REGULAR MEDICATIONS AND RESTARTING MEDICATIONS DURING THE PERIOPERATIVE PERIOD

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DISCLOSURE

In relation to this presentation, I declare the following, real or perceived conflicts of interest: Nil

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LEARNING OBJECTIVES

1. Review the importance of continuing regular medications during the perioperative period
2. Describe the modification and reintroduction of medication in perioperative and post-operative periods
3. Identify the importance of good communication to ensure patients continue appropriate regular medications post-operatively
4. Describe positive communication techniques to utilise with patients about their medications in the post-operative period

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PHARMACIST COMPETENCY STANDARDS

Pharmacist competency standards* addressed include:

- Standard 3.1.2 Assess medication management practices and needs
- Standard 3.2.3 Dispense medicines (including compounded medicines) in consultation with the patient and/or prescriber

National competency standards framework for pharmacists in Australia, 2016

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INTRODUCTION

- Demographics of "The Surgical Patient" are changing
  - Older, sicker patients
  - More complex procedures with new technologies
- Kennedy et. al. New Zealand
  - Nearly 50% of general surgical admissions are taking regular medications not related to their surgical admission[1]
    - Cardiovascular medications (>2) 48% patients
    - CNS medications 45%
- Limited outcome data on perioperative medication management[2]

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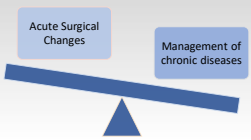
PHARMACIST ROLE



- Best possible medication history
  - Pre-admission clinic
  - Post-op on the ward
- Identify patient factors that may effect post-op medication management
  - NBM → oral absorption, alternate routes of administration
  - Haemodynamic changes → review of regular cardiovascular medications
  - Fluid / Electrolyte Balances
  - Organ dysfunction
  - New post-op medications → drug interactions

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CASE 1 – MR MB

- Booked for TKR, history completed in pre-admission clinic
- Plan:
  - Withhold metformin the morning of OT
  - Withhold empagliflozin for 72 hours pre-op
  - Withhold Novorapid AM of OT
- Day of surgery: BSLs 14mmol, anaesthetist orders an insulin + glucose infusion

Medication	Dose	Indication
Lantus®	30 units nocte	T2DM
Novorapid®	10 units TDS	T2DM
Metformin	1000mg XR mane	T2DM
Empagliflozin	10mg mane	T2DM

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MR MB – D1 POST OP

- Mr MB returns to the ward the afternoon of his surgery. When you review him, you notice his insulin infusion is still running and his regular Lantus® and Novorapid® are not charted.

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SURGERY AND DIABETES[3]

- Surgery and anaesthesia cause a neuroendocrine stress response. May lead to metabolic abnormalities:
  - Insulin resistance
  - Decreased peripheral glucose utilization
  - Impaired insulin secretion
  - Increased lipolysis
  - Protein catabolism (→ hyperglycaemia, ketosis)
- Balanced with decreased oral intake → perioperative glycaemic control various between patients

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GOALS OF PERIOPERATIVE GLYCAEMIC CONTROL[3]

1. Avoid hypoglycemia
   - Potentially life threatening
2. Prevention of ketoacidosis/hyperosmolar states
3. Maintenance of fluid & electrolyte balance
4. Avoidance of marked hyperglycaemia
   - Infection risk

- Optimal BSLs not clear
  - Meta-analysis found intensive glycaemic control not associated with reductions in infection rates, cardiovascular events or mortality, but was associated with more hypo's
  - Guidelines recommend 6.1 to 10mmol/L

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ON YOUR WARD…

- Does your hospital use insulin & glucose infusions?
- Which patient populations get insulin & glucose infusions?
  - Which electrolyte is commonly prescribed with an insulin & glucose infusion?
- How often should BSLs be monitored with an insulin infusion?

