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# Is it safe to reinfuse blood drawn from a CVAD via a syringe when checking line patency or drawing blood?

Posted by Tricia Kleidon on 30 May 2018

Before withdrawing a blood aspirate from a central venous access device (CVAD), ask yourself, why am I taking this blood aspirate? Are you taking the blood aspirate to assess for device patency prior to hooking up to an intravenous infusion or do you require a blood sample for laboratory analysis?

If you are simply checking CVAD patency you only need to pull blood back into the catheter until you see the liquid gold; it never needs to come as far as the catheter hub and needleless connector. This is also the case if you are withdrawing a lock solution, as you only want to take out what is locking the internal length of the catheter. The ease of aspiration can still be assessed with this small aspiration technique as you get a different feel when you are aspirating air (more resistance is felt) as opposed to the free-flowing feeling of aspirating liquid.

So, when is it necessary to take a blood discard from your patient's CVAD? A blood discard should only be taken when blood sampling is required for laboratory analysis to reduce the risk of your blood sample being contaminated with elements of the previous infusion, e.g. antibiotic levels, blood glucose, etc.

In paediatrics, routine re-infusion of discarded/aspirated blood from a central line is not recommended due to potential risks including infection, and re-infusing clotted blood. But what if your patient is clinically anaemic, or having multiple blood tests that increase their risk of developing iatrogenic anaemia? In these instances, reinfusion of discard blood is appropriate, but should be accompanied by a doctor's order. The method used to reinfuse blood should be considered with risk reduction in mind. At our hospital, we recommend using a 3-way tap so that the blood to be reinfused remains in a closed system.

This is not the only method of blood sampling. Several methods of blood sampling are available (See Table1) and should be used according to patient and device characteristics and your local hospital guidelines.

**Table 1. Methods of blood sampling**

<b>Method</b>	<b>Description</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Discard</b>	Aspirate and discard a small amount of blood from the CVAD	Reduces the risk of contaminated blood	Potential iatrogenic blood loss with frequent blood samples.

	<p>via a syringe.  Use a new syringe for the blood sample.  Using a pulsatile flush technique, flush the CVAD with 10 ml 0.9% sodium chloride.</p>	<p>sample for laboratory analysis.  No risk of introducing infection or blood clot through returning aspirated blood.</p>	
<b>Push-Pull</b>	<p>Using a 10 ml syringe, flush the CVAD with 0.9% sodium chloride.  Using the same syringe and without removing it, aspirate 6 ml of blood, then push it back into the CVAD.  Repeat this process 3-4 times.  Remove the empty syringe and attach a new syringe to obtain a fresh blood sample.  Using a pulsatile flush technique, flush the CVAD with 10 ml 0.9% sodium chloride.</p>	<p>Limits blood loss as no blood is discarded.  Reduces risk of infection as blood is not reinfused.</p>	<p>Requires a totally patent CVAD. CVADs with withdrawal occlusion or difficult to aspirate may be difficult to obtain enough blood for 3-4 push-pull sequences.  Risk of haemolysis with the turbulence cause by frequent blood aspiration and flushing.</p>
<b>Re-infusion</b>	<p>Using a 3-way tap, aspirate a small amount of blood into a syringe, turn the tap to the empty syringe, and obtain your blood sample via this syringe.  Turn the tap back to the syringe with the first blood aspirate and re-infuse the discard.  Remove and attach a new flush syringe.  Using a pulsatile flush technique, flush the CVAD with 10 ml 0.9% sodium chloride.</p>	<p>Minimises blood loss and reduces the risk of infection by maintaining a closed system.</p>	<p>Potential to re-infuse clots.  Potential for error and confusing the discard syringe with the blood sample.</p>

The push-pull method is gaining significant chatter and is considered a reliable method for blood sampling. It is intended for use in populations where frequent blood sampling is necessary, such as intensive care and oncology. Adlard (2008) compared the push-pull method to standard practice (discard method). Paediatric oncology patients requiring blood sampling were used as

their own control. Paired samples were taken when blood tests were required. The push-pull technique was used to obtain the first blood sample, then another sample was taken using the discard method. Laboratory results from both samples were very similar, so in theory the push-pull method is quite reliable with little risk.

The problem with the push-pull method is that the catheter needs to be completely patent with no difficulty in aspiration, as you need to be able to aspirate approximately 6 ml of blood 3-4 times. Unfortunately, withdrawal occlusion is often problematic in the oncology population. Otherwise, haemolysis caused by turbulence created during this method might also be a problem for some samples. CVADs are often your patients' lifeline. Always consider hospital guidelines, your patient, their device and the clinical situation before accessing a CVAD.

### **Reference**

Adlard, K. Examining the push-pull method of blood sampling from central venous access devices. *J Pediatr Oncol Nurs*, 2008;25(4):200-7.

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