Regional Analgesia Management (Adult) Procedure

1. Guiding Principles

Regional anaesthesia is an injection or application of local anaesthetic to a specific area of the body to produce a sensory and/or motor block.

Local anaesthetic agents block the transmission of nerve impulses to the Central Nervous System (CNS) by preventing the uptake of sodium ions required for nerve conduction.

Several routes of administration of local anaesthetic infusions are used post – operatively dependent on the type of surgery and the anticipated level of post-operative pain e.g. femoral, brachial plexus, sciatic, lumbar plexus or rectus sheath catheters. Regional analgesia is also utilised pre-operatively e.g. fracture Neck of Femur.

A catheter is sited by the Medical Practitioner, usually the anaesthetist, surgeon or emergency doctor. A wound catheter may also be placed between the peritoneum and muscle layer.

Aseptic technique practices must be utilised during insertion, administration and management of regional analgesia and removal of the regional analgesia catheter (refer to WACHS Aseptic Technique Policy).

Opioid sparing techniques are used, with the advantage of improved analgesia with decreased side effects often associated with opiate use, such as nausea and vomiting, sedation, constipation or respiratory depression. These techniques can often be used for patients where an epidural is contra-indicated and also be an adjunct to intravenous analgesia, thereby reducing the required doses and decreasing the risk related side-effects. Infusions are usually discontinued within 48hs of commencement but may remain up to 5 days.

Major regional analgesia requires the skill and expertise of a proceduralist who is a medical practitioner, with training and experience in the technique, or trainees under the supervision of such a practitioner.

An understanding of the relevant anatomy (including sonoanatomy where relevant), physiology, pharmacology, equipment used and potential complications of the particular procedure as well as appropriate patient monitoring is essential for the safe conduct of these procedures (ANZCA PS03). Prompt treatment of side effects or complications may be critical.[8]

Management of regional analgesia most often occurs on the ward, though this is often initiated in Theatre/Recovery or the Emergency Department. There may be occasions where patients are discharged with regional catheters in place, however this involves careful planning, with patient education, regular review by Hospital in the home (HITH) or similar services and a plan for removal by the HITH nurse or removal in outpatient services and review by APS Team/Anaesthetist.

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2. Procedure

2.1 Regional catheter sites

Regional catheter techniques used at WACHS facilities can include:

Nerves:

- Rectus sheath
- Adductor canal
- Femoral
- Paravertebral
- Erector spinae
- Lumbar plexus
- Transvers abdominus plane (TAP)
- Interscalene
- Brachial plexus
- Sciatic
- Intercostal

Wounds:

- Any surgical site deemed appropriate by an Anaesthetist or Surgeon.

2.2 Medication used

Commercially prepared local anaesthetic solution is used for infusion/bolus regimens via a dedicated pain management pump – the most common solution used is Ropivacaine Hydrochloride 400milligrams/200mL.

The local anaesthetic blocks the smaller diameter sensory nerve fibres first, thus decreasing the sensation of pain. Higher concentrations will also block the larger motor fibres, impacting on the patient's ability to move the limb.

Patients will often receive other forms of analgesia with a regional infusion as part of multi-modal analgesia and to reduce opiate requirements if this is deemed to be appropriate by the Anaesthetist. This may include Patient Controlled Intravenous Analgesia (PCIA)/opioid or Ketamine infusion, or oral/topical analgesia.

If PCIA/opioid or Ketamine infusion refer to the WACHS/Regional policy documents for their additional management.

The regional analgesia prescription is written on the MR170K WACHS Regional Analgesia Prescription and Additional Observation Record. Note: If multiple regional catheter sites (e.g. rectus sheath left and right side) then each site requires a separate prescription form.

2.3 Methods of Delivery

Regional analgesia is administered in WACHS using the following methods:

- Fixed rate infusion +/- clinician initiated boluses
- Fixed rate infusion +/- patient initiated boluses
- Programmed intermittent boluses (PIB)
- Top-up doses

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2.4 Intravenous access

Intravenous (IV) access is to be obtained prior to commencement of major regional analgesia. In most circumstances IV access is maintained for the duration of administration of the local anaesthetic therapy.[8]

Where IV access remains in place post procedure, management and assessment of the device and insertion site should be in line the WACHS Peripheral Intravenous Cannulae (PIVC) Management Clinical Practice Standard or the WACHS Central Venous Access Device (CVAD) Management Clinical Practice Standard, with the use of the relevant forms according to device type.

Where the IV access is no longer viable, medical review should occur and the need for replacement assessed with consideration of future therapies and medication requirements e.g. if prescribed IV antibiotic therapy.

If there is no IV access available and a regional anaesthetic top-up is needed, then IV access must be obtained prior to administration of the top-up (as per ANZCA PS03 Guideline for the management of major regional analgesia).

