PROCEDURE

Peripheral arterial line - infants

A peripheral arterial line is a thin catheter placed in an infant's artery for continuous blood pressure monitoring and blood sampling.

PURPOSE
Continuous blood pressure monitoring and repeated arterial blood sampling

PROCEDURE TYPE
Diagnostic - minimally invasive bedside catheter placement

WHERE IT IS DONE
At the bedside in neonatal or paediatric intensive care

ANAESTHESIA
Local anaesthetic and comfort measures; sedation uncommon

HOW LONG IT TAKES
About 15-30 minutes for uncomplicated placement

PREPARATION
Usually no fasting; medicines and limb circulation reviewed

RECOVERY
Immediate; monitored while the line remains in place

MAIN RISKS
Bleeding, infection, artery blockage, reduced limb circulation

RESULTS
Blood pressure immediately; blood test timing depends on test

Overview

A peripheral arterial line is a thin, flexible tube placed into an artery in an infant's arm or leg. It is also called an arterial catheter or "art line."

Unlike a standard blood pressure cuff, the line measures blood pressure continuously with every heartbeat. It can also be used to take blood without repeatedly putting a needle through the skin. This is helpful when an infant needs frequent tests, including arterial blood gases, which measure oxygen, carbon dioxide, and blood acidity.

Common sites include an artery at the wrist, foot, or ankle. The line is connected to fluid-filled tubing and a monitor. It is not normally used to give medicines, nutrition, or routine intravenous fluids.

Why the procedure is performed

An arterial line may be offered when an infant needs close monitoring in a neonatal or paediatric intensive care unit. Reasons include:

The line is usually considered when intermittent cuff readings or occasional blood tests do not provide enough information. It is not normally needed for a stable infant who requires only one or two blood samples.

- Measuring blood pressure continuously during serious illness or surgery
- Checking how the infant is responding to treatment
- Taking frequent blood samples while reducing repeated needle sticks
- Measuring oxygen, carbon dioxide, and acidity accurately
- Monitoring an infant receiving breathing or blood pressure support

Who should and should not have it

An arterial line may be suitable for an infant who needs continuous blood pressure readings, repeated arterial blood tests, or both. The healthcare team should remove it when that level of monitoring is no longer needed.

Placement may be avoided or delayed if the proposed limb already has poor blood flow, a blood clot, significant swelling, a blood vessel abnormality, or previous injury or surgery affecting circulation. A site with infection, broken skin, or a burn is generally avoided.

Bleeding problems can increase the risk of bruising or continued bleeding. The team will consider platelet counts, clotting test results, and medicines that affect clotting when relevant.

Sometimes no suitable peripheral artery can be found. In an emergency, the need for accurate monitoring may outweigh some of these concerns, but the team should still choose the safest practical site.

You can ask why the line is recommended, which artery will be used, how long it may be needed, and what alternatives are reasonable for your infant.

How to prepare

A peripheral arterial line is often placed urgently at the bedside, so little preparation may be needed. The treating facility's own instructions take priority over the general information here.

Most infants do not need to stop feeding solely because of arterial line placement. Feeding may already be restricted because of the infant's illness, breathing support, planned surgery, or possible sedation.

Tell the team about known bleeding or clotting conditions, allergies to antiseptics or dressings, and any previous problems with blood flow in the arms or legs. The team will examine the proposed limb and may compare its colour, warmth, pulses, and blood flow with the other side.

Comfort measures may include swaddling, a pacifier, sucrose when appropriate, and local anaesthetic. Stronger sedation is not usually required just for this procedure, but an infant may already be receiving pain relief or sedation for other care.

What happens during the procedure

Your infant is positioned so the chosen wrist, foot, or ankle can be kept still. Monitoring continues throughout the procedure.

The clinician cleans the skin with an antiseptic and uses sterile equipment. They may locate the artery by feeling its pulse or by using ultrasound. A small needle is passed into the artery, and a very thin catheter is guided through the needle or over a guidewire. The needle is then removed.

The catheter is connected to special tubing containing sterile fluid. A pressure sensor changes the pulse inside the artery into a waveform and blood pressure reading on the monitor. The system is levelled and checked so that the reading is accurate.

The line is secured with a dressing and sometimes an armboard or other support. Staff then check that the fingers or toes beyond the line remain warm and normally coloured.

More than one attempt may be needed because an infant's arteries are very small. If the chosen site is unsuccessful or circulation becomes a concern, the clinician will stop and consider another site or another monitoring method.

Recovery and what to expect afterward

There is no separate recovery period from the arterial line itself. Your infant will continue to be monitored while the line remains in place.

Pain: The insertion can cause brief pain. Once secured, the line should not usually cause ongoing pain, although the area may be tender or bruised. Staff should assess unexplained crying, guarding, or discomfort.

Eating: The line itself does not prevent breast milk, formula, or other nutrition. Feeding decisions are based on your infant's overall condition and other treatments.