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INSULIN INFUSION[3]

- Allows tighter glycaemic control intraoperatively with a short half-life (5-10min)
- Requires regular monitoring of: BSLs, electrolytes (potassium, sodium bicarbonate)
- When changing from insulin infusion to patient's regular regimen:
  - T1DM: ensure insulin infusion is not stopped abruptly, require basal insulin to avoid ketosis

SUGGESTION: As long as Mr MB is eating and drinking, cease insulin infusion and restart usual NovoRapid® with evening meal and give regular Lantus® that night.

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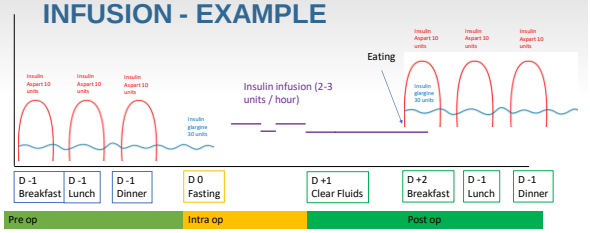
TRANSITIONING FROM INSULIN INFUSION - EXAMPLE



Graphic with thanks to Karl Winckel

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ON YOUR WARD…

- Oral hypoglycaemics → when would you restart them??

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ORAL HYPOGLYCAEMICS - METFORMIN

- Metformin
  - Caution when restarting, do not re-start if patient has renal insufficiency, significant hepatic impairment, or congestive heart failure[3]
  - Consider if the patient has received IV contrast due to risk of lactic acidosis if impaired renal function[4].
    - eGFR <30mL/min (IV contrast) or <45mL/min (intra-arterial contrast) or worsening eGFR, withhold metformin 48 hours post-procedure.

SUGGESTION: restart metformin once Mr MB eating & drinking (so long as kidney function OK)

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ORAL HYPOGLYCAEMICS – EMPAGLIFLOZIN[5]

- Empagliflozin
  - Case reports of euglycaemic ketoacidosis, advice to withhold 72 hours pre-operatively
  - ANZCA suggests restarting once regular eating & drinking resumed and:
    - day cases, withhold a further 24 hours once eating & drinking
    - Major cases: withhold for a further 3 to 5 days once eating & drinking

SUGGESTION: Restart empagliflozin 3 to 5 days post-op, monitor BSLs and ketones (ketones >0.6mmol/L and patient is unwell → seek medical review, blood gas to be checked for acidosis

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CASE 2 – MS AW

- Emergency surgery for compound tibia/fibula fracture after falling from a bike. Ms AW has returned to the ward and the doctors ask you to see the patient as they can't control her pain.

Medication	Dose	Indication
Methadone	60mg mane	Previous IVDU
Sertraline	100mg mane	Anxiety / Depression
Diazepam	5 - 10mg nocte PRN	Anxiety

- You suggest the team also contact the Acute Pain Service and Alcohol & Drugs of Addiction Unit. APS decide to commence Ms AW on an oxycodone PCA

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METHADONE

- Often used for maintenance treatment of patients with an addiction to opioids or for chronic pain[6]
- Indication important as that can guide post-operative pain management options[6]
- Long & unpredictable half life → less effective for managing acute pain[6]
- Analgesic effect of methadone 8-12 hrs, so common to split the dose in hospital to provide better pain management[6]

SUGGESTION: methadone dose 20mg TDS while an inpatient

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SERTRALINE

Antidepressant changeover guide

See also Major depression

Drug[1]	Recommendation[2]	Rationale
Category A changeover		
fluoxetine, phenelzine, tranylcypromine, vortioxetine	• gradual withdrawal generally unnecessary; withdrawal symptoms very unlikely • wait for at least 14 days before starting next antidepressant (may be up to 5 weeks with fluoxetine) • consider hospitalisation during washout/changeover if severely depressed	drug (or metabolites) with long half-life or persistent effects
Category B changeover		
TCAs, SSRIs (except fluoxetine), mianserin, mirtazapine	• withdraw gradually to prevent withdrawal symptoms (particularly if higher dose or long-term use); usually reduce dose by 25% per day • wait for 2–4 days before starting next antidepressant • consider hospitalisation during washout/changeover if severely depressed • *mianserin*: withdrawal symptoms rare	drug (or metabolites) with intermediate half-life of 24–48 hours

