HAEMODYNAMIC MANAGEMENT

Mastering Arterial Line Placement

A COMPREHENSIVE SERIES

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ARTICLE ONE
THE EXPANDING ROLE OF NURSES IN ARTERIAL LINE PLACEMENT

The healthcare landscape is evolving rapidly, and so are the roles of nurses and allied health professionals. One of the most significant shifts in recent years has been the expansion of nursing responsibilities into areas traditionally reserved for physicians—such as the insertion of arterial lines. This change is not just a matter of convenience; it's a strategic response to workforce challenges, technological advancements, and the growing complexity of patient care.

Why this shift matters?

Historically, arterial cannulation was the domain of doctors. However, with the implementation of the **European Working Time Directive** and the **Modernising Medical Careers** initiative in the UK, junior doctors' hours have been reduced. This has created a need for other healthcare professionals to step in and fill the gap—particularly in acute and critical care settings.
Nurses, especially those in advanced roles such as **Advanced Critical Care Practitioners (ACCPs)**, have risen to the challenge. With appropriate training and supervision, they are now performing arterial line insertions safely and effectively, contributing to faster interventions and improved patient outcomes.

Professional and legal responsibilities

With expanded roles come expanded responsibilities. Nurses must navigate a complex web of professional, legal, and ethical obligations. According to the **Nursing and Midwifery Council (NMC)**, nurses are accountable to:

- **Their patients** – ensuring safety, dignity, and informed consent
- **The public** – upholding trust in the profession
- **Their profession** – maintaining standards and competencies
- **Their employer** – adhering to institutional policies and protocols

The NMC encourages professional development but emphasises that it must be done **safely and within scope**. Nurses must be able to justify their actions and demonstrate evidence-based practice at all times.

For **Allied Health Professionals (AHPs)**, the **Health and Care Professions Council (HCPC)** sets similar expectations, requiring continuous professional development and adherence to ethical standards.

"You must keep your knowledge and skills up to date and relevant to your scope of practice through continuing professional development."
(Health Care Professionals Council Standards of Conduct and Ethics)

The importance of competency-based training

Achieving competency takes time. Performing supervised insertions helps build the necessary skills and confidence. This hands-on experience is supported by a structured portfolio that includes:

- Theoretical knowledge
- Reflective practice
- Supervisor assessments
- Documentation of procedures and outcomes

This approach ensures that practitioners are not only technically proficient but also understand the **why** behind each step-critical for safe and effective care.

Conclusion

The expansion of nursing roles into arterial line placement is a testament to the adaptability and professionalism of today's healthcare workforce. With the proper training, support, and governance, nurses and AHPs are not just filling gaps—they are elevating standards of care.

As this series continues, we will explore the anatomy, techniques, and clinical considerations that underpin safe and effective arterial cannulation. We encourage you to explore the entire seven-part series or download the full articles as a single PDF.

ARTICLE TWO
ANATOMY & SITE SELECTION – GETTING THE BASICS RIGHT

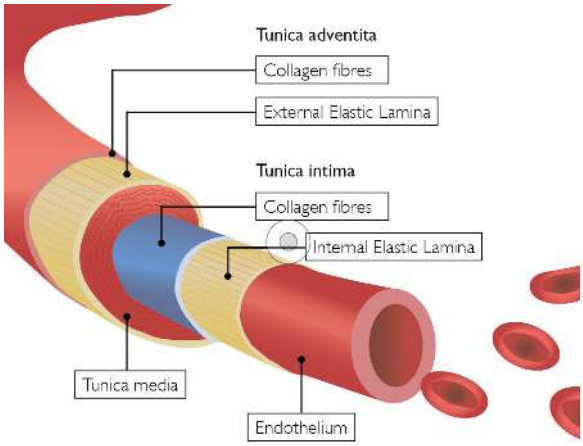
Understanding the foundation of safe arterial cannulation

Behind every successful arterial line insertion lies a solid understanding of anatomy and site selection. These aren't just academic concepts—they're critical to patient safety, procedural success, and long-term outcomes. Whether you're at the start of your practice or refining your technique, mastering the anatomical landscape is essential.

