

Short title: Major regional analgesia

1. Overview

This document is intended to apply to central neuraxial blocks and all other techniques where a catheter is inserted and left in situ, or where a significant dose of local anaesthetic is administered, such that systemic toxicity may occur due to absorption or inadvertent intravascular injection. It is not primarily intended to include superficial peripheral nerve blocks such as facial or digital nerve blocks, or low volume local anaesthetic procedures such as small areas of skin infiltration, although many of the principles may still apply.

The purpose of these guidelines is to facilitate the management of major regional blocks including epidural, subarachnoid, plexus and nerve blocks, and to reduce the likelihood of adverse outcomes and complications which may be associated with such blocks including, but not limited to, cardiovascular collapse, seizures, hypotension, allergic reactions, ventilatory impairment, impaired consciousness, haematoma, infection, abscess and nerve damage. The guidelines also outline practices to minimise the risk of wrong site block.

Major regional analgesia may be initiated for pain management alone, such as providing analgesia in labour or in the perioperative setting for the provision of perioperative analgesia. This may be combined with, but is distinct from, regional anaesthesia which is initiated for surgical interventions and which requires continuous presence of an anaesthetist (see *PS53(A) Position statement on the handover responsibilities of the anaesthetist*). In some instances analgesia may follow on from anaesthesia as a continuation of the technique.

2. General principles for the management of major regional analgesia

- 2.1 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 and the contraindications to its use is essential for safe conduct of these procedures. Prompt treatment of side effects or complications may be critical.
- 2.2 Complications of major regional analgesic techniques may occur due to the physiological changes resulting from nerve blocks, adverse effects from the drugs administered (local anaesthetic, opioid and adjuvant medications), or problems associated with placement of the needle and/or catheter.

Complications may also occur as a result of accidental injection of the incorrect substance such as antiseptic solutions used to prepare the skin, or a contaminated substance such as local anaesthetic drugs contaminated by antiseptic. It is critical that systems and protocols are in place to eliminate these possibilities.

Inadvertent wrong site block may have consequences in addition to unnecessary patient discomfort: local anaesthetic toxicity, complications of performing a second block, inability to provide optimal analgesia and the possibility of proceeding to wrong site surgery.

- 2.3 Informed consent from the patient consistent with *PS26(A) Position statement on informed consent for anaesthesia or sedation* should be obtained prior to the institution of any regional analgesia. With respect to major regional analgesia such discussion should include but not be limited to: nerve injury, drug toxicity, haemodynamic changes, bleeding or bruising, infection, failed or incomplete analgesia or post-dural puncture headache. It is recognised that the timing of obtaining consent in some circumstances may not be ideal (for example, pain relief in the post anaesthesia care unit (PACU) or in labour ward (see item 4.2 below)), however, it can often be facilitated by appropriate prior discussion with the patient. Documentation of such consent is recommended.
- 2.4 Initiation of major regional analgesia requires appropriate assistance. This assistance should be in accordance with *PS08(A) Position statement on the assistant for the anaesthetist*, or in the case of a delivery suite, a suitably trained registered midwife.
- 2.5 Initiation of major regional analgesia needs to be undertaken in an environment consistent with *PS55(A) Position statement on minimum facilities for safe administration of anaesthesia in operating suites and other anaesthetising locations*.
- 2.6 Infection control measures to be followed, including the use of a sterile field, facemask, gloves and gowns where appropriate, are stated in *PG28(A) Guideline on infection control in anaesthesia*. Skin preparation should be conducted in such a manner that agents used for skin preparation are unable to contaminate drugs or equipment used for neural blockade.
- 2.7 Clinical assessment of the patient's coagulation status and anticoagulant medications is required in all circumstances as many regional analgesic techniques may have serious complications in the presence of a coagulopathy, for example, epidural hematoma, and retroperitoneal haematoma from lumbar plexus blocks. Laboratory investigations should be undertaken where appropriate however it should be noted that potent antiplatelet medications, direct thrombin inhibitors and anti-factor Xa drugs are of particular concern because their effects are not readily reversible nor always evident on standard coagulation tests.
- 2.8 Intravenous access should be obtained prior to commencement of major regional analgesia and in most circumstances maintained for the duration of administration of medication for that analgesia.
- 2.9 In addition to monitoring for any specific patient needs, monitoring during establishment of major regional analgesia should include frequent and regular blood pressure measurement, respiratory rate, and conscious state evaluation. An electrocardiograph and pulse oximeter should be available. Oxygen should be administered in the presence of sedation. This level of monitoring should be continued for at least 30 minutes or until the patient's vital signs are stable. Subsequent monitoring depends on the block and drugs used and the clinical circumstances (see item 3.3.1). Institutional protocols must be applied. In general this should include regular assessment of heart rate, blood pressure, sedation, pain, and motor block as indicated by the clinical circumstances.
- 2.10 Prior to performing a regional block, a "block time out" should be performed. This requires verification of the site and side of the proposed block with another clinician (nurse/anaesthesia technician or medical practitioner) prior to performing the block. This verification requires identification of the patient and check of the surgical consent form, identification of a surgical site mark, discussion with the patient (when possible) and placement of a mark close enough to the block site to be visible while performing the block. The proceduralist should then pause just prior to needle insertion to reverify the presence of the anaesthesia site mark and verbally confirm the site and side with the assistant. There should be a pause before needle insertion for each new block site if patient position is changed or the blocks are separated in time.

