



OBSTETRICS AND GYNAECOLOGY
CLINICAL PRACTICE GUIDELINE

Arterial line management

Scope (Staff):	WNHS Obstetrics and Gynaecology Directorate staff
Scope (Area):	KEMH Perioperative Services, Adult Special Care Unit, Labour and Birth Suite (in selected clinical circumstances)
This document should be read in conjunction with this Disclaimer	

See [SCGH/OPH Nursing Practice Guideline 34: Arterial Line Management](#).

Please note that this guideline is for clinical information only. Information contained in it regarding contacts and paperwork (forms) are not applicable for WNHS. In addition, refer to WNHS infection prevention policies.

See also appendix below for some procedures that expand on the SCGH/OPH guideline instructions for WNHS use.

WNHS specific information

Infection prevention principles

For all procedures in this guideline, observe [WNHS infection prevention policies](#) for:

- [Hand Hygiene](#) before and after any manipulation of vascular access devices or catheter sites.
- [Aseptic Technique](#) as required. Strict aseptic technique should be followed during insertion and management.
- Standard Precautions. See [Standard and Transmission Based Precautions](#) policy.
- Personal protective equipment (PPE) should be worn during the insertion and removal of an arterial line and for whenever the arterial line is accessed.

Documentation

Document elements:



- Document insertion in digital medical record (DMR) progress notes and/or (depending on where inserted) MR300 Anaesthetic Chart
- And commence Peripheral Intravascular Cannula Observation Record (MR820)
- Acute Care Observation and Response Chart (MR731 / MR731.01)

Elements:

- Insertion date and time
- Assessment of perfusion distal to arterial line
- Dressing, line and transducer changes (type, date and time)
 - Label the line as per 'Minimum Requirements for Labelling Invasive Monitoring Lines' (section 5.3.1) within ACSQHC National Standard for User-applied Labelling of Injectable Medicines Fluids and Lines (external website). Include:
 - Route- red 'Intra- ARTERIAL' label.¹ Place near the arterial blood sampling port.
 - Line commencement date and time.
- Removal date and time



Additional information- specific to WNHS

- Location: Patients with arterial lines are only cared for in ASCU, outside of theatre, and in LBS in selected clinical circumstances (e.g. labouring with arterial line).
- Patient information: Discuss the need to immobilise the wrist where the arterial line is insitu where possible and that if any bleeding or changes in sensation to the distal part of the hand to alert staff.
- Scope: Assistance to the Medical Officer performing the procedure to be provided by staff (e.g. Registered Nurse or Midwife) familiar in arterial line management.
- Ensure the sodium chloride 0.9% 500mL solution has been checked by two authorised staff (e.g. Registered Nurses / Midwives / Medical staff). See Pharmacy guideline [Medication Administration](#) for full list of second check staff.
- Blood samples:
 - Should only be taken when clinically indicated.
 - **5mls** of blood is discarded when taking blood for sampling at WNHS
- Visualisation and monitoring:
 - The arterial line is to be transduced at all times.
 - Outside of the operating theatre, the insertion site should remain in sight at all times. Regular evaluation of the neurovascular status distal to the arterial insertion site is required. Tingling, paraesthesia, capillary refill >3 seconds, or a cool pale limb require urgent medical review to prevent neurovascular injury.
 - Alarms must be audible and set appropriately for all arterial line monitoring.¹

- Monitor the continuous flush system (patency check) four hourly to maintain pressure level at 300mmHg.
- Tape around the borders may be required (e.g. Fixomull®). Ensure the transducer line is not covered by additional dressings.
- The dressing must allow close site monitoring for signs of arterial thrombosis, haematoma, arterial perforation, catheter kinking or dislodgement.
- Removal:
 - If removal request is not documented, check with the Duty Anaesthetist whether removal may occur.
 - Apply digital pressure for a minimum of 5 minutes or until bleeding has ceased.¹
 - The **cannulation site should be observed for 48 hours post removal** (including peripheral circulation distal to the access site) and documented on the Peripheral Intravenous Cannula Observation Record (MR820).
 - Anticoagulated patients may require prolonged digital pressure.
 - If a firmly applied sterile pressure dressing is required care is taken not to encircle the wrist or impede venous blood flow.
 - **Note:** Femoral arterial catheters are higher risk and are not part of this guideline, seek specialist advice prior to the procedure for removal.

