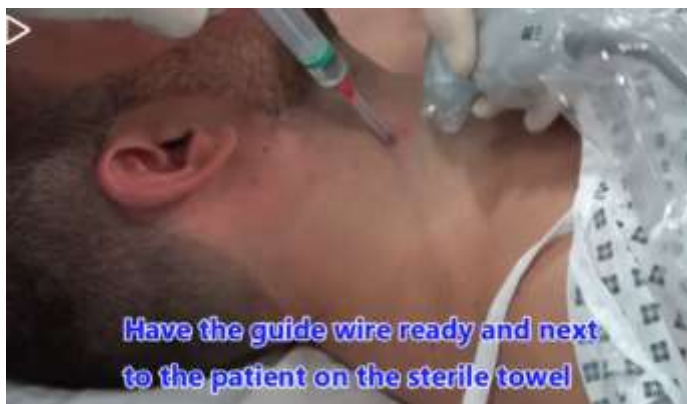


CVC Placement part 2 (part B)



[00:00:33] Ok, so now look at us putting the probe on here and you can see the important point is Tricia's used her hypothenar eminence with that little finger to fix her hand against the patient's clavicle. So if the patient moves, then the probe will move with them and also the probe will be kept still if Trish moves at all. So then similar thing once we're in the vein and we're not moving the needle. Look how she's fixed that

needle. It's not gonna move when the patient moves. So here we are again, fixed the ultrasound probe we're anchoring as we were at the beginning of the video. So here we are. Me being a bit cack handed, poking the needle on. But I'm fixing the needle against the patient's thyroid cartilage. And then look at the guidewire. The guidewire has already pulled through a little bit, and it's next to the patient. I'm not reaching backwards to find the guidewire on the trolley and then moving the needle. And I've just seen so many people do that when they were there pushing central lines and so have the guidewire ready on the sterile towel next to you with a little bit of it pulled through, as I've shown here. So you can just pick it up and immediately put it into the through the needle and into the vein.

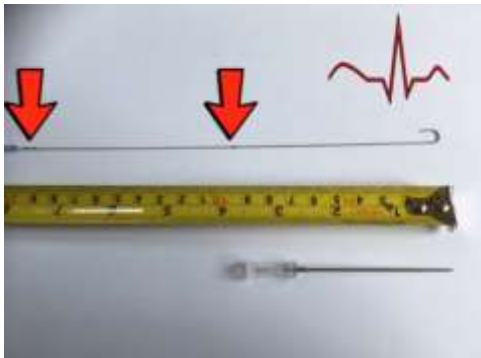


[00:02:15] The other aspects of guidewire placement to do with having somebody confirming that you're not irritating the heart by looking at the ECG as you advance the guidewire and also confirming the guidewire placement in that vein, I actually covered in the LocSSIP's video, which you'll also see in this series of videos.





[00:02:40] So there are two ways of advance in the guidewire. One is you can see here with the guide to being pushed straight from the blue introducer. Now, if you do this, you need to do it several times before you actually put it in the patient. And that's because it's quite stiff when it comes to the packet. And you'll find it difficult, particularly if you're wearing gloves, which, of course, you will be. It's quite difficult to advance the thing because it's stiff when it first comes out of the packet. So practice it a few times while just setting up before you actually start to place the line. But the other way you can do this is what I tend to do, is to pulled the guidewire about 11 centimetres beyond the its holder. Then you can just advance it as a single movement like we can see here. So a single movement, you pick it up and then just slide to 10cm. And it doesn't really matter whether it's been stiff in the packet or not. So the guidewire has sent markings at 10 centimetres and 20 centimetres. And you need to look at these as you advance in the guidewire. If the guidewire won't advance much beyond 10 centimetres then that means that the needle has unfortunately come out of the vein. So you need to remove the guidewire and then pulled back on a syringe through the needle and just check whether any blood's coming out and redirect the needle until you have a good blood flow and then try again.



