

All staff using the Fluid & Medication Management policies *must* first familiarise themselves with the contents of:

- **Roles & Responsibilities Policy,**
 - **Basic Infection Prevention & Control Principles related to Fluid & Medication**
 - **Patient Identification Policy (Volume 11)**
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1 Peri-operative Medications

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1.1 Adult Elective Peri Operative Medication Guideline Table

This information refers to adult elective patients and is for guidance only. It is not a protocol.

Where there is doubt about peri-operative medication seek advice from the Surgeon (or Surgical Team) and/or the Anaesthetist.

Emergency and paediatric patients should be discussed with an Anaesthetist. Drug Information: 80900

Ward Pharmacist – See Ward white boards for contact details

Peri-Operative Medication - To continue or omit?

See text for details. This document is available on the [CDHB intranet Clinical Pharmacology website](#)

This information refers to **adult elective** patients and is for guidance only. It is not a protocol. Where there is doubt about peri-operative medication seek advice from an Anaesthetist and/or the patient's medical team. Emergency and paediatric patients should be discussed with an Anaesthetist. **Useful contacts:** Duty Anaesthetist: Bleep 8120 Drug Information: 80900 Ward Pharmacists – See Ward white boards for contact details

Agent	Class	Example	Continue/Stop Bold high priority	When to stop if stopping and when to restart. Default - start day after surgery or pm day of surgery if pm dose due.	
CNS Agents	Opioids	morphine, oxycodone, codeine, methadone	Continue	If stopping do so on the day of surgery and substitute with another analgesic (risk of withdrawal - consult the acute pain team, bleep 8114). Restart day of surgery if tolerating oral intake, consider IV substitute	
	Opioids (serotonergic)	pethidine, tramadol	Continue BUT risk of seizures and serotonin toxicity	If stopping do so on the day of surgery and substitute with another analgesic (risk of withdrawal - consult the acute pain team, bleep 8114). Restart day of surgery if tolerating oral intake, consider IV substitute	
	Monoamine oxidase inhibitor antidepressants (MAOIs)	Irreversible, Non Selective: phenelzine, tranylcypromine Reversible, Selective: moclobemide	Irreversible – consult with an anaesthetist & psychiatrist Reversible - continue	Irreversible - if stopping (risk of suicide/depression) do so 14 days before surgery or continue (risk of hypertensive crisis) and use a MAO-safe anaesthetic technique.	
	Tricyclic antidepressants (TCAs)	amitriptyline, clomipramine, nortriptyline,	Continue BUT risk of arrhythmia	If stopping do so 7 days before surgery.	
	Selective Serotonin Reuptake inhibitor (SSRI) Selective Noradrenaline reuptake inhibitor (SNRI) antidepressants	fluoxetine, paroxetine, citalopram, venlafaxine	Continue BUT risk of serotonin syndrome and bleeding	If stopping - fluoxetine 75 days pre op - paroxetine 4 days pre op - citalopram 7 days pre op - venlafaxine 1 day pre op (risk of withdrawal/relapse)	
	Lithium	lithium	Continue BUT risk of lithium toxicity if renal function deteriorates	If stopping do so 24 hours before major surgery.	
	Antipsychotics	chlorpromazine, haloperidol, clozapine, olanzapine	Continue BUT consult a pharmacist if on clozapine as risk of agranulocytosis		
	Anticonvulsants	carbamazepine, lamotrigine, phenytoin, sodium valproate	Continue		
	Anxiolytics	diazepam, lorazepam, oxazepam	Continue		
	Skeletal Muscle Relaxant	baclofen	Continue		
	Anti-Parkinsonian drugs	anticholinergics: benzotropine, procyclidine	Continue BUT risk of arrhythmia and hypotension	If stopping do so on the day of surgery.	
			Dopamine agonists: bromocriptine, pergolide, Madopar™, Sinemet™	Continue BUT risk of hypotension	If stopping do so on the day of surgery.
			MAOI reversible, selective, type B: selegiline	Continue BUT risk of hypertensive crisis	If stopping do so on the day of surgery.
Acetylcholinesterase inhibitors	peripheral: pyridostigmine central: donepezil, galantamine, rivastigmine	Continue	Omit long acting preparations the night before surgery and substitute with short acting preparations		