- 2.11 After initiating the regional block it is the responsibility of the proceduralist to remain immediately available until a satisfactory block has been achieved, the patient is stable, and the potential for immediate complications has passed. If the technique has been instituted for anaesthesia as well as subsequent analgesia, the anaesthetist must be present for the duration of that surgical procedure or until handover to another practitioner in accordance with *PS53(A) Position statement on the handover responsibilities of the anaesthetist* has occurred.
- 2.12 Major regional analgesia remains the responsibility of the initiating proceduralist who may delegate subsequent management of the patient to another medical practitioner, health practitioner, registered nurse or registered midwife, provided that these personnel have received the required training, ongoing education and reaccreditation. Institutions offering major regional analgesia services should provide competency-based teaching, and accreditation or reaccreditation programs for staff involved in management of patients undergoing continuous epidural analgesia. The proceduralist must ensure that the environment for ongoing care of the patient complies with college guidelines.
- 2.13 A record of the technique, including method, drugs and dose used, complications or problems encountered should be documented in the patient's medical record by the proceduralist. In addition, instructions for the subsequent management of the patient should be provided. These include drug orders and monitoring requirements. Prescription of all analgesic drugs is the responsibility of the proceduralist.
- 2.14 Written protocols and procedures should be in place for the continued management of each technique, its side effects and common complications. Formal institutional protocols and guidelines for each technique are recommended.

3. Specific principles for the continued management of major regional analgesia in hospital wards

In addition to the general principles listed above, the safe and effective management of major regional analgesia, using repeated intermittent bolus doses or continuous infusions of analgesic drugs via a catheter, requires the following:

- 3.1 Catheters or giving sets used for continuous maintenance of analgesia should be clearly labelled so as to be unambiguously identifiable, minimising the risk of mistaken connection or drug administration errors. Tubing colour should be unique to regional analgesic infusions wherever possible.
- 3.2 When infusion pumps are utilised, they should be dedicated to use for regional analgesia infusions only and clearly marked as such. In order to minimise the risk of inadvertent delivery of excessive amounts of analgesic drug the maximum rate of infusion, and the maximum size of bolus dose that can be delivered by the pump should be limited according to the specific dosage limits for each technique. An infusion pump designed for regional analgesic infusions, in particular with a maximum infusion rate limit, should be used wherever possible.
- 3.3 Tailoring of analgesic regimens to the individual patient requires that regular assessments of adequacy and adverse effects of analgesic drugs or techniques are performed and documented.
 - 3.3.1 Monitoring and recording may include a selection from the following parameters: blood pressure, heart rate, temperature, respiratory rate, pain scores, sedation score, oxygen saturation, urinary output, sensory levels and motor function.
 - 3.3.2 Optimal assessment and control requires patient feedback, use of self-reported measures, frequent assessment of pain intensity and the effect of interventions. Tools

are also available to help assess pain in unconscious or sedated patients, cognitively impaired or young children. Where feasible, pain is best evaluated when assessed both at rest and during activity. Unexpected levels of pain, or pain that suddenly increases, may signal the development of a new physical problem such as compartment syndrome, for example, or psychological distress. In the case of epidural or intrathecal analgesia, back pain or nerve root pain may signify the presence of an epidural abscess or haematoma (see also item 3.3.4).