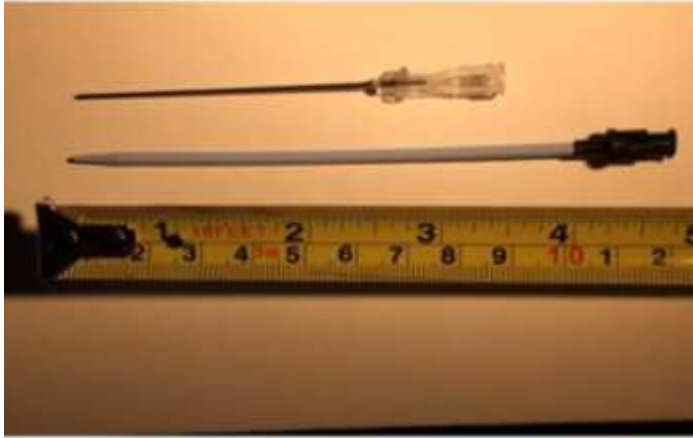
[00:04:29] The second marking is 20 centimetres and you should advance to Guidewire until it's at 20 centimetres. And then observing your assistant should observe the ECG to check that you're not irritating the right ventricle. If the guidewire is getting stuck between 10 and 20 centimetres this may indicate that there's a thrombus or some problem within the within the jugular vein. And if this is the case, you need to get somebody to come and give you a hand. Once the guidewire is sent to 20 centimetres, carefully removes the needle. And then you'll need to check Guidewire placement as described in the LocSSIP video.



[00:05:21] Contained in the central line kit there is also a cannula over needle. And you can use this to place the needle in the jugular vein and then slide the cannula over the needle so that the cannula is sited in the jugular vein and then slide the guidewire through it. The advantage of this is once it's in, it's less likely to become displaced than just using the needle. It's not generally used, I don't think, because the technique is a little more fiddly. But there's no reason why you shouldn't you shouldn't use this technique too. One time the needle of the canula can be really helpful. It's if you got the guidewire in the vein, but you're not quite sure whether it's in the right place.

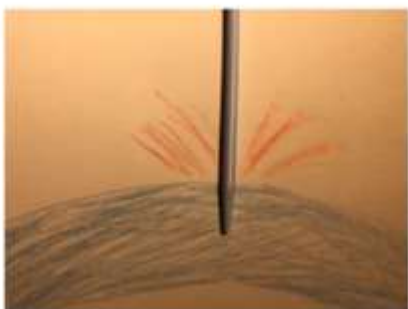


[00:06:20] And you then can feed the cannula over the guidewire, remove the guidewire and then transduce the pressure waveform through the through the cannula to make sure that you've got a venous trace rather than an arterial trace. And clearly, it's much better to just put this little tiny cannula into an artery rather than put the big central line itself so that canula can be really, really helpful in this circumstance.



[00:06:54] So once the cannula is being removed and the guidewire satisfied that it's in the vein, you then need to introduce the introducer. And this is done by making a small neck with the scalpel blade at the skin and then advancing the introduce of firmly using a twisting mechanism. And you can drop the angle a little bit so that it's much flatter against the patient's skin.

[00:07:26] Then you just have firmly advance the dilator with a slight twisting movement. Now, are photographs that dilator here against a ruler and you can see that it's about 12 centimetres long. Now, the vein, generally speaking, is about three or four centimetres below the skin. And you do NOT want to advance his dilator right up to the hilt. You only want to advance it probably about five centimetres through the skin to just dilate the jugular vein to allow that guidewire to allow the central line to advance freely. If you push the dilator right up to the hilt you really, really risk damaging some major structure within the thorax and tearing a central vein. That would be really, really bad and could result in the death of a patient. So think at the depth of the vein and don't advance the guidewire more than about a centimeter beyond what you think the depth of the vein is. Then when you've done that, remove the dilator. But make sure you don't accidentally pull that guidewire, right? Then you can just advance the central line over the guidewire and the guidewire will come out the brown lumen of the central line.



