must be administered using an infusion pump via a CVC only unless otherwise discussed with the patient's usual nephrologist.

INITIAL IV CALCIUM TREATMENT (Must be followed by maintenance infusion as per below)

Solution: Calcium gluconate 10% Injection Ca gluconate monohydrate (1g/10 ml) (equiv. elemental Ca 2.2 mmol/ 10 mL)

<i>Indication</i>	<i>Prescription</i>	<i>Follow up</i>
Only if corrected serum Ca <1.8 mmol/L and/or symptomatic hypocalcemia	20mL of 10% calcium gluconate in 50mL Normal Saline over 30 minutes ⁴	Repeat Ca in 2 hours post bolus or earlier if necessary

IV CALCIUM MAINTAINANCE INFUSION

Solution: 60 ml of 10% calcium gluconate (2.2mmol Ca/10ml)) in 250mL of Normal Saline (total volume 310mL)

Initial infusion rate	20 ml/ hr	Repeat Ca in 2 hours

FOLLOW UP INFUSION RATES BASED ON SERUM CALCIUM MONITORING

<i>Corrected serum Ca:</i>	<i>Prescription</i>	<i>Follow up</i>
<1.8mmol/l and/or symptomatic hypocalcaemia	20mL (2g) of 10% calcium gluconate in 50mL Normal Saline over 30 minutes AND increase infusion rate to 30 ml/hr AND increase oral calcium supplements	Repeat Ca in 2 hours
1.8 - 2.1mmol/l	30ml/hr AND increase oral calcium supplements	Repeat Ca in 4 hours
2.1 - 2.2mmol/l	Continue at current rate AND continue oral calcium supplements	Repeat Ca in 4 hours
> 2.2mmol/l	Cease infusion AND continue oral calcium supplements	Repeat Ca in 4 hours

Contact the Renal Registrar or Consultant on call if concerned

4. Nursing responsibilities

4.1. Pre-operative

4.1.1. Ensure pre-operative bloods are requested which may include, but are not limited to:

- Serum calcium
- Phosphate
- Parathyroid Hormone(PTH)
- Magnesium
- 25 OH VitaminD
- Coagulation
- Full Blood Picture

Refer to the “Management of the Haemodialysis Patient” NPS for further guidance.

4.2. Post-operative

- 4.2.1. It may be necessary to commence a calcium infusion postoperatively in recovery. Refer to section 3.2 (Post-operative calcium replacement).
- Important: Calcium gluconate is highly thrombophlebitic and can cause extensive subcutaneous necrosis if extravasated. CVC line is required for IV calcium infusion (as per section 3.2)



- 4.2.2. Nurse patient with a head elevation of $>30^\circ$ for 24 hrs postoperation
- 4.2.3. Administer all routine postoperative care such as oxygen therapy, observations, drain care and acute pain management as per site policies and protocol, and document in the patient's digital medical record (DMR)
- 4.2.4. Observe for any signs and symptoms associated with airway obstruction including but not limited to, changes to voice, breathing rate/effort, confusion or stridor.

Inform the Medical Officer (MO) of any concerns regarding the amount of swelling or drainage, or if frank drainage is noted in the drain or from the surgical site.

Initiate a MET call for any threats to the patient's airway. Consultant Surgeon must be contacted directly and immediately.

Ensure a stitch cutter is available at the patient's bedside for emergency airway management. The stitch cutter is to be used under direction of a MO.

- 4.2.5. Surgical drain should only be removed after surgical review (usually after 24hours)
- 4.2.6. The patient may have a renal diet and fluids when tolerated as ordered by the MO.
- 4.2.7. Do not withhold oral calcium supplements.

4.3. Patient education

Instruct the patients to notify the Nurse immediately if they experience any difficulty breathing, as this maybe an early sign of complications such as airway obstruction(stridor).

4.4. Discharge management

- 4.4.1. Ensure patient education is provided to the patient and follow up appointments are booked.
- 4.4.2. Calcium level may rise rapidly 3-5 weeks after Parathyroidectomy. Discuss with Renal Physician for advice and management.
- 4.4.3. Haemodialysis patients: Serum calcium should be checked three times per week until stable. Checking is generally performed at the commencement of the normal haemodialysis session.
- 4.4.4. Peritoneal dialysis patients: Serum calcium should be checked three times per week until stable. This will be booked through Home Dialysis Therapies or Renal Clinics. Requirements for calcium supplements and calcitriol upon discharge are likely to vary considerably between individual patients. Medication adjustment is to be supervised by Renal Physician or Senior Renal Registrar with responsibility for the relevant clinical area.

5. FOLLOW UP POST DISCHARGE

- 5.1. Requirements for calcium supplements and calcitriol upon discharge are likely to vary considerably between individual patients and **must be closely monitored**.

5.2. Post discharge biochemical monitoring schedule

Post discharge– 1 week	Ca, PO ₄ , EUC	Predialysis bloods 3x/week until Ca is within the normal range
1 week – 1 month	Ca, PO ₄	At least weekly until within normal range
1 month – 2 months	Ca, PO ₄	At least fortnightly unless outside the normal range
2 months -12 months	Ca	At least monthly unless outside the normal range

- 5.3. **For Home Haemodialysis patients:** The first HD session post discharge must be organised in the in-centre unit. Results and patients must be medically reviewed prior to discharge from the in-centre HD Unit.
- 5.4. **Peritoneal dialysis and renal transplant patients:** Arrange biochemical monitoring with Home Therapies, Senior Renal Registrar or usual Renal Physician.

6. Related policy documents

FSFHG:

- Guideline for Pre-operative and Pre-Intervention Management of Medications (FSFH-HW-GUI-0002)
- Management of the Haemodialysis Patient (FSH-HHW-NPS-0072)
- Peripheral Phlebotomy (FSFH-HW-POL-0062)
- FSFHG IV Drug Guideline - Calcium Gluconate

7. Related standards

NSQHS Standards:

- Medication Safety

8. Monitoring

The Nephrology Head of Service in conjunction with relevant staff from other departments will be responsible for monitoring compliance with this document. Compliance will be evaluated via routine incident review processes.

9. Bibliography

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10. Authorisation

EXECUTIVE SPONSOR: Service Director, Service 1					
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	02/2023	Endocrine Surgery	NMPGC; DTC	FSFHG Policy Committee	02/2025