- 3.3.3 Protocols for the recognition and treatment of adverse effects, whether pharmacological or physiological, resulting from the use of analgesic drugs including local anaesthetic, opioid, or adjuvant medication, should be available.
- 3.3.4 Protocols for the recognition and management of complications resulting from dural puncture and the use of indwelling catheters should be available. In the case of epidural or intrathecal analgesia, these complications may include postdural puncture headache, epidural abscess, epidural haematoma and spinal cord or nerve root compression. Any unexpected neurological deficit should be investigated promptly because in the latter cases, urgent management is essential for optimal outcomes. Should imaging be required, magnetic resonance imaging is preferable to a computed tomography scan. It should be remembered that epidural abscess may present some days after the procedure. In continuous peripheral nerve block techniques, suspected infected catheters should be removed and cultured.
- 3.3.5 The presence of epidural catheter insertion site infection and systemic pyrexia indicate a need for heightened consideration of the possibility of epidural space infection.
- 3.4 The proceduralist or delegate, whether a suitably trained practitioner or an acute pain service, should review patients ideally on a daily basis and more often if clinically indicated. Such a review may include an assessment of neurological function, and inspection of the catheter insertion site for signs of inflammation/infection. It should also include a review of the patient's medications, especially with regard to anticoagulants. The proceduralist, or delegate, should remain available for consultation or management of complications at all times. After termination of major regional analgesia, follow-up assessment is desirable.
- 3.5 A protocol for catheter removal that relates the timing of removal to the timing of administration of anticoagulant medication, or in the presence of a coagulopathy, should be available. A registered nurse, midwife, or other staff member, with the necessary training, may remove the catheter on the orders of the proceduralist. Details of the removal of the catheter, the date, time, and state of the catheter and its tip, as well as the state of the insertion site, should be documented in the patient's record.
- 3.6 Surgical and/or other medical staff caring for the patient should be aware of the analgesic technique used, its potential complications and any specific implications for the surgery performed or other management issues for the patient. The need for appropriate consultation with specialised pain management staff should be communicated to other medical staff.
- 3.7 Adequate transitional analgesia should be prescribed for patients and consideration should be given to ensuring that pharmacological interactions are avoided such as systemic opioids given shortly after subarachnoid morphine causing late respiratory depression.

4. Specific principles for regional analgesia in obstetrics

In addition to the principles listed above, safe regional analgesia in labour requires adherence to the following principles:

- 4.1 Epidural and subarachnoid analgesia have the potential to change many of the normal physiological processes of labour and delivery. From the time that regional analgesia is instituted, it is essential that the woman is under the care of a medical practitioner with obstetric training who can assess her as necessary, and rapidly effect delivery of the baby by whatever technique is indicated.
- 4.2 The proceduralist establishing regional analgesia is required to establish that the woman has consented to the procedure after having been informed about advantages, disadvantages including possible complications, and alternatives. Ideally information about pain relief options for labour, including regional analgesia should be part of antenatal education for the woman.
- 4.3 The services of a qualified interpreter, who is not a family member, should be engaged wherever possible, when necessary to assist with consent (as per *PS26(A) Position statement on informed consent for anaesthesia or sedation*). In addition, an interpreter may be required to assist in communication between the proceduralist and the patient during the performance of the procedure, assessment of the procedure, and any subsequent management issues related to the regional analgesia.
- 4.4 Skilled staff and monitoring equipment are required throughout regional analgesia in labour, to ensure care for both woman and foetus, and for management of any complications arising.
- 4.5 Following delivery of the baby, the woman should continue to be monitored until all effects of the block have subsided.

5. Equipment and staffing

- 5.1 It is desirable that equipment to assist nerve location be available if appropriate, for example, ultrasound and/or peripheral nerve stimulator, consistent with *PS55(A) Position statement on minimum facilities for safe administration of anaesthesia in operating suites and other anaesthetising locations*.
- 5.2 Consideration should be given to the availability of a lipid emulsion, which may be effective in resuscitation of circulatory collapse due to local anaesthetic toxicity, used in conjunction with advanced cardiac life support.¹
- 5.3 Equipment and staffing of the area in which the patient is being managed should satisfy the requirements of the relevant Australian and New Zealand College of Anaesthetists professional documents, where appropriate.

This document is accompanied by a background paper (PG03(A)BP) which provides more detailed information regarding the rationale and interpretation of the Guideline.

Related ANZCA documents

PS02(A) Position statement on credentialling and defining the scope of clinical practice in anaesthesia

PS04(A) Position statement on the post-anaesthesia care unit

PS08(A) Position statement on the assistant for the anaesthetist

PG09(G) Guideline on procedural sedation

PG18(A) Guideline on monitoring during anaesthesia

PS26(A) Position statement on informed consent for anaesthesia or sedation

PG28(A) Guideline on infection control in anaesthesia

PG41(PM) Guideline on acute pain management

PS53(A) Position statement on the handover responsibilities of the anaesthetist

PS55(A) Position statement on minimum facilities for safe administration of anaesthesia in operating suites and other anaesthetising locations

Reference

The Association of Anaesthetists of Great Britain and Ireland. Management of severe local anaesthetic toxicity. London: The Association of Anaesthetists of Great Britain and Ireland, 2010. *This reference has been superseded by: Association of Anaesthetists. Quick reference handbook. Guidelines for crises in anaesthesia. Association of Anaesthetists; 2023 [cited 2024 Jan]. Available from: <https://anaesthetists.org/Quick-Reference-Handbook> Accessed 26 Feb 2024. Note: this updated reference has not yet been reviewed by ANZCA.

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