The structure of arteries: more than just tubes

Arteries are composed of three distinct layers, each with a specific function and clinical relevance:

1. **Tunica intima** – The innermost layer, made of smooth endothelial cells. It facilitates blood flow and prevents the formation of blood clots. Trauma to this layer during cannulation can trigger platelet adhesion and thrombus formation.
2. **Tunica media** – The middle layer, rich in smooth muscle and elastic fibres. It allows the artery to constrict and dilate. This layer is often responsible for vasospasm during attempts at cannulation.
3. **Tunica adventitia** – The outermost layer, composed of connective tissue and nerve fibres. It provides structural support and protection.



Understanding these layers helps clinicians minimise trauma during insertion and reduce complications like thrombosis or arterial spasm.

Choosing the right site: a strategic decision

Not all arteries are created equal when it comes to cannulation. Here's a breakdown of the most commonly used sites:

Radial artery – the gold standard

- **Why it's preferred:** Superficial, easily palpable, and has strong collateral circulation via the ulnar artery.
- **Best for:** Most adult patients in ICU or theatre settings.
- **Tip:** Always perform an Allen's test to confirm adequate ulnar flow before cannulation.

Ulnar artery – use with caution

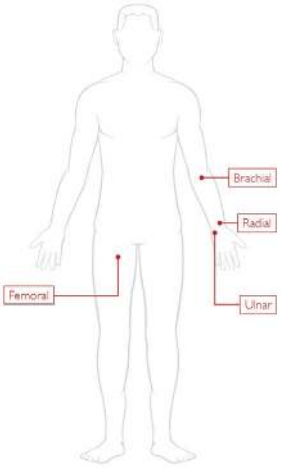
- Historically avoided due to difficulty in palpation and higher complication rates.
- Now viable with ultrasound guidance, especially in patients with ulnar dominance.

Brachial artery – larger but riskier

- Easier to cannulate due to size, but lacks collateral circulation.
- **Risk:** Occlusion can lead to significant limb ischemia.

Femoral artery – last resort

- Useful in emergencies or when peripheral access fails.
- **Risks:** Higher infection rates and potential for catheter fracture if patient positioning is poor.



The role of ultrasound for arterial line placement

Ultrasound guidance is increasingly becoming the **standard of care** for arterial line placement. It improves first-attempt success rates, reduces the number of punctures, and minimises complications.

- **Transverse view**: Shows the artery as a round structure ideal for identifying location.
- **Longitudinal view:** Allows real-time visualisation of the needle entering the vessel.

Key principles

- **Basic physics:** High-frequency sound waves reflect off tissues and are converted into real-time images.
- **Probe use:** Proper orientation and positioning are essential. Transverse views show vessels as circles; longitudinal views show them as lines.
- **Frequency selection:** Use high-frequency probes for superficial vessels to maximise resolution.

Ultrasound not only improves procedural success but also enhances patient safety when used with proper training and technique.

Conclusion

Anatomy and site selection are not just the first steps, they're the **foundation** of safe and effective arterial cannulation. By understanding the structure of arteries and choosing the right site with purpose and intent, clinicians can reduce complications and improve outcomes.

ARTICLE THREE
CHOOSING THE RIGHT DEVICE FOR THE RIGHT PATIENT

Optimising outcomes through proper device selection

Arterial cannulation is not just about technique—it's also about choosing the correct device for the right patient. The type, size, and design of the arterial catheter can significantly influence the accuracy of monitoring, the risk of complications, and the overall success of the procedure. In this section, we explore how to make informed decisions about device selection to ensure optimal outcomes.

Why device selection matters

Arterial lines are used primarily for:

- **Continuous blood pressure monitoring**
- **Frequent arterial blood sampling**

But not all devices are created equal. Factors such as **dwell time**, **signal quality**, and **patient-specific risks** must be considered when selecting a catheter.

Indications and contraindications

Indications for arterial line placement include:

- Continuous and accurate blood pressure monitoring
- Frequent arterial blood sampling for blood gas analysis.
- Avoiding repeated needle sticks in critically ill patients

Contraindications

There are no absolute contraindications to arterial line placement, but if any of the below are present, then senior medical opinion should be sought before proceeding.