References

1. Sir Charles Gairdner Osborne Park Health Care Group [SCGOPHCG]. Nursing practice guideline (NPG 34): Arterial line management Nedlands, WA: SCGOPHCG. 2023. Available from: https://healthpoint.hdwa.health.wa.gov.au/policies/Policies/NMAHS/SCGH/SCGOPHCG.NPG.Arterial_Line_Management.pdf
2. Joanna Briggs Institute [JBI]. Arterial line: Management: JBI. 2022. Available from: https://ovidsp-dc1-ovid-com.kelibresources.health.wa.gov.au/ovid-new-a/ovidweb.cgi?&S=JJOLFPOEOFACDOCDKPKJNFPMBLGEAA00&Link+Set=S.sh.21%7c4%7csl_1_90

Related external policies, legislation and standards

[ACSQHC National Standard for User-applied Labelling of Injectable Medicines Fluids and Lines](#)

Related WNHS policies, procedures and guidelines

[Transfusion Medicine](#) guidelines (blood sampling)









Pharmacy: [Medication Administration](#) policy and procedure

[Infection Prevention and Management policies](#): [Aseptic Technique](#), [Hand Hygiene](#), [Standard and Transmission-Based Precautions](#)

Useful resources (including forms)

Forms

- MR300 Anaesthetic Chart
- MR731 ASCU Observation Chart
- MR731.01 Obstetric Acute Care Observation and Response Chart
- MR820(KEMH) / MR120.2(OPH) Peripheral Intravascular Cannula Observation Record

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Version history

Version number	Date	Summary
n/a	Prior to Jan 2017	Archived. From Sept 2007 were previously individual guidelines. Contact OGD Clinical Guideline Coordinator for previous versions.
1	Jan 2017	History: Amalgamated six individual guidelines on arterial lines dating from Sept 2007. No content changed at this time.

		<p>Supersedes:</p> <ol style="list-style-type: none"> 1. (A4.5.1) Insertion of an Arterial Line (dated July 2014) 2. (A4.5.2) Dressing of an Arterial Line Insertion Site (amended Jan 2015) 3. (A4.5.3) Flushing and Monitoring of an Arterial Line (amended Jan 2015) 4. (A4.5.4) Changing the Transducer of an Arterial Line (dated July 2014) 5. (A4.5.5) Removal of an Arterial Cannula (date amended Jan 2015) 6. (A4.5.6) Arterial Blood Gas Sample Collection (amended Jan 2015)
2	Oct 2018	<ul style="list-style-type: none"> • Wear PPE during insertion, removal and whenever line accessed • Equipment list updated- Biopatch and suture material optional • Monitoring section: Removed requirement to obtain printout of systolic and diastolic pressures at end expiration • Sampling arterial lines: Prior to sample, collect ≥5mL blood and dispose
3	Oct 2023	<ul style="list-style-type: none"> • Reformatted; Content condensed; Links to SCGH/OPH arterial line guideline for guidance with WNHS specific information remaining. • Line label- include date / time. Links to ACSQHC standard. • Option added to use CHG Gel Tegaderm™ • Nurse / midwife helping with insertion to be familiar with arterial lines • Educate the patient to immobilise the wrist where arterial line insitu and to inform staff if bleeding or distal limb sensation changes • New chart in use- Acute Care Observation and Response Chart • Do not cover transducer lines with dressing that interferes with visibility • Clear priming caps have been replaced with red caps • Removal- <ul style="list-style-type: none"> ○ If not documented, check with the Duty Anaesthetist whether removal may occur ○ Document removal date and time and condition of site ○ Observe site for 48 hours post removal and document on PIVC Observation Record

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Appendix 1: Procedural information in addition to SCGOPHCG guideline

Transducer set up

1. Assemble the pressure monitoring set. All assembled equipment should be prepared for use prior to line insertion.
2. Ensure flush system is free of air bubbles and all parts are primed with fluid.
3. Ensure pressure bag is inflated to 300mmHg, all priming caps replaced with those provided by the manufacturer and connections are secure.
4. Following insertion of the catheter by the Medical Officer, attach the arterial transducer line using a non-touch technique.
5. Label as per labelling requirements at beginning of this guideline.
6. Ensure sampling port is in "ON" position, and that the transducer is attached to the pressure cable and monitor and that there is an identifiable trace line.
7. Once the arterial cannula has been secured, apply Biopatch® (optional) and transparent dressing or CHG Gel Tegaderm™ dressing to the catheter over the insertion site. Reinforce borders with tape e.g. Fixomull®.
8. Ensure transducer line is secured to the patient with tape to provide support. The line should not be covered with any part of the arterial cannula dressing.
9. Zero the arterial line. See 'Flushing and Monitoring' section in this document.