2.5 Management of patients with regional analgesia

2.5.1 Medication Administration

Caution: Erroneous neuraxial and peripheral neural administration of medicines or fluids intended for administration by other routes is a small but highly significant proportion of the number of injection errors in medicines administration. Moreover, the administration of medicines intended for neural procedures can be erroneously given by other routes. These incidents can be catastrophic for patients and may result in serious permanent harm or death.[10]

- Administration of a medicine by the wrong route is facilitated by the interconnectivity of intravenous devices with epidural, intrathecal, regional and peripheral nerve devices, including syringes, needles, filters, syringe caps and lines.[10]
- These wrong route medication errors have been made possible due to the universal use of the Luer connector that has no physical barrier to prevent unintentional misconnection of devices.[10]
- The International Organization for Standardization (ISO) developed a standard for neuraxial connectors, ISO 80369-6:2016 to address this system deficiency.[10]
- Devices compliant with this standard will only connect with other ports for neural delivery of medicines.[10]
- This reduces the risk of misconnections and wrong route administration of a medicine or fluid. ANZCA and the Commission recommended in a joint safety statement that devices for neural procedures compliant with ISO 80369-6:2016 be adopted in Australia as part of this global initiative to improve patient safety.[10]

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To reduce the risk:

- Infusions or pre-set bolus regimes must be given via a dedicated pain management pump that has specific dosage limits for each technique in order to minimise the risk of inadvertent delivery of excessive amounts of local anaesthetic8
- Tubing colour of giving sets should be unique to regional analgesic infusions wherever possible8
- Only medications approved for regional administration are used to prevent permanent nerve and local tissue damage
- Breaking the line should be avoided / kept to a minimum to reduce the risk misconnection and infection:
    - An Anaesthetist or Medical Officer instructed by an anaesthetist may break the line to administer a top-up by injection through the filter;
    - Nursing/midwifery staff may interrupt the line during bag/line changes, or if there is air in the line and priming of the tubing is required
- The route of administration must be identified/labelled on all catheter lines. The labelling must comply with the ACSQHC National Standard for User Applied Labelling of Injectable Medicines Fluids and Lines.

Note: Only line labels are required. Bag labels are not required as the medication is commercially prepared and the contents are already listed on the bag.

- The infusion bag is to be changed if has been in-situ for 24hours and the line changed every 72hours (refer to the WACHS Medication Administration Policy).

2.5.2 Assessment

On each instance of clinical handover, check and record on the MR170K WACHS Regional Analgesia Prescription and Additional Observation Record the following:

- Patient identification (refer to the WACHS Patient Identification Policy)
- The pump settings match the prescription
- The filter and line connections are secure and **connected to the correct site**
- Labelling of medication and lines must comply with the ACSQHC National Standard for User Applied Labelling of Injectable Medicines Fluids and Lines
- The dressing is intact and catheter in situ with no unexpected leakage; swelling at insertion site or signs of infection present (dressing intact; leakage; erythema, warmth, tenderness)
- Any abnormal findings - escalate for review by the APS Nurse or Anaesthetist or after hours Medical Officer responsible for the patient's care.

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2.5.3 Observations

- Vital signs are recorded on the MR140A Adult Observation and Response Chart (A-ORC)
- Additional observations specifically related to regional analgesia (e.g. motor block/dermatomes and medication delivery) are recorded on the MR170K WACHS Regional Analgesia Prescription and Additional Observation Record. If additional space is needed, the MR170K.1 Regional Analgesia Continuation Sheet can be used
- Frequency of vital signs and additional observations and standard order are outlined on the back page of the MR170K
- If PCIA/opioid infusion/Ketamine infusion insitu, additional observations are required – refer to the relevant WACHS/Regional policy document/forms
- Specific post-operative observations may be required – refer to the WACHS Pre and Post Procedural Management Clinical Practice Standard and surgeon orders
- Non-operative patients – refer to medical team managing the patient for orders regarding observational requirements.

2.5.4 Cessation of Treatment and removal of regional analgesia catheter

- The order for removal is to be written on the MR170K WACHS Regional Analgesia Prescription and Additional Observation Record
- A plan for cessation can be documented and may include stopping the infusion, alternating with oral analgesia and if pain is managed, the infusion is removed. If pain relief is inadequate the infusion can be restarted and another trial of cessation can be tried at a later time
- For patients with regional analgesia located in the back, e.g. lumbar plexus and also on anti-coagulants, the catheter will be removed when there is a trough in anti-coagulant activity to decrease the risk of haematoma.
    - Unfractionated heparin - 6 hours post-administration of
    - Low molecular weight heparin, e.g. Enoxaparin - 12 hours post prophylactic
    - Unfractionated (Standard) heparin and prophylactic low molecular weight heparin can be administered 2 hours after a regional catheter has been removed from a patient's back.
- If prior to removal a top up/bolus given, and patient for due for discharge – the observational period must be adhered to before leaving (as outlined on the back page of the MR170K)
- Catheter tips are inspected for completeness and may be sent to microbiology if there are signs and symptoms of infection. If catheter tip is not intact – keep the tip and escalate for review by APS Nurse/Anaesthetist
- Removal procedure – refer to Appendix 1: Removal of regional analgesia catheter.