Agent	Class	Example	Continue/Stop Bold high priority	When to stop if stopping and when to restart. Default - start day after surgery or pm day of surgery if pm dose due.
Anti-coagulants and adjuvants	Coumarin anticoagulant	warfarin	See table 2 and section 1.12	
		aspirin	Continue if known cardiovascular disease BUT risk of bleeding, otherwise stop	If stopping do so 4 to 7 days before surgery but increased risk of cardiovascular events.
		clopidogrel	Discuss with Cardiologist / Anaesthetist	If stopping do so 7 days before surgery but increased risk of cardiovascular events.
		dipyridamole	Continue	If stopping do so 2 days before surgery but increased risk of cardiovascular events.
Agents that have anti-platelet properties	NSAIDs	diclofenac, ibuprofen (short acting), naproxen, indomethacin, celecoxib	Continue BUT risk of bleeding	If stopping do so 4 days before surgery.
Steroids	Glucocorticoids	dexamethasone, hydrocortisone, prednisone	See table 3 and section 1.14	
Diabetic Agents	Oral hypoglycaemics & insulin	glibenclamide, gliclazide, glipizide, metformin, pioglitazone, insulins	See form C160011	
Hormones	Combined oral contraceptive (COC)	Loette™, Monofeme™	Continue BUT increased DVT risk	If stopping do so 4 to 6 weeks before surgery.
	Hormone replacement therapy (HRT)	Cilmara™, Kliogest™, Menoprem™, Premarin™	Continue BUT increased DVT risk	If stopping do so 4 to 6 weeks before surgery.
	Thyroid hormones	Levothyroxine	Continue	
	Progestogen-only oral contraceptive	Farluta™, Femulen™, Microval™, Noriday™	Continue	
	Selective oestrogen modulators	tamoxifen, anastrozole, exemestane	Continue BUT increased DVT risk	If stopping do so 4 to 6 weeks before surgery.
Biologic response modifiers		etanercept, infliximab, rituximab, adalimumab	Rheumatology - stop 14 days before surgery (risk of sepsis) Gastroenterology - continue	Rheumatology - restart 14 days post op if tolerating oral intake (risk of sepsis)
Rheumatological agents	Bisphosphonates	alendronate, etidronate	Continue	
	Gout agents	colchicine, allopurinol, probenecid	Continue BUT risk of allopurinol toxicity if renally impaired.	If stopping do so on the day of surgery
	Disease modifying agent	leflunomide	Continue BUT risk of infection	If stopping do so 11 days before surgery and chelate with cholestyramine day one post op if tolerating oral intake - consult a pharmacist/gastroenterologist.
		methotrexate, azathioprine	Continue BUT risk of infection	If stopping do so 7 days before surgery Restart 7 days post surgery
		hydroxychloroquine, sulphasalazine	Continue	

Agent	Class	Example	Continue/Stop Bold high priority	When to stop if stopping and when to restart. Default - start day after surgery or pm day of surgery if pm dose due.
Cardiovascular Agents	β-blockers	atenolol, carvedilol, celiprolol, labetalol, metoprolol,	Continue	
	Antiarrhythmics	amiodarone, flecainide	Continue/Stop	Stop if having an electrophysiological procedure where induction of arrhythmia is required.
	Cardiac glycosides	digoxin	Continue	
	Calcium channel blockers	amlodipine, diltiazem, felodipine, nifedipine, verapamil	Continue	
	ACE Inhibitors	captopril, enalapril, lisinopril, quinapril, cilazapril	Continue BUT risk of hypotension	
	ACE Inhibitors + diuretics	Hyzaar™, Inhibace Plus™, Accuretic™	Continue BUT risk of hypotension	Check blood pressure before re-starting.
	Angiotension II Antagonists	candesartan, losartan	Continue	
	α-blockers	prazosin, terazosin, doxazosin	Continue	
	Lipid modifying agents	nicotinic acid, bezafibrate, simvastatin, atorvastatin	Continue	If stopping do so 1 day before surgery.
	Diuretics	amiloride, bendrofluazide, furosemide (frusemide), spironolactone	Stop BUT risk of heart failure if on large doses	Stop on the day of surgery (or before if the patient is nil by mouth). Check blood pressure before re-starting.
	Nitrates	isosorbide mononitrate, glyceryl trinitrate	Continue	
Respiratory agents	Xanthine derivative	theophylline	Continue BUT risk of arrhythmias and interactions	If stopping do so 1 day before surgery.
	Inhaled bronchodilators	salbutamol, ipratropium, tiotropium	Continue	
	Leukotriene inhibitors	montelukast	Continue	
Antispasmodics	Urinary antispasmodic	oxybutynin	Continue BUT risk of confusion	If stopping do so on the day of surgery
Gastrointestinal agents	H ₂ receptor antagonists	ranitidine, famotidine	Continue	
	Proton pump inhibitors	omeprazole, lansoprazole, pantoprazole	Continue	
	Digestive supplements and cholelitholytics	Pancrex™, Creon™, ursodeoxycholic acid	Stop when not eating	
Herbals		Arnica, calcium, chondroitin, ephedra, garlic, ginkgo, glucosamine, kava, multivitamins, omega 3, omega 6, parsley, Remifemin™ black cohosh, vitamin B complex, vitamin E	Stop	Stop 7 to 14 days before surgery
		St John's Wort	Stop	Stop 7 to 14 days before surgery.