Flushing and monitoring: Background information

(see also [SCGOPHCG Arterial Line guideline](#) section 'Maintenance of Arterial Line')

1. Electronic monitoring requires an:
 - Indwelling arterial catheter attached to high-pressure tubing (non-distensible) - this reduces distortion between the intravascular device and transducer. This pressure is converted to electrical energy and recorded as a waveform
 - Transducer to convert the arterial pressure into an electrical signal.
 - Flush system, recording device, amplifier and display monitor.
2. Accuracy is dependent on:
 - Levelling the transducer and altering this level with patient changes in position.
 - Measurements are taken with the patient supine or semi-recumbent to 45 degrees.
 - Zeroing the transducer to atmospheric pressure and fast flush wave testing.
 - The transducer is levelled to the reference point of the **phlebostatic axis** (at the intersection of the 4th intercostal space and the mid thoracic anterior-posterior diameter). The phlebostatic axis is an external landmark used to identify the level of the atria in the supine patient

3. The cannulated site should be visible and the catheter firmly secured.
Access and visibility may be maintained by use of a splint (ventral surface of the forearm with dorsiflexion of the wrist).
4. Monitor the access site and limb distal to the catheter for complications².
Haematoma, thrombus, arterial spasm, paraesthesia or tingling may indicate neurovascular problems. Symptoms require urgent review as potentially may lead to permanent impairment or loss of limb. Other potential complications include air embolism, accidental disconnection or accidental drug administration.
5. Changing the transducer: Replacing/securing the administration set should not impede evaluation of the cannulation site.

Equipment

- Pressure bag
- Monitoring system
- Mediswab
- Splint
- Sterile disposable transducer and administration set
- Tape
- Sterile gloves
- Flush solution: Sodium chloride 0.9% 500mL

Procedure

PROCEDURE	ADDITIONAL INFORMATION
<p>1.1 Explain the procedure to the woman and gain verbal consent. Position the patient supine or if appropriate at 45 degrees.</p>	<p>The first reading should be attended with the woman supine. Unless the woman is very sensitive to orthostatic changes, thereafter, positions up to 45 degrees can produce similar results to supine positioning.</p>
<p>1.2 Position the stopcock nearest the transducer, level with the phlebostatic axis.⁴</p>	<p>It is recommended that the transducer be taped to the woman's chest at the phlebostatic axis. If mounted on a bedside pole realign after any patient repositioning.</p>
<p>1.3 To zero the equipment:</p> <ul style="list-style-type: none"> • Open the stopcock to room air (closed to the patient) and flush the system • Press the Zero button on the relevant pressure module • Observe the monitor for a flat line and a zero reading • When the above occurs, close the 3-way tap and replace the cap. 	<p>Zeroing the transducer is required:</p> <ul style="list-style-type: none"> • At set up or line changes • At insertion of the line • After disconnection of the pressure cable from the transducer or monitor • When the accuracy of the reading is questioned • At the commencement of each shift

PROCEDURE	ADDITIONAL INFORMATION
1.4 Observe and assess the quality of the monitor trace. Perform a dynamic response test (fast flush square wave testing) once per shift (every 8-12 hours) and when the system is opened to the air or when accuracy is questioned.	Checks the dynamic response of the monitor to signals from the blood vessel and on the subsequent haemodynamic pressure values.
1.5 The fast flush device within the system, when triggered, will produce a waveform on the monitor that rapidly rises and squares off before pressure drops back to baseline	This test is interpreted by the clinician for both speed and pattern.
1.6 Record the pressure measurement on the Acute Care Observation and Response Chart (MR731 / MR731.01)	

QRG arterial blood sample collection

1. **Prepare** equipment, perform hand hygiene and don PPE.
2. **Explain** procedure to the woman, **silence alarms** and **turn 'off'** the 3 way tap to the woman.
3. **Remove cap** from the 3 way tap and **clean** exposed port with an alcohol swab.
4. **Collect at least 5mL of blood** by placing a 5 mL syringe on exposed port and turning 3 way tap **'on'**.
5. **Turn 'off'** 3-way tap to the woman, remove and **dispose of syringe** appropriately.
6. **Aspirate 1mL of blood** by attaching the ABG syringe to the exposed port and turning tap **'on'** to the woman.
7. **Turn 'off'** the 3 way tap to the woman, **remove and expel any air** from ABG syringe. **Replace cap** on tip of syringe.
8. **Flush side port:** Turn the 3 way tap so flush comes through the side port. Flush until clear.
9. **Flush line to woman:** Rotate the 3 way tap to enable the line to be flushed to the woman. Flush several times for no longer than 2 seconds at a time until the line is clear of blood.
10. **Clean** the side port with an alcohol swab and **replace cap**.
11. **Return** the 3 way tap to its original position and ensure the **arterial trace** is identifiable. Zero the transducer after blood sampling.
12. **Label** the woman's blood sample at the bedside:
 - Time and date of collection, patient name and UMRN.
13. Place in laboratory specimen bag with appropriate pathology request form completed.