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2.5.5 Side effects and complications

Side Effect / Complication	Signs/Symptoms	Action
Inadequate analgesia	• Leakage at the site accompanied by unresolved pain • Catheter migration	• May require adjustment of the infusion rate or re-siting of the catheter
Nerve damage (May happen during insertion of catheter; this is extremely rare)	• Dense or prolonged block • Increase or change in Bromage	• APS Nurse/Anaesthetist for immediate review • Consider Neurological review
Haematoma	• Swelling and/or blood loss at catheter site. Numbness/paraesthesia due to compression on local nerves	• APS Nurse/Anaesthetist for immediate review • Depending on site and blood loss, apply pressure bandage
Infection	• Erythema, warmth, tenderness, swelling • Fever	• APS Nurse/Anaesthetist for review • Remove catheter and send tip to microbiology.
Toxicity (Occurs due to the unintended intravascular injection of local anaesthetic agent or accumulation of dose)	• Numbness around lips • Metallic taste in mouth • Tinnitus / blurred vision • Fitting • Cardiac Arrest	• STOP Infusion • APS Nurse/Anaesthetist for immediate review • Initiate MER as appropriate for signs and symptoms

Local anaesthetic toxicity
Signs and symptoms of local anaesthetic toxicity may be experienced if there is rapid absorption of local anaesthetic into the blood stream or local anaesthetic is inadvertently administered intravacularly.[9]

Toxicity can also occur with an infusion where there is an accumulation of the LA if delivered at a high rate over a period of time.

Early symptoms include numbness and tingling around the tongue and lips, tinnitus, diplopia and confusion.[9]

Signs of severe toxicity include[9]:

- Sudden alteration in mental status, agitation or loss of consciousness with or without seizures
- Cardiovascular collapse: sinus bradycardia, conduction block,
- Asystole and tachyarrhythmias.

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Management of severe local anaesthetic toxicity is as per the Royal Australian and New Zealand College of Anaesthetists endorsed guidelines from the Association of Anaesthetists in Great Britain and Ireland: Management of severe local anaesthetic toxicity – guideline and accompanying notes.

- 1000 ml of 20% lipid emulsion should be immediately available to all patients receiving potentially cardiotoxic doses of local anaesthetic
- Staff need to be aware of the location of the lipid emulsion as this may be located in another area of the hospital.

3. Definitions

APS	Acute Pain Service
CADD	Computerised Ambulatory Drug Delivery
PCIA	Patient Controlled Intravenous Analgesia
PIB	Programmed intermittent bolus
Sonoanatomy	Sonographic appearance of anatomy

4. Roles and Responsibilities

Nurses, Midwives and Medical Officers are to work within their scope of practice appropriate to their level of training and responsibility.

Medical Staff are to obtain informed consent using the MR30D Patient Consent to Anaesthesia - General or Regional.

All Staff are required to work within policies and guidelines to make sure that WACHS is a safe, equitable and positive place to be.

5. Compliance

Failure to comply with this procedure may constitute a breach of the WA Health Code of Conduct (Code). The Code is part of the Integrity Policy Framework issued pursuant to section 26 of the *Health Services Act 2016* (WA) and is binding on all WACHS staff which for this purpose includes trainees, students, volunteers, researchers, contractors for service (including all visiting health professionals and agency staff) and persons delivering training or education within WACHS.

WACHS staff are reminded that compliance with all policies is mandatory.

6. Records Management

Health Record Management Policy

7. Evaluation

Monitoring of compliance with this document is to be facilitated locally by Regional Medical, Nursing and Midwifery Directors as indicated by clinical audit and incident data related to administration of regional analgesia.