Table 2: Management of Patients on Warfarin Therapy Undergoing Surgery (Based on the Blue Book 13th Edition)

Long term oral anticoagulants may be given for atrial fibrillation, prosthetic heart valves, history of venous thromboembolism or arterial emboli. In each patient the risk of surgical bleeding must be balanced against the risk of recurrent (or new) thrombosis or emboli. The following is a suggested management plan for patients having elective surgery. However **the final decision on what prophylaxis to use (if any) is taken by the Surgeon caring for that patient.**

HISTORY	BEFORE SURGERY	AFTER SURGERY
DVT or PE <1 month ago (defer surgery if possible) or Acute Arterial emboli < 1 month ago	<ul style="list-style-type: none"> Withhold warfarin for 4 days prior to operation day. The aim is to allow INR to drop to <1.5 on day of surgery. Commence LMWH (e.g. enoxaparin 1 mg/kg Q12h) at treatment dose when INR <2. Last dose prior to surgery given in morning, the day BEFORE surgery i.e. no LMWH for 12-24 hours prior to surgery <p>Or</p> <ul style="list-style-type: none"> Commence IV unfractionated heparin when INR <2. Stop 6 hours prior to surgery. Test INR on day of surgery. If still ≥ 1.5 discuss with Surgeon / Anaesthetist. 	<ul style="list-style-type: none"> Restart warfarin (patient's usual daily dosing) AND either IV unfractionated heparin or LMWH at treatment dose, commencing 12-24 hours after surgery. Discuss with Surgeon / Anaesthetist prior to recommencing therapy. Continue with heparin until INR >2.
DVT or PE >1 month ago or Acute Arterial emboli >1 month ago	<ul style="list-style-type: none"> Withhold warfarin for 4 days prior to operation day. The aim is to allow INR to drop to <1.5 on day of surgery. Commence on LMWH at prophylactic dose e.g., enoxaparin 40 mg SC daily. Last dose given on the day BEFORE surgery. Test INR on day of surgery. If INR ≥ 1.5 discuss with Surgeon / Anaesthetist. 	<ul style="list-style-type: none"> Continue with LMWH at prophylactic dose after procedure, preferably on day of surgery. Restart warfarin (patient's usual daily dosing) 12-24 hours after the surgery. Ensure therapy commenced only after discussion with Surgeon / Anaesthetist. Continue with heparin until INR >2.
Atrial Fibrillation	<ul style="list-style-type: none"> Withhold warfarin for 4 days prior to operation day. The aim is to allow INR to drop to <1.5 on day of surgery. Test INR on day of surgery. If INR ≥ 1.5 discuss with Surgeon / Anaesthetist. 	<ul style="list-style-type: none"> Restart warfarin (patient's usual daily dose) preferably on evening of day of surgery. Ensure therapy is recommenced only after discussion with Surgeon / Anaesthetist.
Prosthetic Heart Valves	<p>If uncertain about management before or after surgery, discuss with Cardiac Surgeon.</p> <ol style="list-style-type: none"> Mechanical aortic valve only inserted >6 months ago and no other additional risk factors (history of TIAs, CVA, systemic emboli, atrial fibrillation, severe LV systolic dysfunction, recurrent CHF, previous thromboembolism, hypercoagulable conditions): <ul style="list-style-type: none"> Thromboembolic risk is low, follow regimen as for atrial fibrillation. Other valves, multiple valves, valve replacement <6 months ago or additional risk factors: <ul style="list-style-type: none"> Before Surgery: Thromboembolic risk is high, follow regimen as for DVT/PE <1 month ago 	<ol style="list-style-type: none"> Mechanical aortic valve only inserted >6 months ago and no other additional risk factors: <ul style="list-style-type: none"> Regimen as for atrial fibrillation Other valves, multiple valves, valve replacement < 6 months ago or additional risk factors: <ul style="list-style-type: none"> Regimen as for DVT/PE <1 month ago.