- Thromboangiitis obliterans (Buerger disease)
- Raynaud's syndrome
- Atherosclerosis
- Coagulopathy
- Inadequate collateral flow
- Infection at the cannulation site
- Burn at the cannulation site
- Previous surgery in the area
- Synthetic vascular graft
- Presence of AV fistula.

Understanding Dwell Time

The **expected duration** of arterial line use should guide your device choice:

- **Short-term use (hours to 1–2 days)**: A standard cannula may suffice.
- **Longer-term use (several days):** A Seldinger catheter is preferred due to its longer length and reduced risk of dislodgement.

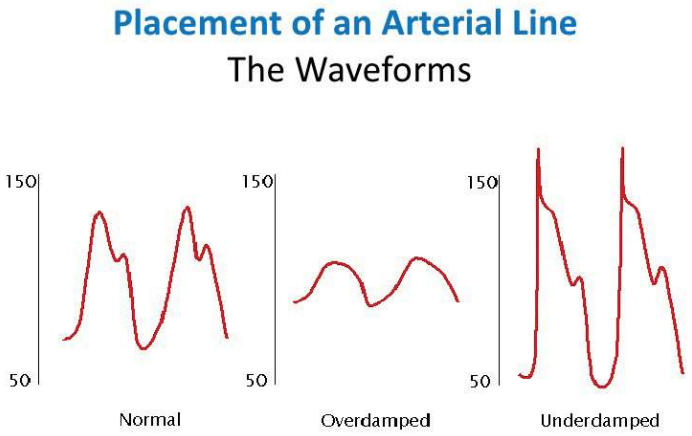
Seldinger catheters have been shown to maintain accurate pressure readings and reliable access for longer periods compared to shorter cannulas.

Signal quality: the damping dilemma

When using an arterial line for continuous blood pressure (BP) monitoring, signal quality is crucial. Poor signal transmission can lead to inaccurate readings and clinical misjudgements.

- **Over-damping**: Causes underestimation of systolic and overestimation of diastolic pressure.
- **Causes:** Bubbles, clots, kinks, long/narrow tubing.
- **Under-damping**: Causes overestimation of systolic and underestimation of diastolic pressure.
- **Causes:** Rigid, non-compliant tubing.

Solution: Use a catheter with the correct **gauge** and **pliancy.** A **20G catheter** is typically ideal for the radial artery in adults—wide enough to reduce the risk of thrombus, yet small enough to preserve vessel integrity.



The top device options

There are several options available; however, fundamental arterial line systems should include the following:

1. **Option one**
- Classic Seldinger technique
- Polyethylene material for accurate waveform
- Red hub for easy identification

2. **Option two**
- Non-Seldinger (over-the-needle) arterial cannula
- Direct insertion with integrated flashback for rapid confirmation
- Simplified design for quick deployment in routine cases

These systems are designed to support both clinical accuracy and safety.

Clinical tips for device selection

- Match catheter **length and gauge** to the artery and patient size.
- Choose a device that supports **critical damping** for accurate waveform.
- Consider **blood sampling needs** - some systems are better suited for frequent draws.
- Always prime the system and check for air bubbles before connection.

Conclusion

Device selection is a critical, often under appreciated, component of arterial line placement. By aligning your choice with the patient's clinical needs, expected dwell time, and anatomical considerations, you can improve accuracy, reduce complications, and enhance patient safety.

ARTICLE FOUR
PATIENT ASSESSMENT & CONSENT – A CRITICAL FIRST STEP

Laying the groundwork for safe arterial line insertion

Before a needle touches the skin, a thorough patient assessment and clear communication are essential. These early steps are not just procedural—they are foundational to patient safety, ethical practice, and clinical success. In this section, we explore how to assess patients for arterial line insertion and how to approach consent, even in high-pressure environments.

Why assessment matters

Arterial cannulation is an invasive procedure. While generally safe, it carries risks that can be mitigated through careful pre-procedural evaluation. A well-conducted assessment helps clinicians:

- Identify contraindications
- Choose the most appropriate site
- Anticipate complications
- Build trust with the patient or their family

Key factors to assess before insertion

The following factors should be considered before inserting an arterial line.

