

Arterial Lines

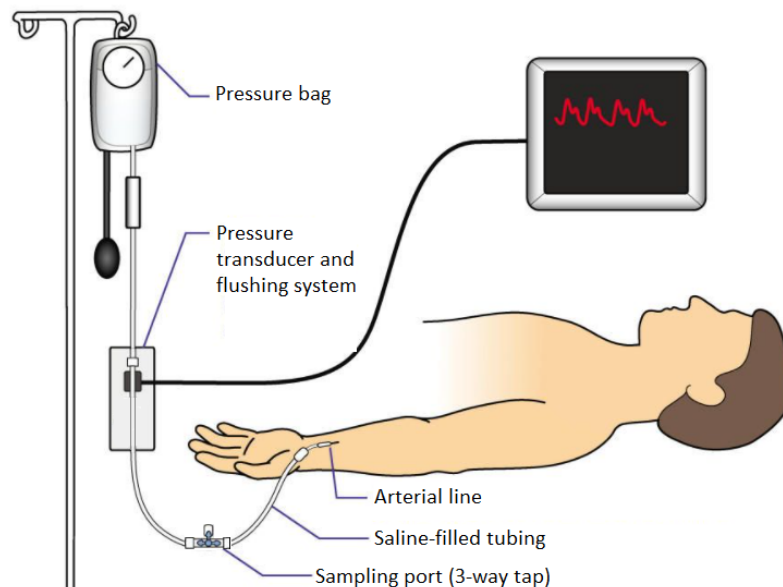
AKA - "art line", "A-line".

What is it?

A thin plastic catheter inserted into an artery - this is usually the radial artery but the brachial artery is also a common site.

The arterial catheter is attached sequentially to:

- A 3-way tap,
- A pressure transducer (placed at the level of the heart),
- An arterial giving set,
- And a bag of 0.9% saline, pressurised to 300mmHg

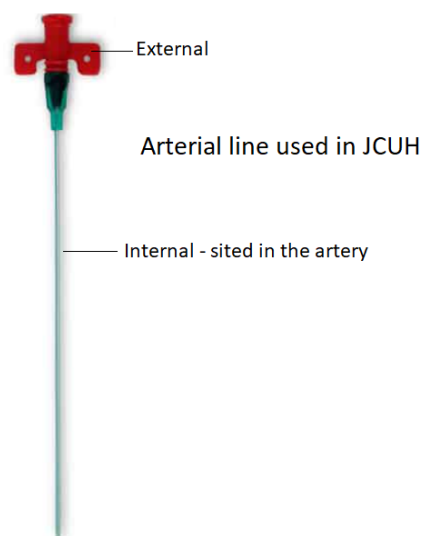
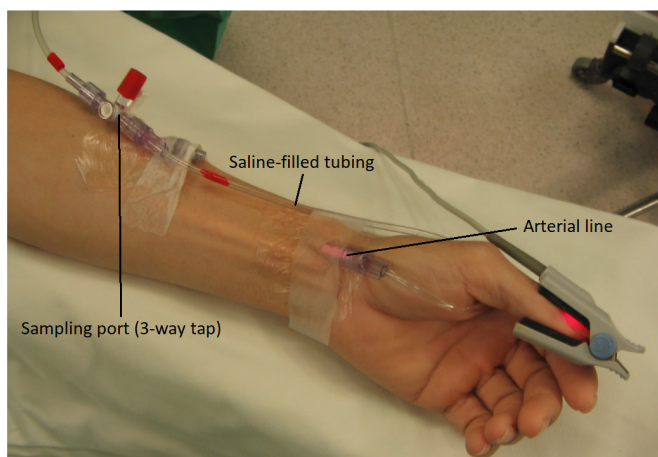


How does it work?

Fluid from the pressurised bag continuously flushes through the line at a slow rate (3-4ml/hr) to prevent occlusion of the line. Intra-arterial pressure is transmitted via this column of 0.9% saline in the line to a diaphragm in the transducer. This produces the arterial waveform displayed on monitoring devices.

By adjusting the 3-way tap, arterial blood can be aspirated for sampling. The first few mls of fluid should be discarded as this contains the saline flush. After the sample has been obtained, the line should be flushed again with saline from the pressurised bag.

What does it look like?



What does it do?

- Provides continuous, accurate 'beat-to-beat' blood pressure measurement in the critically unwell. This monitoring is useful when haemodynamic instability is present or predicted.
- Enables frequent blood sampling for ABG analysis and other lab tests.

What can go wrong?

The 3 most **common** complications and how to deal with them:

- Bleeding
 - Apply prolonged direct pressure
- Thrombosis of the artery causing distal ischaemia
 - Remove the line, consider vascular team input and anticoagulation.
- Infection (usually local soft tissue infection, line sepsis from an arterial line is uncommon)
 - Remove the line, consider blood cultures and antibiotics.
- Air emboli
 - Avoid introducing any air bubbles into the line, aspirate bubbles if they occur.

The most **serious** complication:

- Administration of medication through the arterial line. This may cause severe, irreversible damage to the hand.

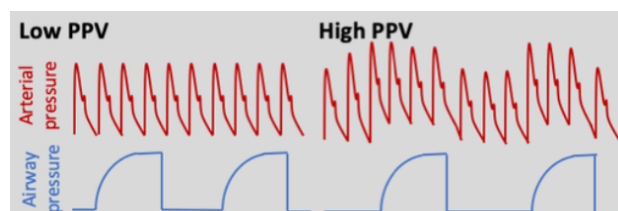
Key safety point

Never give medication or IV fluid through an arterial line.

Other notes

Pulse pressure variation ("swing" on the art line) may indicate hypovolaemia.

Arterial lines can be left in place for up to 28 days.



Further reading

https://www.ucl.ac.uk/anaesthesia/sites/anaesthesia/files/Arterial_Line.pdf

<https://derangedphysiology.com/main/cicm-primary-exam/required-reading/cardiovascular-system/Chapter%20758/arterial-line-pressure-transducer-setup>

<https://derangedphysiology.com/main/cicm-primary-exam/required-reading/cardiovascular-system/Chapter%20760/normal-arterial-line-waveforms#:~:text=it%20is%20generally%20believed%20that%20the%20peripheral%20dicrotic%20notch%20owes%20more%20of%20its%20shape%20to%20the%20vascular%20resistance%20of%20peripheral%20vessels%20than%20to%20the%20closing%20of%20the%20aortic%20valve.>

Image 1 - <https://intensivecarehotline.com/arterial-catheter/> 15/11/2021.