Table 3: Guidelines for Perioperative Steroids in Patients Already on Steroids (Based on Blue Book 13th Edition)

Note: Approximate equivalent doses: prednisone 5 mg ≈ hydrocortisone 20 mg ≈ dexamethasone 0.75 mg ≈ methylprednisolone 4 mg.

- Patients with intrinsic lack of ACTH or with primary adrenal insufficiency are especially sensitive to acute stress illness.
- Patients taking supraphysiological doses of steroids (>5-7 mg prednisone or equivalent per day) for <3 weeks are unlikely to have significant HPA axis suppression, but if in doubt treat as steroid deficient. Patients on high doses of inhaled glucocorticoids (>1500 mcg beclomethasone or >750 mcg fluticasone daily) may have HPA axis suppression.

All patients should take their usual steroid doses on day of surgery (or IV equivalent) and supplementation (see table below).

Monitor fluid status, electrolytes and glucose daily.

Patients currently taking steroids	≤ 5mg prednisone daily (and not known to be steroid deficient)	Assume normal HPA response	Additional steroid cover not usually required.
	> 5mg prednisone daily or high dose inhaled steroids	Minor surgery e.g. hernia repair, tooth extraction, laparoscopic procedures	Double usual dose oral steroids on day of procedure or 25 mg hydrocortisone IV at induction.
		Moderate surgery e.g. hemicolectomy, open cholecystectomy, nephrectomy	50mg hydrocortisone IV at induction then 50mg Q8H for 24 hours and reduce to maintenance over 1-2 days.
		Major surgery e.g. AAA repair, Whipples, major cardiothoracic surgery, liver resection	50-100mg hydrocortisone IV at induction then 50-100mg Q8H for 48-72 hours and reduce to maintenance over 2-4 days.
Patients stopped taking steroids (>5mg prednisone/day)		Critically ill e.g. shock, sepsis induced hypotension	50-100mg hydrocortisone IV Q8H for 24-48 hrs and taper to maintenance as condition improves, usually 2-4 days.
		< 3 months	Check Synacthen test* pre-op, if normal no steroids; if urgent procedure, treat as if on steroids.
		> 3 months	No peri-operative steroids necessary.

***To arrange test ring 80934, if test not possible treat as if on steroids**

1.1.2 General Post Operative Medication Requirements

- After major surgery, patients may be unable to take drugs by mouth because of nausea, vomiting, delayed gastric emptying or because they are nil by mouth.
- Continuation of a medication may require administration via an alternative route, or changing to an alternative agent with a similar action.
- Selection of alternative treatments needs care, as even switching to a different formulation of the same drug may involve a change in dose due to differing bioavailability of the active drug.
- Advice for the selection of alternative treatments can be obtained from your clinical pharmacist or Drug Information (80900) if required.

References

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Blue Book 13th edition 2009.

Policy Owner	Clinical Pharmacology
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1.2 Peri-operative Management of Adult Diabetes Mellitus

Purpose

The aim of this protocol for peri operative management of diabetes mellitus is to avoid hypoglycaemia, excessive hyperglycaemia (>12mmol/L), prevent protein catabolism, lipolysis and electrolyte disorders while the patient is fasting.

Scope

Nurse/Midwife

Level 1 IV Certificated Nurse/Midwife (for IV administration)

RMO

Associated documents

Adult Peri-operative Insulin/Dextrose Infusion form - Ref: C160011, Adult Nephrology Peri-operative Insulin/Dextrose Infusion Protocol form – Ref: C260082

Information

- Normal Capillary blood glucose is 3.5 - 8.0mmol/L.
- There are three groups of adult diabetic patients:
 - Type 1 Diabetes
 - Type 2 Diabetes requiring Insulin
 - Type 2 Diabetes not requiring Insulin
- Peri operative diabetes management depends on the type of anaesthetic and whether the surgery is minor or major
- A modified peri operative insulin/dextrose infusion management regime is required for dialysis, oliguric and or fluid restricted patients – see Nephrology section of the table for management of these patients.