Medical history

- Diabetes – May affect vascular integrity and healing
- Peripheral vascular disease – Increases risk of thrombosis or occlusion
- Raynaud's syndrome – Contraindicated due to poor peripheral circulation
- Previous surgeries or trauma – May alter anatomy or compromise access

Local considerations

- Infection or burns at the proposed site
- Previous arterial line placements (especially within the last 2 weeks)
- Presence of AV fistulas or grafts

Cognitive and physical status

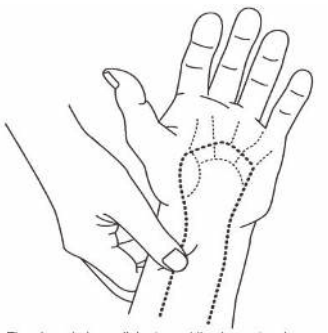
- Is the patient conscious and able to give consent?
- Can they cooperate with positioning and remain still during the procedure?

The Allen's test: a simple but vital check

Before radial artery cannulation, it's essential to confirm that the hand has adequate collateral circulation via the **ulnar artery**. The **modified Allen's test** is a quick bedside assessment:

1. Ask the patient to clench their fist (or close it for them).
2. Occlude both the radial and ulnar arteries using firm pressure.
3. Ask the patient to open their hand—it should appear pale.
4. Release pressure on the ulnar artery only.

Thumbs occlude radial and ulnar arteries. Pallor is produced by clenched fist.



Thumb occludes radial artery while ulnar artery is released and patent. Unclenched hand returns to baseline colour because of ulnar artery and connecting arches.

- **Positive test:** Hand flushes within 15 seconds - proceed with radial cannulation.
- **Negative test:** No flush - avoid radial artery on that side.

If the test is negative, assess the other arm or consider an alternative site.

Communicating with the patient

Even in urgent settings, patients (or their families) deserve to understand what's happening. A clear explanation should include:

- **Why** the arterial line is necessary
- **What** the procedure involves
- **Risks:** bleeding, infection, occlusion, discomfort
- **Expected duration** of the line
- **What to expect** during and after the procedure

In emergencies or with unconscious patients, verbal consent may not be possible. In such cases, document the clinical justification and proceed in the patient's best interest.

Documentation essentials

Record the following in the patient's notes:

- Assessment findings (e.g., Allen's test result)
- Site selection rationale
- Consent discussion (or reason for implied consent)
- Any anticipated challenges or precautions

Conclusion

Patient assessment and consent are not just checkboxes—they are acts of clinical diligence and respect. By taking the time to evaluate risks, communicate clearly, and document thoroughly, clinicians lay the foundation for a safe and successful arterial line insertion.

ARTICLE FIVE
INSERTION TECHNIQUES – FROM PREPARATION TO DOCUMENTATION

Executing arterial cannulation with precision and confidence

Arterial line insertion is a high-skill procedure that demands both technical precision and clinical awareness. Whether you're using the direct puncture method or the Seldinger technique, success hinges on preparation, sterile technique, and a structured approach. In this section, we walk through the whole insertion process—from setup to documentation—highlighting best practices and safety tips.

Reducing pain during procedures

Several techniques can be used to help to reduce the pain of the procedure. Helping the patient to relax can lessen the awareness of pain.

Local anaesthesia

Local anaesthetic should be infiltrated subcutaneously around the site of cannulation immediately before insertion of the arterial cannula. Lidocaine is the most frequently used injectable local anaesthetic and comes in different concentrations (0.5%, 1% and 2%). 1% or 2% can be used for arterial line insertion.

There are potential risks of local anaesthesia, including:

- Allergic reactions, including anaphylaxis
- Inadvertent injection into the vascular system
- Obliteration of the artery

Despite the use of local anaesthesia, the insertion of an arterial catheter can be an uncomfortable or painful procedure. The patient will often experience a significant amount of pressure, so psychological support is important.