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8. Standards

National Safety and Quality Health Service Standards
Clinical Governance Standard: 1.7 and 1.27
Medication Safety Standard: 4.13, 4.14 and 4.15

Australian Commission on Safety and Quality in Health Care National Standard for User Applied Labelling of Injectable Medicines Fluids and Lines

9. Legislation

Medicines and Poisons Act 2014 (WA)
Medicines and Poisons Regulations 2016 (WA)

10. References

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9. Government of Western Australia – North Metropolitan Health Service – King Edward Memorial Hospital. Postoperative management: Anaesthetics Clinical Practice Guideline. Perth WA: 2019
10. Australian Commission on Safety and Quality in Health Care (ACSQHC) and Australian and New Zealand College of Anaesthetists (ANZCA). ISO 80369-6:2016 neural connector devices to reduce misconnection errors: Guidelines for implementation in Australia. Dec 2019. [cited 2020 September 14]

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11. Related Forms

MR140A Adult Observation and Response Chart (A-ORC)
MR170K WACHS Regional Analgesia Prescription and Additional Observation Record
MR170K.1 WACHS Regional Analgesia Continuation Sheet
MR170.5 WACHS PCIA-IV Opioid Infusion Prescription and Additional Observation Chart
MR30D Patient Consent to Anaesthesia - General or Regional

12. Related Policy Documents

WACHS Aseptic Technique Policy
WACHS Central Venous Access Device (CVAD) Management Clinical Practice Standard
WACHS Clinical Escalation of Acute Physiological Deterioration including Medical Emergency Response Policy
WACHS Hand Hygiene Policy
WACHS Infection Prevention and Control Policy
WACHS Intravenous Opioid Administration Policy
WACHS Medication Administration Policy
WACHS Patient Identification Policy
WACHS Peripheral Intravenous Cannulae (PIVC) Management Clinical Practice Standard
WACHS Pre and Post Procedural Management Clinical Practice Standard
WACHS Specimen Collection (including Phlebotomy) and Pathology Results Clinical Practice Standard
WACHS Waste Management Policy

13. Related WA Health System Policies

MP 00095 Clinical Handover Policy
MP 0086/18 Recognising and Responding to Acute Deterioration Policy
OD 0657/16 WA Health Consent to Treatment Policy

14. Policy Framework

Clinical Governance, Safety and Quality

15. Appendix

Appendix 1: Removal of regional analgesia catheter

This document can be made available in alternative formats on request for a person with a disability

Contact:	Program Officer Clinical Practice Standards		
Directorate:	Medical Services	**EDRMS Record:**	ED-CO-21-30045
Version:	1.00	**Date Published:**	28 January 2021

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Appendix 1: Removal of regional analgesia catheter

15.1 General information

Ensure that there is a valid order for removal documented on the MR170K WACHS Regional Analgesia Prescription and Additional Observation Record.

Give alternate analgesia prior to removal if indicated.

Removal can be performed by a nurse/midwife who has the skills, knowledge and experience in managing and removing regional analgesia catheters.

15.2 Relevant policy documents

- WACHS Aseptic Technique Policy
- WACHS Hand Hygiene Policy
- WACHS Infection Prevention and Control Policy
- WACHS Specimen Collection (including Phlebotomy) and Pathology Results Clinical Practice Standard
- WACHS Waste Management Policy

15.3 Equipment

- Trolley
- Dressing pack
- Sodium Chloride 0.9% sachet
- Clear occlusive dressing e.g.: Tegaderm™

Additional items if indicated:

- Pathology request
- Sterile scissors and labelled specimen container
- Wound swab

15.4 Procedure

1. Confirm order for removal on the MR170K
2. Confirm patient identification
3. Explain the procedure to the patient
4. Position the patient comfortably so that the site is easily accessible
5. Perform hand hygiene
6. Remove dressing and tape
7. Observe for signs of infection at insertion site - collect wound swab if indicated
8. Perform hand hygiene
9. Clean the insertion site with Sodium Chloride 0.9%
10. Withdraw the catheter using aseptic technique, avoid contamination of the tip
    - If resistance is felt when removing the catheter, halt the procedure and contact the APS Nurse/Anaesthetist for advice
11. Inspect catheter to ensure that the tip is complete
    - If tip not intact, save the tip and contact the APS Nurse/Anaesthetist for advice

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12. If the patient is febrile and a tip specimen has been requested by the APS nurse/Anaesthetist, use sterile scissors to cut the tip from the catheter and place it in the labelled specimen container
13. Apply clear occlusive dressing to the insertion site
14. Dispose of waste as per WACHS Waste Management Policy

15.5 Post removal

- Document the removal details of the catheter on the MR170K
- If indicated - complete the microbiology request and send it with the specimen/s to pathology
- Observe and document in the healthcare record the status of the site each shift for 24hours. Escalate for review if signs of infection or haematoma or any other anomalies
- Dressing can be removed after 24hours
- If discharged within the post-removal 24hr period, refer to discharge information below and adhere to any vital sign observations if top-up or bolus given prior to removal of the regional catheter

15.6 Discharge information

Patients to be given instructions (written where possible) regarding:

- insertion site assessment – check for signs of infection: redness, warmth, tenderness
- care of site (e.g. dressing – if needs changing or if in-situ, when to remove)
- ongoing tingling or numbness – what is expected and what to do if remains longer than advised
- when and whom to seek medical advice from

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