Vascular access in Apheresis Procedures

Ingrid de Beer
Centre of Stem Cell Therapy
LEIDEN UNIVERSITY MEDICAL CENTRE
Vascular access in Apheresis Procedures

- Definition
- Access possibilities
- Needle sizes
- side effects
Vascular access in Apheresis Procedures

Adverse reactions
(Related to donor and patient apheresis)

Anatomy
(Related to apheresis)
Definition

Vascular access

The ability to enter the vascular system; the ease with which the vascular system can be entered for administering therapy or obtaining blood.

Reserved act
- proven theoretical and practical medical knowledge
- declaration of competence for infusion insertion and cvc care
- Every 5 years renewal
Access possibilities
Donor or patient

(Un) related donor

Patient
Venipunctures

- Forearm
- Fossa Cubiti
- Subclavian vein
- Internal Jugular vein
- Femoral vein
Access possibilities

A. Peripheral IV Catheter
B. US-Guided Peripheral IV Catheter
C. Midline Catheter
D. Nontunneled Central Venous Catheter
E. Tunneled Central Venous Catheter
F. Implanted Port
G. Peripherally Inserted Central Catheter
Access possibilities

**Good access ➔ sufficient blood flow**

What access you use depends on:

- the veins of the patient
- the procedure you're going to run
- the competence of the nurses
- the competence of the medical staff
- the materials the hospital supplies
### Needle size

<table>
<thead>
<tr>
<th>Needle</th>
<th>Nominal Outer Diameter</th>
<th>Nominal Inner Diameter</th>
<th>Nominal Wall Thickness</th>
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<tbody>
<tr>
<td></td>
<td>📏</td>
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</tr>
<tr>
<td><strong>Gauge</strong></td>
<td><strong>inches</strong></td>
<td><strong>mm</strong></td>
<td><strong>tol. inches (mm)</strong></td>
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Needle size
## Needle size

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<th>Diameter (mm)</th>
<th>Diameter (inches)</th>
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</table>
Peripheral venous access
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Peripheral venous access
Local anatomy is complex

- veins
- artery
- nerves

lateralis

medialis
Local Adverse Events

Hematoma
Injury of nerves
Local Adverse Events

- Arterial puncture
- Phlebitis
- Thrombosis
Phlebitis

- Inflammation of the vein
- Slow onset of a painful, red area
- Long, thin, red area along the vein (hard, warm, swollen, and cord-like).
Peripheral venous access

Draw:
Apheresis needle 16 G

Draw Flowrate: 250-300 ml/min

Closed IV catheter system
Draw flowrate: 35-45 ml/min

return

20 G

22 G
Peripheral venous access

• New: BD Nexiva™DIFFUSICS™ Closed IV Catheter System

• Enable high flow rates with patients that may require a smaller IV catheter
• Enables higher flow rates with a smaller gauge catheter (20 G - 22G)

20 GA 1,1 x 25 mm  68ml/min                           22 GA 0,9 x 25 mm  45 ml/min
Peripheral venous access

![Diagram of peripheral venous access]

Power Injection Flow Rates

<table>
<thead>
<tr>
<th>Gauge and Length</th>
<th>BD Catalog #</th>
<th>Max Flow Rate (mL/sec)</th>
<th>Max Injector Setting (PSI)</th>
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<tbody>
<tr>
<td>24 G 0.75 IN</td>
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<td>3.0</td>
<td>325</td>
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<td>383591</td>
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<td>20 G 1.00 IN</td>
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<td>20 G 1.25 IN</td>
<td>383593</td>
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</table>

![Image of power injection flow rates]

http://bcove.me/9nqqgkhg
central venous access

Subclavian vein
Internal Jugular vein
Femoral vein

Local anesthesia
Sterile situation
Double lumen catheter
Ultrasound guided
X-ray
central venous access

Adult  11,5 F
Child  7-10 F
central venous access

Subclavian vein insertion

Internal jugular vein insertion
central venous access

Tunneled subclavian catheter
central venous access
peripherally inserted central catheters and midline catheters are too small to get a sufficient flow rate.
central venous access

Side effects central venous catheter
Pneumothorax
Infections
Air embolism
Hemorrhage
Arrhythmia
Thrombosis
pneumothorax
pneumothorax
pneumothorax
infections

Staphylococcus aureus and Staphylococcus epidermidis sepsis
Central venous access

Implanted ports
Central venous access
Power ports

- Titanium / silicone
- "MRI safe"
- catheter 11.4G
- ca. 200 punctures with a 16G-needle per lumen
- erythrocytapheresis with a flow rate of 50ml/min
- “non-coring” needle: point doesn’t damages the membrane /as little as possible
In summary

Various venipuncture sites and needles to achieve a sufficient flow/successful apheresis procedure

the choice of place and needle type depends on:
procedures
Anatomy of the human body
Donor or patient
Competence of the nurses and physicians
Adverse events