Two techniques, one goal: safe access

There are two primary methods for arterial line insertion:

1. Direct puncture method

- The catheter is advanced directly over the needle into the artery.
- Limitation: Higher failure rate due to difficulty advancing the catheter, even with flashback.

2. Seldinger technique (preferred)

- A guidewire is inserted through the needle, followed by the catheter.
- **Benefits:** Higher success rate, longer dwell time, and reduced trauma.

Use the Seldinger technique for patients with difficult access, paediatrics, or those requiring long-term monitoring.

The Seldinger approach

1. A needle gains access to the artery, confirmed with flashback
2. A wire is inserted through the needle, maintaining the arterial access,
3. The needle is removed
4. The catheter is threaded over the wire into the artery lumen
5. The wire is withdrawn.

The Seldinger technique should be used for the following patients:

- Those with a history of difficult access
- Those with anticipated difficult access. Paediatric patients due to a higher rate of artery occlusion influenced by repeated puncture attempts
- Those who require long-term access.

Step-by-step: the Seldinger technique

Equipment checklist:

- Absorbent pad for under limb
- Clean dressing trolley
- Gown
- Sterile dressing pack
- Chlorhexidine 2% (or alternative for those with allergy)
- Lidocaine or alternative local anaesthesia
- Sterile gloves
- 18 gauge blunt fill needle for withdrawing lidocaine
- 25 gauge needle for injecting lidocaine
- Suture or purpose made suture-less securement device
- Ultrasound probe (if used)
- Transparent semi-permeable dressing
- Syringes
- Arterial line
- Arterial line tubing (red line as an aid to identity), connected to three-way taps, transducer and pressure bag and flushed through
- Bag of 500ml 0.9% saline in a pressure bag, inflated to 300mmHg
- Three-way taps
- Transducer.

Patient preparation

1. Introduce yourself
2. Verify patient identity
3. Assess patient, including drug allergies, current blood counts and past medical history
4. Explain the procedure and gain consent
5. Palpate the radial artery and check the collateral circulation
6. Position the patient's wrist by hyper-extending the wrist.

Insertion procedure

1. Complete patient assessment and gain consent
2. Set trolley using sterile technique
3. Assess patient and choose an adequate insertion site by palpation and with the use of ultrasound
4. Position the patient's wrist by hyper-extension
5. Wash hands
6. Put on sterile gloves
7. If using ultrasound, prepare the probe. Squeeze sterile gel into the base of the sterile cover and ask assistant to drop the probe inside
8. If using local anaesthetic, place the 18G needle onto the syringe
9. Withdraw lidocaine from vial. Remove the 18G needle and replace it with a 25G needle
10. Clean the insertion site with chlorhexidine and allow the solution to dry

11. Prime the 25G needle with the lidocaine and infiltrate the subcutaneous tissue around the proposed s entry
12. Palpate the artery; ensure the bevel of the needle is facing up. With the needle directed proximally, puncture the skin at approximately 30-degree angle
13. Slowly advance the needle until flashback is noted
14. Reduce the angle between the needle and the skin to about 20 degrees. Advance the guidewire into the artery. There should be no resistance when the wire leaves the needle. Never force the wire and never withdraw the guidewire back through a needle once advanced
15. Hold onto the guidewire as you remove the needle
16. Whilst maintaining contact with the guidewire, thread the catheter over the wire and use a gentle rotating motion to advance the catheter all the way up to the hub
17. Remove the guidewire
18. Ensure the arterial line tubing is flushed through and free of air bubbles.
19. Connect the arterial line tubing to the catheter and secure it tightly
20. Flush the catheter to ensure patency and observe the arterial waveform on the monitor
21. Secure the catheter in place and apply transparent dressing
22. Clean up the tray, disposing of sharps and dirty gloves appropriately
23. Record the procedure in the patient notes.

Maintaining aseptic technique

Use **Aseptic Non-Touch Technique (ANTT)** throughout the procedure. For Seldinger insertions, **a surgical ANTT** approach is required, including sterile gown, gloves, and drapes.

Zeroing the transducer

Prior to documentation, the arterial line needs to be calibrated. To do this, the line needs to be zeroed. Zeroing is required immediately after insertion and if there are issues with the reading of the arterial wave form.