[00:09:17] Now, when the guidewire is removed from the central line through the brown port, there's a danger because the brown port is then open to air and a similar danger will have arisen when did the initial needle has been placed in the vein and the syringe is removed before the guidewire is inserted. If the patient's conscious and capable of breathing they can generate a negative pressure within the thorax as they try and breathe. And this will suck air into the vein and can potentially kill the patient. Now, this is particularly true in critically ill patients who are struggling to breathe. So their lungs will be stiff. They'll be acidotic, be trying very, very hard to breathe. So they could generate very significant negative intrathoracic pressures. And you only need to leave these devices open for seconds before enough air will go into the patient to actually result in them having a cardiac arrest. And I've described all this in extreme detail in the video "Air embolus a constant threat to the critically ill".



[00:10:42] So please, please, please do not forget this important risk. To protect against air embolus we put the guidewire into the needle as quickly as possible and if there is going to be any delay we occlude the end of it. We can rapidly push down the blue occluder and then get a three way tap on that brown lumen as quickly as possible.



[00:11:15] Left internal jugular vein lines need to be inserted quite a bit deeper than this, and normally at least another four centimetres. So that will the formula. It would be rather them. Okay. So once you've advanced the central line, how far should you push it in? So there's a formula that is described where you have the height of a patient. Let's say there are 170 centimetres. You divide that by 10. That's 17. And then you subtract two centimetres. So that would be fifteen. So you can see this central line. They've got markings on it. And this one's been inserted by my colleague, Dr. Greenbaum to fifteen centimetres insertion depth. For Left internal jugular lines minus two would be between plus two and plus four. Obviously, all of these things depend on how high in the neck You've made the initial puncture. But I think this formula is kind of a reasonable guide and it's the best there is. But as one of the things you need to look at on the chest x ray.

[00:12:34] OK, so to protect against air embolus we've really quickly put a three way tap on the brown lumen. Now we now put the transducer onto the proximal lumen, which in

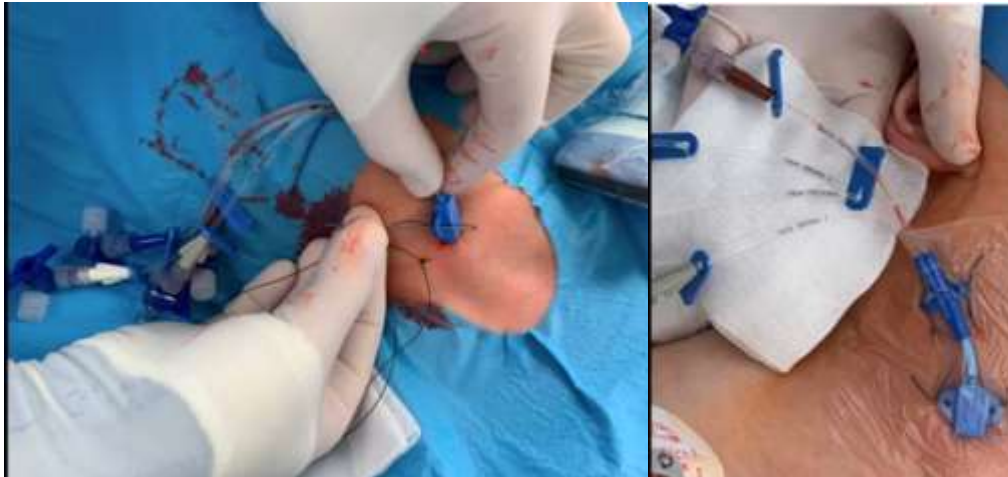
our kits is coloured white. Clearly, we followed the advice and the locSSIP video about transducing this. We use the proximal lumen because if the central line becomes displaced at all, then that will tell us because we'll lose the central venous waveform. Now, if we had used a distal Lumen and then we're running noradrenaline through the proximal lumen and the central line became displaced a little bit then we would risk running noradrenaline into the peripheral tissues rather than into the vein. And then more importantly, not being able to work out why the patient's blood pressure had collapsed. So make sure you transduce the proximal lumen and run any noradrenaline, obviously distal to that.