1.3 Type of anaesthetic

Local anaesthesia without sedation

- Surgery performed with local anaesthetic infiltration only, e.g. plastic surgery procedures at the Burwood Outpatient Procedure Unit (BOPU) and ophthalmic surgery with an eye block.
- These patients are not routinely made nil by mouth, they should have their usual food and medications on the day of surgery.

Local anaesthesia with sedation / regional anaesthesia / general anaesthesia

- Regional anaesthesia includes arm blocks and spinal anaesthesia.
- These patients need to be nil by mouth and should be managed according to the guidelines below.
- If in doubt, patients should be kept nil by mouth. The exact management plan will be determined by the Anaesthetist and surgical team.

1.4 Surgery**Minor**

- The patient is expected to resume normal oral intake on the day of surgery.
- See post operative management section below

Major

- The patient is expected to resume oral intake on the day after surgery or later.
- See Post operative management section below

1.5 Type 1 Diabetes Mellitus Peri operative Diabetic Management

1.5.1 Type I Diabetes Mellitus (ABSOLUTE deficiency) – Minor Surgery

Morning Surgery - Minor	
Adult Patients	Dialysis/Oliguric and or fluid restricted adult Nephrology Patient
<ul style="list-style-type: none"> • Base line capillary blood glucose • Omit morning insulin, • Establish IV (intravenous) access • Monitor capillary blood glucose every 2 hours • Consult medical staff if capillary blood glucose <4mmol/L or > 12 mmol/L 	<ul style="list-style-type: none"> • Base line capillary blood glucose • Omit morning insulin, • Establish IV access • Monitor capillary blood glucose hourly • Consult medical staff if capillary blood glucose <4mmol/L or > 10mmol/L • If above 10mmol/L consult medical staff to consider commencement of the Adult Nephrology Insulin/Dextrose infusion protocol as per prescription
Afternoon Surgery - Minor	
Adult Patient	Dialysis/Oliguric and or fluid restricted adult Nephrology Patient
<ul style="list-style-type: none"> • Base line capillary blood glucose • Administer half the morning dose of insulin • Give a light breakfast before 0730hrs • Establish IV access • Monitor capillary blood glucose 2 hourly • Consult medical staff if capillary blood glucose <4mmol/L or > 12 mmol/L • If above 12 mmol/L consider commencement of the Adult Insulin/Dextrose protocol infusion as per prescription 	<ul style="list-style-type: none"> • Base line capillary blood glucose • Administer half the morning dose of insulin • Give a light breakfast before 0730hrs • Establish IV access • Monitor capillary blood glucose hourly • Consult medical staff if capillary blood glucose <4mmol/L or > 10 mmol/L • If above 10mmol/L consult medical staff to consider commencement of the Adult Nephrology Insulin/Dextrose infusion protocol as per prescription

1.6 Type I Diabetes Mellitus (ABSOLUTE deficiency) – Major Surgery

Morning Surgery - Major	
Adult Patient	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit morning insulin • Start IV Insulin/Dextrose Protocol Infusion on morning of surgery • Monitor capillary blood glucose 2 hourly and adjust rate according to prescription 	<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit morning insulin • Start Adult Nephrology Insulin/Dextrose infusion protocol on morning of surgery • Monitor capillary blood glucose hourly and adjust rate according to prescription
Afternoon Surgery - Major	
Adult Patients	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Baseline capillary blood glucose • Administer half the morning insulin • Give a light breakfast before 0730hrs • Establish IV access • Start IV Insulin/Dextrose Infusion on morning of surgery • Monitor capillary blood glucose 2 hourly and adjust rate according to prescription 	<ul style="list-style-type: none"> • Baseline capillary blood glucose • Administer half of morning insulin • Give a light breakfast before 0730hrs • Establish IV access • Start Adult Nephrology Insulin/Dextrose infusion protocol on morning of surgery • Monitor capillary blood glucose hourly and adjust rate according to prescription

