

Cannula tips and tricks

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| [emergency](#), [General medicine](#), [intensive care](#), [ontheponds](#)

James talks to Dr Ryan Downey about his cannula tips and tricks for the insertion of an intravenous cannula.

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About Dr Ryan Downey

Dr Ryan Downey completed his Residency at Royal Prince Alfred Hospital and is a Clinical Lecturer with the Department of Medicine at the [University of Sydney](#) and Senior Fellow in Anaesthetics at Royal Prince Alfred Hospital.

Ryan commenced his Staff Specialist position in [Anaesthetics](#) with a focus on Head and Neck, [ENT](#), Obstetric and Ophthalmic Anaesthesia in August 2015. He has a keen interest in medical education, particularly crisis simulation and assists in the Department of Anaesthetics Simulation Laboratory. Ryan has extensive experience in difficult [intravenous](#) cannulation.

Cannula Tips & Tricks

With Dr Ryan Downey, Consultant Anaesthetist at Royal Prince Alfred Hospital and Lifehouse, New South Wales, Australia

Introduction

Inserting cannulas is a bread-and-butter job that every junior doctor does. Dr Ryan Downey shares his tips and tricks from his experience.

Case

A nurse has asked you to insert a cannula.



1. Initial questions over the phone?

- Why does the patient need a cannula?
- What happened to the existing cannula? Is it tissue or requiring replacement?
- How urgent is this cannula? For blood transfusion, or IV antibiotics?

2. Outline your general approach

- **Preparation**

- Put tourniquet on, then draw up everything that is needed e.g. saline flush, bung, etc. and put in a sterile tray.
- Then inspect the patient for a good cannula site.
- Regarding the size of cannula to insert, it depends on the indication. Remember that the packaging of the cannula contains information on the flow rate. For routine fluids and antibiotics, a blue cannula (22G) should suffice; but for resuscitation situation for serious haemorrhage, consider a 16G or even a 14G cannula. Pink cannula is 20G, green is 18G, black is 16G and orange cannula is 14G.

- **Do you use local anaesthetic?**

- Dr Downey does, but it makes cannulation more difficult as local anaesthetic causes vasoconstriction.
- Consider the clinical context:
 - Big vein requiring small cannula? Local anaesthetic will be fine.
 - Emergency? Don't bother.
 - Elective cases requiring 20G or 18G? Ok to consider local anaesthetic.
- If using local anaesthetic, consider using a 27G needle e.g. insulin needle. No need to inject over the vein as the side will do. Inject a good volume and rub it down with your finger so that it spreads. The local anaesthetic works quickly so there's no need to wait before cannulating the patient.

- **How to select a preferred site for cannulation**

- Firstly, think about the patient comfort factor and what the cannula is used for.
 - Non-dominant forearm usually more comfortable.
 - Placing a cannula in the hand might disrupt eating.
 - Avoid placing cannula over the joint as it might kink the cannula causing the infusion alarm to go off frequently, thus disturbing patient's rest.
- Start distally first e.g. the hand, and move proximally if needed. Working proximal to distal will only cause fluids to ooze out of the proximal puncture holes if cannula inserted distally.
- The cubital fossa is a popular site (especially in the ED) because of the big veins good for taking bloods and putting an IVC in at the same time. However, there is a good chance that a smaller cannula (such as the blue 22G ones) may kink.
- Consider other clinical factors:

- Swollen arm due to DVT: placing an IVC there clearly contra-indicated because it would be difficult for fluids/antibiotics to go past the DVT.
- Lymphoedema risk e.g. in a patient with axillary clearance. IVC on the ipsilateral site is a relative contra-indication. Only do it as a last resort and following consultation with a surgical registrar.
- Potential haemodialysis patients: avoid the use of the cephalic vein (on the radial side) as this is potentially a site for AV fistula formation.