Drugs	Withdrawal effects	Comments
MAOIs	nausea, vomiting, nightmares, panic, restlessness, hallucinations	delirium may also occur with tranylcypromine (particularly if there was dependence)
SSRIs	dizziness, nausea, paraesthesia, anxiety, agitation, tremor, sweating, confusion, electric shock-like sensations	more common with paroxetine and least likely with fluoxetine

SUGGESTION: Continue Ms AWs regular sertraline dose

Ref: (7) AMH

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BENZODIAZEPINES

- Establish frequency of use
  - Risk of withdrawal symptoms?
- Indication for use
  - Sleep?
  - Alcohol withdrawal scale?
  - Anxiety?
- Additive side effects e.g. with opioids, increased risk of respiratory depression

Benzodiazepine withdrawal symptoms[7]
- Anxiety
- Dysphoria
- Irritability
- Insomnia, nightmares
- Sweating
- Memory impairment, hallucinations
- HTN, tachycardia
- Psychosis
- Tremors
- Seizures

SUGGESTION: Establish how frequently Ms AW uses diazepam an discuss with the acute pain team / treating team

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CASE 3 - MS EG

- Ms EG is discharged from ICU to your ward post a Whipple's procedure (pancreaticoduodenectomy). You ask her treating team during the ward round and they expect her to be nil by mouth for the next 48 hours.
- She had a medication history completed in the pre-admission clinic which you confirm to still be accurate.

Medication	Dose	Indication
Levetiracetam	1000mg BD	Epilepsy
Perindopril	5mg mane	HTN
Targin	10/5mg	Back pain

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ALTERNATE ROUTES OF ADMINISTRATION

- Often surgical patients are NBM
  - Gut rest
  - Major head and neck surgery
  - Multi-trauma
- Important to identify essential medications
- Consider alternate routes of medication administration
  - e.g. IV/oral/NG/sublingual
  - Is the dose equivalent for different routes
  - Monitoring required (e.g. IV metoprolol vs PO metoprolol)
  - IV compatibility (AIDH, Trissels)
- NG administration: Don't rush to crush

Australian Injectable Drugs Handbook, 7th Edition

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ALTERNATE ROUTES FOR MS EG

- Levetiracetam
  - Acute withdrawal of levetiracetam could worsen seizure control
- Targin (SR oxycodone/naloxone)
  - PCA or epidural cover
  - Sublingual buprenorphine

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POST-OPERATIVE BLOOD PRESSURE

- Multiple factors may contribute to post-operative hypotension
  - General anaesthetic (e.g. Propofol = vasodilator)
  - Blood loss
- Intraoperative tachycardia and/or hypotension associated with MI, stroke and death after noncardiac surgery[8,9]
  - Potential mechanism = oxygen supply/demand imbalance
- Intraoperative hypotension may cause post-op AKI[10]
- Important to monitor post-op, consider withholding antihypertensives (e.g. ACE-I/ARB if AKI likely)

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CASE 4 – MR NV

- Mr NV is admitted to the orthopaedic ward after right total hip replacement. He is a 70 year old male with no known allergies. He is 60kg. eGFR = 75mL/min

Past Medical History
- Depression
- Glaucoma
- Vertigo
- Non-Smoker

Current Medications
- Docusate + Senna 2 BD
- Targin 5/2.5mg BD
- Pantoprazole 40mg mane
- Sertraline 100mg mane
- Paracetamol 1g QID
- Latanoprost nocte both eyes
- Metoclopramide 10mg TDS PRN
- Ondansetron 4mg TDS PRN
- Oxycodone 5-10mg q4h PRN
- Cephazolin 2g TDS (for 3 doses)

What if Mr NV also had a history of AF, T2DM with a prior CVA and HTN, and was taking warfarin 3.5mg daily pre-op??

CASE 4 – MR NV

The ward doctor asks you if they should prescribe VTE prophylaxis for this patient. What would you recommend?