[00:14:00] So we then want to secure the central line and we do this by suturing it at all four points. So you put the Clip-On at the skin puncture side, as you can see here. And there's two little parts to that, that clip together. So there's then four points where we need to suture. It's really important that we do this properly because we definitely, after all this effort, hours of watching these videos, you do not want the central line to come out.

[00:14:31] And even more importantly than that, you don't want it to become partially displaced since it's still in the patient's skin, but not in the vein, because that's really difficult for people to work out what the hell's going on when the patient's blood pressure's disappeared. So you must carefully suture at all four points to secure that line very firmly. Okay. So this video, we're not going to cover suturing technique, unfortunately. And even more disappointing, I can't find a decent video describing how to suture these devices in. So if you find one, please e-mail me and a lot of reference in there. But one little tip is you can push the needle through using the blunt hand, like we said, and say in this picture, it means you're less likely to stab yourself. And in my personal opinion, with no evidence at all, I'd normally use a curved needle only because

it's more predictable as to where it's going to come out of the patient's skin. My colleague here prefers a straight needle.



[00:15:42] Once the line has been secured, he'll then need to clean the area and there's gauze and you can use Saline to do that and then make sure the area is dry before you put the dressing on. If the patient has lots of skin creases, then you may need to pull the skin apart to stretch it, to remove the creases before you put the dressing on. And here you can see my colleague has beautifully applied the dressing for this patient. So once the central lines in you've got to dispose of your sharps, the trolley may well be a dreadful mess like this. You need to sort out where the sharps are and identify what you've used. So there'll be a scalpel blade. There'll be a suture. They'll be they introduce a needle. There'll be the local anaesthetic needle and any other needles that you've used. You will need to find them all and make sure they go in the sharps. But note the guidewire is not sharp. Sharp things go in the in the sharps. But Non-sharp things don't. I've had read many many patients safety incidents where people have given themselves a needle stick injury trying to push the guidewire into the sharps container. So please don't do that. And then otherwise, at this point, you need to follow all the advice described in the locSSIPS video.



Summary and home work

- 1 We have reviewed some of the setup of the trolley and preparation for the procedure
- 2 We then reviewed a concept of how we would locate the vein using the position of the vein in the ultrasound image and using depth and angles to produce a mental model that would allow us to place our needle
- 3 We then reviewed how we could follow the needle tip into the vein and the advantages of this more difficult approach
- 4 We suggested how we could learn this from following the placement of local anaesthetic to identify the needle tip.
- 5 Following this we reviewed many of the steps to flow from placement of the wire.
- 6 We did not review topics covered in the LocSSIPs video or the first CVC placement video

▶ Homework

The main homework is reflection and observing the procedure and then starting to learn it!

We will also provide you with tools to allow you to practice the hand eye coordination that you will need to complete the technique

[00:17:24] So it's now time to summarise what we've learnt in this presentation. So we've reviewed some of the set up as a trolley in preparation for the procedure. We have reviewed the concept of how we would locate the vein, using the position of the vein and the ultrasound image and using the depth and angles to produce a mental model that would allow us to find where to place her needle and then follow this through with depression off the vein. We then gone on to review how we might follow the needle tip into the vein and the advantages of using this approach, particularly going forward when we're going to be placing Double Lumen catheters, which we have to use some shallow approach for. We then looked at suggesting how we could use the placement of local anaesthetic under direct ultrasound vision to help us learn how to follow the needle tip into the vein. And then. After that, we looked at what to do after placing the guide wire to completing the procedure, particularly reviewing the risk of air embolus. We didn't review any of the topics which again, to be covered in the other two videos. So we now need to think about how we are going to take this forward and what additional homework you need to do. So the main thing is around reflection and observing the procedure and then starting to actually help carry out it yourself. We will hopefully provide you with some practical demonstrations so that you can actually learn the hand eye coordination which will enable you to place central lines. So I hope you've found all of this interesting and that you will have a successful career placing central lines for many years to come. So I just need to thank my colleagues, particularly Tricia Jordan and Kevin Gregson. Jonathan Greenbaum and Kate Bailey. And also the patients which for consent reasons I can't name in this presentation. So we'll play you out with a bit of music and cheerio.