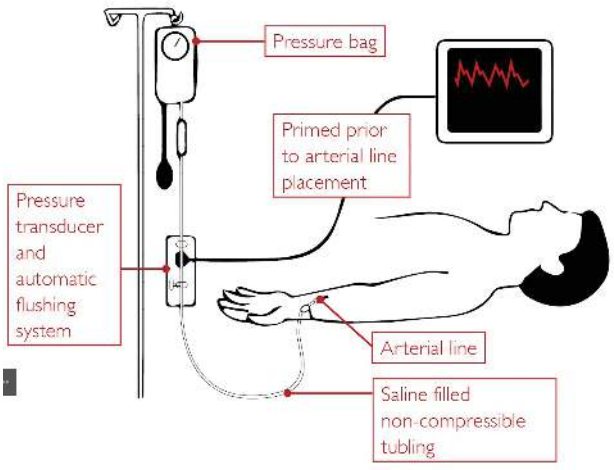
To zero the line:

- Place the transducer at the same level as the phlebostatic axis
- Open the transducer stopcock to measure atmospheric pressure
- Press Zero button on the monitor.

Documentation essentials

Accurate documentation is crucial for ensuring patient safety and providing legal protection. You should record:

- The artery accessed
- If ultrasound was used
- Skin decontamination used
- Ease of insertion or complications encountered
- Number of attempts
- Device information
- Number of attempts to successful insertion
- Device information.



Conclusion

Mastering the insertion technique is about more than just getting the line in—it's about doing it safely, efficiently, and with full clinical awareness. By following a structured approach and maintaining a sterile technique, clinicians can reduce complications and ensure high-quality care.

ARTICLE SIX
COMPLICATIONS – PREVENTION, RECOGNITION, AND MANAGEMENT

Staying ahead of the risks in arterial cannulation

Staying Ahead of the Risks in Arterial Cannulation

While arterial line insertion is a routine procedure in critical care, it is not without risk. Even with proper technique and training, complications can occur—some minor, others potentially life-threatening. The key to safe practice lies in anticipating these risks, recognising early warning signs, and responding swiftly and appropriately. In this series, we explore the most common complications associated with arterial lines and how to prevent and manage them effectively.

Common complications and how to handle them

1. Infection

Cause: Infection is a significant complication associated with arterial lines, often underestimated. Despite being frequently handled in critical care, arterial catheters can be a source of bloodstream infections, with colonisation occurring via:

- **Extraluminal routes** (skin flora at the insertion site)
- **Intraluminal contamination** (hub manipulation)
- **Haematogenous spread** (from distant infections)

Risk factors include poor aseptic technique, inadequate skin disinfection, insecure catheter placement, and frequent line manipulation.

Microbial sources:

- **Resident flora** (e.g., S. aureus, S. epidermidis) - difficult to remove and can invade sterile sites.
- **Transient flora** - transferred via contact or contaminated surfaces.

Prevention:

- Strict **hand hygiene** before handling lines.
- Use of **Aseptic Non-Touch Technique (ANTT)** - surgical ANTT for Seldinger technique; standard ANTT for short-term cannulas.
- **Cutaneous antisepsis** with >0.05% chlorhexidine in 70% alcohol.
- Minimise line manipulation and ensure secure fixation.

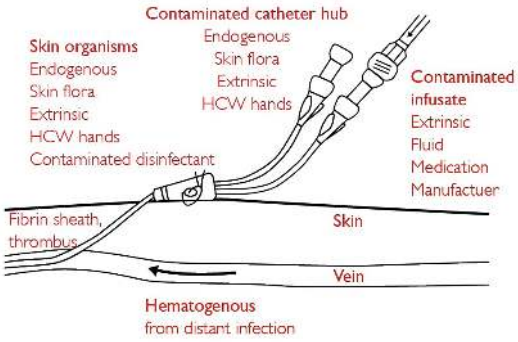
Management:

Suspected infection:
- Remove the arterial line if clinically indicated.
- Send catheter tip and blood cultures for microbiological analysis.

Confirmed infection:
- Initiate appropriate antimicrobial therapy.
- Monitor for signs of systemic involvement (e.g., sepsis).