1.7 Type 2 Diabetes Mellitus Diabetes Requiring INSULIN Peri operative Diabetic Management

1.7.1 Type 2 Diabetes Mellitus REQUIRING INSULIN – Minor Surgery

These patients often have some residual insulin secretion and are less prone to ketoacidosis

Morning Surgery - Minor	
Adult Patients	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> Document base line capillary blood glucose Omit morning insulin and oral hypoglycaemic on day of surgery Establish IV access Monitor capillary blood glucose every 2 hours Consult medical staff if capillary blood glucose <4mmol/L or > 12 mmol/L If above 12 mmol/L consult medical staff to consider commencement of the Adult Insulin/Dextrose Protocol Infusion as per prescription 	<ul style="list-style-type: none"> Document base line capillary blood glucose Omit morning insulin and oral hypoglycaemic on day of surgery Establish IV access Monitor capillary blood glucose hourly Consult medical staff if capillary blood glucose <4mmol/L or > 10mmol/L If above 10 mmol/L consult medical staff to consider commencement of the Adult Nephrology Insulin/Dextrose infusion protocol as per prescription
Afternoon Surgery - Minor	
Adult Patient	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> Omit morning and lunchtime oral hypoglycaemias on day of surgery Administer half of morning dose of insulin Give a light breakfast before 0730hrs Establish IV access Monitor capillary blood glucose 2 hourly Consult medical staff if capillary blood glucose <4mmol/L or > 12 mmol/L If above 12 mmol/L consult medical staff to consider commencement of the Adult Insulin/Dextrose Protocol Infusion as per prescription 	<ul style="list-style-type: none"> Omit all oral hypoglycaemias that day Administer half the morning dose of insulin Give a light breakfast before 0730hrs Establish IV access Monitor capillary blood glucose hourly Consult medical staff if capillary blood glucose <4mmol/L or > 10 mmol/L If above 10mmol/L consult medical staff to consider the commencement of the Adult Nephrology Insulin/Dextrose protocol infusion as per prescription

1.8 Type 2 Diabetes Mellitus REQUIRING INSULIN – MAJOR SUGERY

Morning Surgery - Major	
Adult Patient	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Document baseline capillary blood glucose on admission • Omit morning insulin and morning and afternoon oral hypoglycaemics on day of surgery • Start IV Insulin/Dextrose Infusion on morning of surgery • Monitor capillary blood glucose 2 hourly and adjust rate according to prescription 	<ul style="list-style-type: none"> • Document baseline capillary blood glucose on admission • Omit morning insulin and oral hypoglycaemic on day of surgery • Start Adult Nephrology Insulin/Dextrose infusion protocol on morning of surgery • Monitor capillary blood glucose hourly and adjust rate according to prescription
Afternoon Surgery - Major	
Adult Patients	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Document baseline capillary blood glucose on admission • Administer half of morning insulin • Omit oral hypoglycaemics on day of surgery • Give a light breakfast before 0730hrs • Establish IV access • Start IV Insulin/Dextrose Infusion on morning of surgery • Monitor capillary blood glucose 2 hourly and adjust rate according to prescription 	<ul style="list-style-type: none"> • Document baseline capillary blood glucose on admission • Administer half of morning insulin • Omit oral hypoglycaemics on day of surgery • Give a light breakfast before 0730 hrs • Establish IV access • Start Adult Nephrology Insulin/Dextrose infusion protocol on morning of surgery • Monitor capillary blood glucose hourly and adjust rate according to prescription

