Short Term Vascular Access Devices for Parenteral Nutrition

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Aims of Presentation

• Differentiate between Vascular Access Devices (VADs)
• Understand criteria used for appropriate device selection.
• Placement and tip positioning
Case Study

- Patient admitted with abdominal pain.
- Underwent multiple bowel resections.
- Surgeons want complete bowel rest.
VAD
(Vascular Access Devices)

- Peripheral cannula
- Peripheral midline
- Peripheral inserted central catheter (PICC)
- Short term central venous catheter (CVC)
  - Subclavian, jugular or femoral
- Tunnelled central venous catheter (CVC)
- Implantable Port
Determinants of Appropriate Device Selection

- Potential treatments
- Duration of therapy
- Peripheral venous availability
- Anatomy, diagnosis and co-morbidities
- Needle phobia and body image
- Risk assessment
Potential Therapies

• What Treatment is required?
• How many lumens are required?
• Need a dedicated PN lumen
• Single
• Dual
• Triple
• CT imaging
## Duration of Use

<table>
<thead>
<tr>
<th>Type</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral cannula</td>
<td>Up to 72 hours</td>
</tr>
<tr>
<td>Peripheral midline</td>
<td>2 to 12 weeks</td>
</tr>
<tr>
<td>PICC</td>
<td>Up to 12 months</td>
</tr>
<tr>
<td>Skin Tunneled line</td>
<td>As long as needed and in good working order</td>
</tr>
<tr>
<td>Non-tunnelled (Temporary line)</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Implantable port</td>
<td>As long as needed and in good working order</td>
</tr>
</tbody>
</table>
Venous availability

• Are peripheral veins palpable or visible?
• Does this procedure need ultra sound guidance?
• Do you have access to an ultra sound machine?
• Do you have the correct training?
• Has the patient had problems with access devices in the past (thrombus)?
• Absent limbs? Skin conditions?
Patients’ clinical condition

• Are there any restrictions which may prevent you from placing the line?
• Is the patient able to lie flat?
• Can the patient cooperative with the procedure? Do you need an assistant?
• Does the patient need sedation or GA?
• Does the patient have deranged clotting?
Consent

- Does the patient have capacity?
- Are they able to consent to the procedure?
- Is special consent required?
Risks, benefits & alternatives

- Risks of the procedure are discussed with patients who have capacity.
- Those without capacity, risks, benefits and alternatives are discussed with family.
- Written consent is obtained for PICC, non tunnelled, skin tunnelled catheters and implantable ports.
- For midline placement valid verbal consent
Risks of IV insertion

• Infection
• Thrombus
• Arterial puncture/bleeding
• Nerve damage
• Malposition during placement & post placement
• Cardiac Arrhythmias
• Pneumothorax/haemothorax
• Thoracic duct injury
Peripheral IV Cannula

• For short term IV therapy only
• 3 days
• Not for TPN
Peripheral Midline

- Normally around 20cm in length
- For peripheral PN administration
- Fairly non invasive
- Small needle gauge 22G (but can get larger)
- Placed with or without ultrasound guidance
- Consider positioning of device
- Single or Dual, open and closed ended devices available
Peripheral Midline

ADVANTAGES
- Duration 2-12 weeks
- Bedside insertion
- Minimal discomfort
- X-ray not required
- Cost
- Used and inserted in hospital and community settings

DISADVANTAGES
- Small lumen
- Not suitable for blood sampling
- Mechanical/chemical phlebitis
- blockage
Midline Catheter Tip Position

The tip of the midline catheter is positioned in a peripheral vein.
PICC

- Multiple lumens available
- Power PICC’s suitable for CT contrast administration
- CVP monitoring in critical care areas
- Open/closed ended devices
- Placed with or without ultrasound guidance
PICC

ADVANTAGES
• Duration >6 weeks
• Bedside insertion
• <Risks in relation to insertion
• ↓ incidence of infection
• Can be used for HPN
• Blood sampling
• Repairable?

DISADVANTAGES
• Skilled operator
• CXR required
• Malposition of line tip
• Fracture
• Not suitable for all patients
Ensure you are familiar with the device prior to placement.

Does the patient need local anaesthetic?

Measuring the desired length

Does the device need cutting before placement?

Does the device yield from the lumen(s)?

Do you need a micro-introducer set?
Figure 3

PICC Line

Long slim silastic catheter

Entrance to vein

Exit site

Central veins
Short-term CVC

ADVANTAGE
• Useful in acute settings
• Quick insertion
• Offers multiple access
• CVP monitoring
• Pacing

DISADVANTAGES
• >risks during insertion
• ↑ incidence of infection
• Ideally should be changed every 10-14 days
Central Venous Lines

Figure 1

Routes: a - Subclavian, b - Jugular
Which lumen shall I use?

**Triple**
- Proximal – *blood sampling & drug therapy*
- Medial – *TPN or medication*
- Distal – *CVP readings, blood transfusion, colloid, high volume fluids*

**Quadruple**
- It will have 2 medial lumens
Skin Tunneled CVC

ADVANTAGES
• Long term access
• Reduced risk of infection
• Appropriate for all therapies
• Relatively good body image
• Repairable

DISADVANTAGES
• Experienced operator
• Insertion risks
• Sedation/general anaesthetic
• Regular maintenance
• Surgical removal
Implantable Port

ADVANTAGES
- Monthly maintenance
- Reduced incidence of infection
- Good body image

DISADVANTAGES
- Specialist training for management
- Specialist equipment
- Needle access
Who is placing the device?

- Many nurses/doctors have enhanced their skills in IV access placement.
- The level of skill depends upon the support and training available.
- What is the level of training is provided in your trust?
- Who can place what lines?
Staff Training

- What devices are available in the Trust?
- Who is trained to place them?
- Who is trained to confirm tip position by Cxray?
- Do the nursing staff know how to manage this line safely?
- Have they received the correct training in IV therapy and TPN management?
Training

- Training for IV access insertion and management is done by clinical skills department and practical assessment done by IV access/Nutrition Nurse
- Ultra sound placement is a separate course
- Not everyone has received updated training who places IV access devices
Have you got the equipment required?

- Ensure you have all the equipment you require before you begin the procedure.
- Correct skin prep – 2% Chlorhexidine gluconate in alcohol (Check for allergies!!!)
- Maximum barrier protection
- IV access device
- Appropriate dressing/securing device
- Needle free device
If not don’t proceed!
If total parenteral nutrition is being administered,
Complications Post Insertion

- Infection
- Thrombus
- Migration of line tip (CVC’s)
- Occlusion
- Failure to aspirate blood
- Fracture
Malposition of catheter tip

• Difficulty advancing the device?
• Tip of the catheter can be displaced on placement.
• Confirmation of this is by Chest xray
• How do you manage this?
• What are your options?
Improving the patient’s experience

• Appropriate VAD selection
• Timely insertion
• Frequency of practice
• Troubleshooting
Outcomes

- Reduced incidences of infection
- Lower complication rates
- Reduction in hospital stay
- Improved patient experience
- Increased job satisfaction for health professional
- Reduced cost to organisation
Any Questions?