Activity: Staff may support the limb to prevent bending, pulling, or accidental removal. Ask for help before repositioning, dressing, or holding your infant so the tubing is protected.

Driving: An arterial line does not create a driving restriction for a parent or caregiver. Infants generally remain in hospital while the line is in place, and discharge depends on the condition being treated.

Going back to work: The procedure itself does not determine when a caregiver can return to work. The infant's hospital stay and ongoing care needs are the important factors.

When the line is removed, pressure is held over the artery until bleeding stops. A small dressing is applied, and circulation in the limb is checked again.

Risks and possible complications

The team balances the need for close monitoring against the risks of leaving a catheter inside an artery.

Possible complications include:

Reduced circulation can injure tissue if it is not recognised promptly. Nurses regularly check the limb's colour, warmth, swelling, pulses, and capillary refill-the time taken for colour to return after gentle pressure on the skin.

Frequent blood sampling can also contribute to anaemia, especially in very small infants. The team should limit samples to those needed and use small collection volumes where possible.

- Bleeding, bruising, or a collection of blood under the skin
- Artery spasm, which temporarily reduces blood flow
- A blood clot or blocked artery
- A pale, cool, blue, or poorly perfused hand or foot
- Infection at the insertion site or in the bloodstream
- Accidental removal, disconnection, or blood loss
- Skin, tissue, nerve, or nearby structure injury
- Inaccurate readings if the tubing is blocked, kinked, or incorrectly positioned

Results and follow up

The blood pressure waveform and readings appear as soon as the line is connected and set up correctly. Staff compare them with the infant's condition and may sometimes confirm them with a blood pressure cuff.

Blood gas results may be available within minutes. Other laboratory tests can take longer, depending on what is being measured and whether the sample is processed on the unit or in a central laboratory.

Routine follow-up includes checking the insertion site, dressing, tubing, monitor waveform, and circulation beyond the catheter. The team also reviews each day whether the line is still needed. Prompt removal reduces the time during which infection, clotting, and circulation problems can develop.

After removal, staff continue checking for bleeding and normal limb circulation. A small bruise or puncture mark may remain temporarily.

Alternatives

The realistic alternatives depend on why continuous monitoring or repeated blood tests are being considered.

- Blood pressure cuff: Avoids placing a catheter, but provides readings only at intervals. Results may be less reliable in very small or unstable infants.
- Occasional arterial needle samples: Provides arterial blood gases without leaving a line in place, but each sample requires another needle puncture.
- Venous blood samples: Suitable for many laboratory tests and easier to obtain in some infants. Venous blood gases do not provide the same information about oxygen levels, and a vein cannot measure arterial blood pressure.
- Capillary heel samples: Less invasive and useful for selected small-volume tests. They can require repeated heel sticks and are not equivalent to arterial blood for every measurement.
- Umbilical arterial catheter: May be an option for some newborns soon after birth. It gives central arterial access but has its own risks and is not suitable for every infant or age.
- Clinical observation with less frequent testing: Avoids an arterial catheter but may not provide enough information when an infant is unstable or treatment is changing quickly.

When to call your healthcare team

While your infant is in hospital, tell the nurse promptly if you notice new redness, swelling, leaking, bleeding, a loose dressing, or signs that the line has been pulled.

Ask for an urgent assessment if the hand or foot beyond the line becomes pale, blue, unusually red, cold, swollen, or more painful, or if the fingers or toes move less than before. These changes can suggest reduced circulation or pressure on the limb.

Active bleeding that does not stop with firm pressure, rapid swelling around the site, or a disconnected line requires immediate help. Use the bedside call system rather than trying to reconnect or adjust the equipment yourself.

After line removal, routine questions about mild bruising or the dressing can be raised with the healthcare team. Seek urgent advice for continued bleeding, spreading redness, pus, fever, or a cool or discoloured limb. Call emergency services for severe bleeding or if your infant becomes unresponsive or has serious breathing difficulty.

Common questions

Will my baby be asleep?

Usually not for the arterial line alone. Local anaesthetic and infant comfort measures may be used. An infant who is critically ill, ventilated, or having another procedure may already be receiving sedation.

Can I drive my baby home afterward?

Placement does not restrict a caregiver from driving. However, an infant needing an arterial line usually remains in hospital. The clinical team will decide when discharge is safe based on the underlying condition.

How painful is it?

Needle insertion can cause brief pain, similar to other needle procedures. Keeping the limb still and using appropriate comfort or pain-relief measures can reduce distress. Ongoing pain should be assessed.

When will I know the results?

Blood pressure readings appear immediately once the system is working. Blood gas results are often available within minutes. Other blood test results may take longer.

Can I hold or feed my baby with the line in?

Often yes, if your infant's condition allows it. Ask staff to help protect the catheter and tubing

during holding, skin-to-skin care, feeding, or repositioning.

How long will the line stay in?

It stays only while continuous blood pressure monitoring or repeated arterial sampling is needed. The team reviews this regularly and removes the line when its benefits no longer outweigh its risks.

Sources

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