Prevent recurrence:
- Review insertion and maintenance protocols.
- Educate staff on infection control practices.

By adhering to these practices, clinicians can significantly reduce the risk of arterial line-associated infectio
and improve patient safety.



2. Air embolism

Cause: Entry of air into the arterial system through loose connections or unprimed tubing.

Signs:

- Over-dampened arterial waveform
- Tachycardia, hypotension
- Tachypnoea
- Loss of consciousness

Prevention:

- Prime all tubing before connection
- Avoid prolonged flushing
- Ensure all connections are tight

Management:

- Call for urgent medical assistance
- Tighten all connections
- Monitor patient closely

3. Arterial occlusion or thrombosis

Cause: Trauma to the vessel wall or catheter occupying too much of the lumen.

Signs:

- Cold, pale limb distal to insertion
- Loss of arterial waveform
- Pain, numbness, or paralysis
- Absent pulse

Prevention:

- Use a 20G catheter for radial access
- MMinimisetrauma during insertion
- Ensure adequate flushing

Management:

- Remove the catheter immediately
- Seek urgent vascular or medical review

4. Haemorrhage

Cause: Dislodgement of the catheter or loose connections in the system.

Signs:

- Visible bleeding
- Hypotension, tachycardia
- Cardiac arrest (in severe cases)

Prevention:

- Secure the catheter properly
- Keep the site visible
- Maintain pressure bag at 300 mmHg

Management:

- Apply direct pressure
- Re-secure or replace connections
- Monitor vital signs and escalate care

5. Accidental drug injection

Cause: Mistaking the arterial line for a venous access point.

Signs:

- Immediate pain or discomfort
- Mottled skin
- Absent pulse or limb dysfunction

Prevention:

- Never administer drugs via an arterial line
- Use red tubing and clear labelling
- Educate all staff on arterial line identification

Management:

Call for urgent help

- Attempt to aspirate the drug
- Monitor for ischemic complications

6. Haematoma:

Cause: Inadequate pressure post-insertion or removal.

Signs:

- Swelling and bruising at the site
- Pain or discomfort

Prevention:

- Apply firm pressure for at least 5 minutes after removal
- Avoid multiple puncture attempts

Management:

- Apply pressure
- Monitor for progression
- Document and report

Conclusion

Complications from arterial lines are rare but can be serious. The best defence is a proactive approach: know the risks, follow best practices, and act quickly when problems arise. With vigilance and preparation, clinicians can ensure arterial cannulation remains a safe and effective tool in critical care.

ARTICLE SEVEN
POST-INSERTION CARE, MAINTENANCE & SAFE REMOVAL

Protecting the line and the patient after placement

The work doesn't end once the arterial line is in place. In fact, the post-insertion phase is just as critical as the insertion itself. Proper care and maintenance are essential to prevent complications such as infection, occlusion, or dislodgement. And when the line is no longer needed, safe removal ensures patient comfort and minimises risk. In this final article of the series, we explore best practices for maintaining and removing arterial lines.

Post-insertion monitoring: what to watch for

Once the line is secured, regular monitoring is essential. Clinicians should assess:

- Limb perfusion: Check for cyanosis, cool skin, sluggish capillary refill, or decreased pulse.
- Signs of displacement: Swelling, bleeding, loss of waveform, or fluid leakage.
- Signs of infection: Redness, pain, pus, swelling, or fever.

The insertion site should always be visible and inspected at every shift change.

Dressing and site care

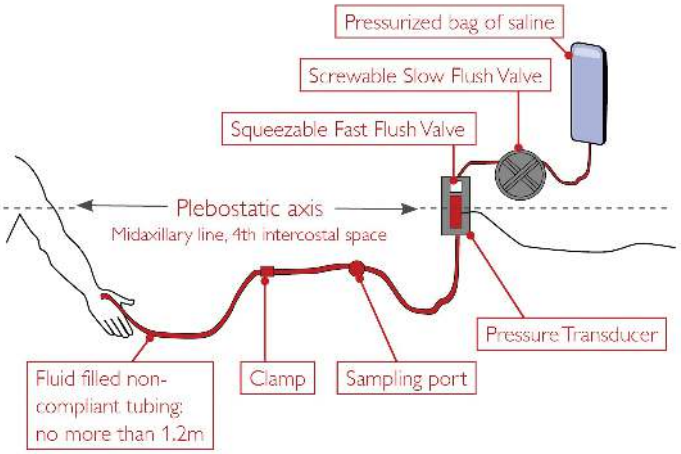
A well-maintained dressing protects the site and reduces infection risk. Follow these principles:

- Use transparent, semi-permeable dressings to allow visual inspection.
- Change dressings when:
- Soiled or loose
- Integrity is compromised
- Cannula is kinked underneath
- Use an aseptic non-touch technique (ANTT) during dressing changes.
- Secure the catheter with sutures, steri-strips, or a suture-less securement device.

Maintaining catheter patency

A pressurised intravascular infusion is required to maintain arterial line patency.

- Administer a continuous infusion at 0.5-2mls/hr either via a pressure bag
- Infusion solutions should be with 0.9% sodium chloride (INS 2016)
- Do not use infusion solutions containing glucose
- The infusion pressure should be higher than the intra-arterial systolic pressure. It is usually maintained at 300mmHg
- Manual flushing of the intra-arterial administration set should be kept to a minimum
- Always fully flush the line after blood sampling until no blood is visible at the hub



- The administration set should be changed every 96 hours or when clinically indicated
- Minimise the number of manipulations of the system
- Minimise the number of devices (such as three-way taps) inserted into the system
- Use a closed system to reduce blood loss and risk of bloodstream infection
- Only use specific arterial line tubing (with a longitudinal red line) to aid identification. This also has the correct pliancy to achieve critical damping.

Safe removal: when and how

Devices should be removed as soon as they're no longer required or if they are causing the patient harm (Loveday 2014). Only competent practitioners should remove arterial lines. The procedure should be explained to the patient, and their consent gained. It is important to check the most recent coagulation blood tests prior to removal. Patients with abnormal results or pre-existing severe clotting disorders may require infusions before arterial line removal.

Arterial lines should be removed when:

- No longer clinically necessary
- Signs of infection or occlusion are present
- The patient's condition improves, and invasive monitoring is no longer required

Equipment needed:

- Dressing trolley (cleaned, with disposal bag attached)
- Plastic apron
- Non-sterile gloves
- Sterile basic dressing pack
- Stitch cutter (if required)
- Transparent, semi-permeable

Removal procedure:

Patient Preparation:

- Check patient identity
- Check patient coagulation status
- Explain procedure
- Gain consent.

Prepare trolley:

- Wash hands with soap and water
- Open sterile pack onto clean trolley
- Drop all necessary equipment onto pack.

Remove old dressing:

- Decontaminate hands with alcohol rub and put on non-sterile gloves
- Loosen and remove all dressings
- Remove using ANTT and avoid touching the insertion site.

Clean site:

- Place sterile wrapping of the dressing out as the sterile field
- Clean exit site with skin cleaning solution
- Allow the site to completely dry.

Removal process:

- Cut retaining sutures if present
- Position the sterile gauze just above the insertion site
- Slowly withdraw the arterial catheter
- Using the sterile gauze, immediately apply pressure for up to 5 minutes
- Apply a sterile dressing or pressure dressing over the arterial line site.
- If infection is suspected, send the catheter tip for culture.

Documentation checklist

After removal, document:

- Date and time of removal
- Reason for removal
- Condition of the site
- Any complications
- Patient response
- Actions taken (e.g., culture sent, pressure applied)

Conclusion

Post-insertion care and safe removal are vital components of arterial line management. They protect the patient from avoidable harm and ensure the benefits of arterial monitoring are not overshadowed by preventable complications. With vigilance, skill, and adherence to best practices, clinicians can close the loop on safe and effective arterial cannulation.

Thank you for following the Mastering Arterial Line Placement series. If you'd like a compiled version of all seven articles in PDF format, you can download it below.

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FOR FURTHER INFORMATION, PLEASE CONTACT: **info@vygon.co.uk**

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