1. Drug?
2. Dose?
3. Duration?
4. Counselling points?
5. PBS criteria?

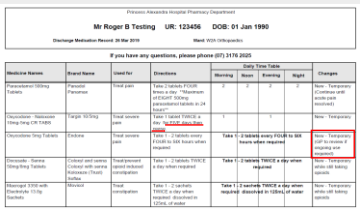
CASE 4 – MR NV

- When should Mr NV re-start his warfarin?
  - What factors might influence this?
- What dose of warfarin should he re-start at?
- Does Mr NV require bridging post-op?
  - How long is bridging required?
- Are there any other post-op considerations for Mr NV's warfarin?

DISCHARGE COMMUNICATION

- Transitions of care = opportunity for patient harm
- Physiological changes around the time of surgery result in changes to patient's regular medications AND addition to new medications for patient on discharge
- Clear communication of plans to patients is vital
  - Opioids: set expectation of pain post-op. Weaning plans essential!!
  - Diabetes management: changes to insulin doses common due to changes in diet while in hospital, surgical endocrine response – clear plan for monitoring on discharge
  - VTE prophylaxis: technique, how to administer? Duration of treatment? Signs of bleeding?
  - Therapeutic anticoagulation – when is the bleeding risk reduced to an acceptable level to restart therapeutic anticoagulation?

DISCHARGE MEDICATION SUMMARY



Princess Alexandra Hospital Pharmacy Department

Mr Roger B Testing UR: 123456 DOB: 01 Jan 1990

Discharge Medication Record: 26 Mar 2019 Ward: W2A Orthopaedics

If you have any questions, please phone (07) 3176 2625

Medicine Names	Brand Name	Used for	Directions	Daily Time Table: Morning	Noon	Evening	Night	Changes
Paracetamol 500mg Tablets	Panadol/ Panamax	Treat pain	Take 2 tablets FOUR times a day. **Maximum of EIGHT 500mg paracetamol tablets in 24 hours!!!**	2	2	2	2	New - Temporary (Combine until acute pain resolved)
Oxycodone+ Naloxone 10mg-5mg CR TABS	Targin 10/5mg	Treat severe pain	Take 1 tablet TWICE a day **EVERY 12hrs Take Only when**	1		1		New - Temporary
Oxycodone 5mg Tablets	Endone	Treat severe pain	Take 1 - 2 tablets every FOUR to SIX hours when required	Take 1 - 2 tablets every FOUR to SIX hours when required				New - Temporary (GP to review if ongoing use required)
Docusate - Senna 50mg-8mg Tablets	Coloxyl and senna/ Colosan with senna/ Kolosacin (Tricel)	Treat/prevent opioid induced constipation	Take 1 - 2 tablets TWICE a day when required	Take 1 - 2 tablets TWICE a day when required				New - Temporary (while still taking opioids)
Movicol 3350 with Electrolyte 131g Sachets	Movicol	Treat constipation	Take 1 - 2 sachets TWICE a day when required- dissolved in 125mL of water	Take 1 - 2 sachets TWICE a day when required- dissolved in 125mL of water				New - Temporary (while still taking opioids)

GP review dates
- Explain to patient why / when they should see their GP

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Medicine Names	Brand Name	Used for	Directions	Daily Time Table: Morning	Noon	Evening	Night	Changes
Empagliflozin 10mg Tablets	Jardiance	Treat diabetes	Take 1 tablet in the MORNING. If you are unwell or having surgery contact your doctor & consider withholding this medicine.	1				With food temporarily stopped 3 days post-op once eating and drinking)

Allergies and Adverse Drug Reactions:

Date	Medicine / Causal Agent	Reaction
06/03/2019	Penicillins	anaphylaxis

IMPORTANT: Please note that this Medication Record may not be a complete and accurate record of all your medications. The Medication Record is based on: (a) information from you and/or your GP and/or other sources; (b) information gathered during your hospital stay; and (c) discharge instructions. You should contact your regular GP or primary treating doctor to check the accuracy and completeness of this medication record. Please take it to your medical appointments and ensure that your medication records are updated.

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