3. What is your approach to inserting a cannula?

- Start with ergonomics
 - Try to be directly in front of the vein.
 - Place patient inclined at 45 degrees, with arm and hand hanging over the side of the bed.
- Inspect the arm thoroughly and pick a reasonably sized vein that is straight. If you pick a vein that just fits for example a 22G cannula, the vein might become blocked if a 22G cannula is inserted.
- Tether the vein distally, not across, in order to straighten the vein
- Regarding mobile veins (veins that move under the skin) rub your finger across the vein at different points to locate an area where the vein is tethered to the skin. Make sure to tether the vein to increase your chances.
- Sometimes a cannula cannot be advanced into the vein despite flashback into the cannula for two reasons:
 - The cannula is against the sidewall of the vein and the vein is not completely straight.
 - Cannula is up against the valve of the vein.
 - A tip is to ensure that the cannula tip is retracted while the needle is in the vein, and then lift the needle up parallel to the skin and try advancing the cannula again. This should work most of the time. Flushing the cannula with saline does not usually work.

4. Approach to difficult patients

- Very important to put the tourniquet on early.
- Consider patient's ergonomics and positioning e.g. patient at 45 degrees with arm hanging over edge of bed.
- Then gentle tapping over the usual spots e.g. the sides of wrist and on the dorsum of the hand. If a small vein is seen, try tapping it to get it bigger.

- Another trick is to release the tourniquet and then reapply it. Histamine released from ischaemic tissues may cause veins to become more prominent.
- Use of heat to induce vasodilation. The main problem is it may take a long time (usually 30 minutes) for this to work properly. Use a warm blanket, or a warm saline bag, or a glove filled with warm water.

5. What are the common errors that junior doctors make?

- Time is usually a problem (rushing, etc.).
- Not putting the tourniquet on early.
- Incorrect checking, selection and preparation of veins.
- Tethering across the vein which actually flattens the vein.
- Inserting the needle through skin and vein in one movement. This increases the risk of penetrating the vein through to the other side. Better to make this into 2 movements: the first to penetrate the skin, and the second the vein.

6. Any tips on taking bloods from a newly inserted cannula?

- Take bloods through the cannula without the bung attached (and with tourniquet on), because drawing blood through the bung can cause haemolysis. Best to check which bungs can do that.
- Make sure the vein is the right size (the bigger the better) and don't attempt to draw blood through a 22G cannula with a 20ml syringe (the cannula lumen can potentially collapse due to the internal pressure thus stopping blood flow).

7. Any tips on reducing the risk of thrombophlebitis or infection?

- Hand hygiene is critical.
- Sterile no-touch technique is the best, although using the regular gloves with no-touch technique is also acceptable.
- Prepare the skin adequately with alcohol or chlorhexidine prior to cannulation.
- Always swab the bung with alcohol or chlorhexidine swabs before accessing the IVC.
- The risk of infection goes up significantly when IVCs stays in situ for longer than 72 hours. NSW has a guideline that requires all IVCs to be changed every 3 days.

8. Any suggestions on how to reduce the risk of needlestick injury?

- Needlestick injury typically happens from doing things you're taught not to do e.g. re-sheathing a needle or cannula.
- Make sure there is a sharps bin nearby for easy discard of needles, or a kidney dish or a tray to put needles in (and make sure you do not put your hand in the dish!). Re-draw or use a new cannula - better be safe than sorry.

9. What can a junior doctor do to escalate a difficult cannulation?

- Have a few goes first. Then get a second pair of eyes from a colleague to check for better veins, etc. Senior colleagues can also provide tips.
- If the anaesthetic registrar has to be called after the junior doctors and more senior doctors have tried and failed, the former will have some equipment that can be used for cannulation. E.g. ultrasound machine. The anaesthetic registrar can also try more central veins, e.g. external jugular vein, or consider putting a PICC line or a central line in depending on urgency and clinical need.

Take home messages

- Watch other people cannulate.
- Do not be afraid to change your technique.
- Take your time - the more care you take with selection and preparation of vein, the better success you will have.

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- [Intern survival tips and tricks](#)

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