1.9 Type 2 Diabetes Mellitus NOT requiring INSULIN Peri operative Diabetic Management

1.9.1 Type 2 Diabetes Mellitus NOT requiring INSULIN – MINOR Surgery

Morning Surgery - Minor	
Adult Patients	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Monitor capillary blood glucose every 4 hours • Consult medical staff if capillary blood glucose <4mmol/L or > 12mmol/L • If below 4 mmol/L notify medical staff, commence 5% dextrose infusion at 100ml/hr as per prescription, and monitor capillary blood glucose 2 hourly • If > 12 mmol/L consult medical staff to consider commencement of Adult/Dextrose Protocol IV Infusion as per prescription 	<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Monitor capillary blood glucose hourly • Consult medical staff if capillary blood glucose <4mmol/L or > 10mmol/L • If below 4 mmol/L notify medical staff, commence 50% dextrose infusion at 10ml/hr as per prescription, and monitor capillary blood glucose hourly • If > 10 mmol/L consult medical staff to consider commencement of Adult Nephrology Insulin/Dextrose infusion protocol as per prescription
Afternoon Surgery - Minor	
Adult Patient	Dialysis/Oliguric /fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Monitor capillary blood glucose every 4 hours • Consult medical staff if capillary blood glucose <4mmol/L or > 12mmol/L • If below 4 mmol/L commence 5% dextrose infusion at 100ml/hr as per prescription, and monitor capillary blood glucose hourly • If > 12 mmol/L consult medical staff to consider commencement of Adult/Dextrose Protocol IV Infusion Protocol as per prescription 	<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Monitor capillary blood glucose every 4 hours • Consult medical staff if capillary blood glucose <4mmol/L or > 10mmol/L • If below 4 mmol/L commence 50% dextrose infusion at 10ml/hr as per prescription, and monitor capillary blood glucose hourly • If > 10 mmol/L consult medical staff to consider commencement of Adult Nephrology Insulin/Dextrose infusion protocol as per prescription

1.9.2 Type 2 Diabetes Mellitus NOT requiring insulin – MAJOR Surgery

Morning Surgery - Major	
Adult Patients	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Establish IV access • Start IV Insulin/Dextrose Infusion on morning of surgery • Monitor capillary blood glucose 2 hourly and adjust rate according to Insulin/Dextrose protocol • Consult medical staff if capillary blood glucose <4mmol/L or > 12mmol/L 	<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Establish IV access • Start Adult Nephrology Insulin/Dextrose infusion protocol on morning of surgery • Monitor capillary blood glucose hourly and adjust rate according to prescription • Consult medical staff if capillary blood glucose <4mmol/L or > 10mmol/L
Afternoon Surgery - Major	
Adult Patient	Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Establish IV access • Commence Adult Insulin/Dextrose Infusion as per prescription • Monitor capillary blood glucose 2 hourly and adjust rate according to Insulin/Dextrose protocol • Consult medical staff if capillary blood glucose <4mmol/L or > 12mmol/L 	<ul style="list-style-type: none"> • Baseline capillary blood glucose • Omit oral hypoglycaemic on day of surgery • Establish IV access • Start Adult Nephrology Insulin/Dextrose infusion protocol on morning of surgery • Monitor capillary blood glucose hourly and adjust rate according to Insulin/Dextrose protocol • Consult medical staff if capillary blood glucose <4mmol/L or > 10mmol/L

1.10 Post Operative Management of Diabetes Mellitus

1.10.1 Minor Surgery – Post Operative Management

Type 1 requiring INSULIN
Adult Patient or Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Continue monitoring capillary blood glucose until patient resumes normal diet. • Once eating, administer subcutaneous insulin • Stop insulin/dextrose infusion two hours after administration of subcutaneous insulin • Resume normal diabetic regime in discussion with patient. • Restart glargine (Lantus) on evening of day of surgery.
Type 2 Diabetes Mellitus requiring INSULIN
Adult Patients or Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Continue monitoring capillary blood glucose until patient resumes normal diet. • Once eating, administer subcutaneous insulin • Stop insulin/dextrose infusion two hours after administration of subcutaneous insulin • Resume normal diabetic regime in discussion with patient. • Restart glargine (Lantus) on evening of day of surgery.
Type 2 Diabetes Mellitus NOT requiring INSULIN
Adult Patients or Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Continue monitoring capillary blood glucose until patient resumes normal diet. • Once eating give oral hypoglycaemic • If used, stop insulin/dextrose infusion two hours after oral hypoglycaemic • Resume normal diabetic regime in discussion with patient.

1.11 Major Surgery– Post Operative Management

Type 1 requiring INSULIN
Adult Patient or Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Continue monitoring capillary blood glucose until patient resumes normal diet. • If a patient is usually on glargine (Lantus), aim to restart early. • Discuss the transition from the insulin-dextrose infusion to subcutaneous insulin with the Diabetes Registrar/Consultant. • Patients on prolonged insulin infusions need plasma sodium and potassium levels monitored, as they may become hyponatraemic and/or hypokalaemic. • The insulin/dextrose protocol is only intended for use over a 24 hour period.
Type 2 Diabetes Mellitus requiring INSULIN
Adult Patients and Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient
<ul style="list-style-type: none"> • Continue monitoring capillary blood glucose until patient resumes normal diet. • If a patient is usually on glargine (Lantus), aim to restart early. • Discuss the transition from the insulin-dextrose infusion to subcutaneous insulin with the Diabetes Registrar/Consultant. • Patients on prolonged insulin infusions need plasma sodium and potassium levels monitored, as they may become hyponatraemic and/or hypokalaemic. • The insulin/dextrose protocol is only intended for use over a 24 hour period. • If patient usually on an oral hypoglycaemic - restart when patient resumes normal diet

Type 2 Diabetes Mellitus NOT requiring INSULIN**Adult Patients and Dialysis/Oliguric and or fluid restricted Adult Nephrology Patient**

- Continue monitoring capillary blood glucose until patient resumes normal diet.
- If used, stop insulin/dextrose protocol when they resume normal diet
- Restart oral hypoglycaemic when patient resumes normal diet.
- Resume normal diabetic regime in discussion with patient.

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1.12 Management of Surgical Patients already on Warfarin Therapy

Information

Surgical patients may be taking long term oral anticoagulants for atrial fibrillation or prosthetic heart valves or may be on Warfarin because of recent venous thromboembolism.

In each patient the risk of surgical bleeding must be balanced against the risk of recurrent (or new) thrombosis.

Refer to your local service policy or refer to Thrombosis, Embolism and Anticoagulation section of the Blue Book <http://bluebook.streamliners.co.nz>

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1.13 Management of Peri-operative Low Molecular Weight Heparin (LWMH) (Clexane, Fragmin, Innohep, Fraxiparin)

Statement

- In the first instance refer to your Services local Policy in regard to risk prediction, management and administration
- If your service does not have their own policy refer to the Blue Book
 - Thrombosis, Embolism, and Anticoagulation/Venous Thromboembolism/ Deep-Vein Thrombosis (DVT), and Pulmonary Embolism (PE)/Prophylaxis of DVT/PE/Surgical DVT Prophylaxis

Associated Documents

- General Surgery Christchurch Hospital - VTE risk assessment C240158
- Sub Cutaneous Administration Policy Vol 12

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1.14 Recommended Peri-operative Steroid Therapy for Adults taking Exogenous Steroids

Please Note: Prednisone 5mg = hydrocortisone 20mg = dexamethasone 0.75mg = methylprednisolone 4mg

- Patients with an intrinsic lack of adrenocorticotrophic hormone (ACTH) or with primary adrenal insufficiency are especially sensitive to acute stress illness. Patients taking supraphysiological doses of steroids (>5-7mg prednisone or equivalent per day) for <3 weeks are unlikely to have significant hypothalamic pituitary adrenal (HPA) axis suppression. Patients on high doses of inhaled glucocorticoids# (>1500mcg beclomethasone or >750mcg fluticasone daily) may have HPA axis suppression.
- All patients should take their usual steroid doses on day of surgery (or IV equivalent) and supplementation as outlined below:

Patients currently taking steroids	≤ 5mg prednisone daily	Assume normal HPA response	Additional steroid cover not usually required.
	> 5mg prednisone daily or high dose inhaled steroids	Minor surgery (eg. hernia repair, tooth extraction, laparoscopic procedures)	Double usual dose oral steroids on day of procedure or 25 mg hydrocortisone IV at induction.
		Moderate surgery eg. hemicolectomy, open cholecystectomy, nephrectomy	50mg hydrocortisone IV at induction then 50mg Q8H for 24 hours and reduce to maintenance over 1-2 days.
		Major surgery eg. AAA repair, whipples, major cardiothoracic surgery, liver resection	50-100mg hydrocortisone iv at induction then 50-100mg Q8H for 48-72 hours and reduce to maintenance over 2-4 days.
		Critically ill eg. shock, sepsis induced hypotension	50-100mg hydrocortisone IV Q8H for 24-48 hrs and taper to maintenance as condition improves, usually 2-4 days.
Patients stopped taking steroids (>5mg prednisone/day)	< 3 months	Check synacthen test* pre-op, if normal no steroids; if urgent procedure treat as if on steroids.	
	> 3 months	No peri-operative steroids necessary.	

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