Complications of Peripheral IV Access

Better Care, Better Outcomes

Infiltration
The inadvertent administration of nonvesicant medication or solution into the surrounding tissues.

Extravasation
The inadvertent administration of vesicant medication or solution into the surrounding tissues.
Phlebitis

Inflammation of the intimal lining of the vein. Phlebitis is a progressive complication. Early recognition and management is key to limiting progression.

Types and Causes of Phlebitis

Chemical Phlebitis

- Hypertonic solutions >375 mOsm/L
- Medications and solutions with pH <5 or >9
- Drugs classified as irritants or vesicants
- Solutions with large amounts of particulate

Mechanical Phlebitis

- Trauma from the IV catheter during insertion or while indwelling
- Rigid catheter material (i.e., FEP Polymer)
- Larger gauge and/or longer length catheters
- Lower skill level of inserting clinician
- Inadequate stabilization of the catheter
- Insertion across a joint

Bacterial Phlebitis

- Compromised skin integrity (i.e., shaving)
- Palpating site after applying skin prep
- Other breaks in aseptic technique
- Contamination of the IV system
- Non-sterile dressing

Management of Phlebitis

- Remove the catheter
- Culture cannula if infection is suspected
- Apply warm moist compress
- Provide comfort measures

Clinical Criteria

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms</td>
</tr>
<tr>
<td>1</td>
<td>Erythema at access site with or without pain</td>
</tr>
<tr>
<td>2</td>
<td>Pain at access site with erythema and/or edema</td>
</tr>
<tr>
<td>3</td>
<td>Pain at access site with erythema Streak formation Palpable venous cord</td>
</tr>
<tr>
<td>4</td>
<td>Pain at access site with erythema Streak formation Palpable venous cord &gt;1 inch in length Purulent drainage</td>
</tr>
</tbody>
</table>

From Infusion Nursing Standards of Practice

Phlebitis Rate Calculation

\[
\text{Percentage of Phlebitis} = \left( \frac{\text{Number of Phlebitis Incidents}}{\text{Total Number of Peripheral Lines}} \right) \times 100
\]
**Hematomas**

A localized mass of blood outside of the vessel, usually creating a hard, painful lump.

### Causes
- Nicking the vein during an unsuccessful insertion
- Incomplete insertion of the needle into the lumen of the vessel
- Tourniquet above a previous attempt site
- Unskilled clinician
- Lack of pressure over site of discontinued catheter
- Large cannula

### Management
- With unsuccessful attempts, apply direct pressure and elevate extremity until bleeding stops
Infiltration
The inadvertent administration of nonvesicant medication or solution into the surrounding tissues.

Extravasation
The inadvertent administration of vesicant medication or solution into the surrounding tissues.

Clinical Criteria

**Grade 0**
No symptoms

**Grade 1**
Skin blanched
Edema <1 inch in any direction
Cool to touch
With or without pain

**Grade 2**
Skin blanched
Edema 1-6 inches in any direction
Cool to touch
With or without pain

**Grade 3**
Skin blanched, translucent
Gross edema >6 inches in any direction
Cool to touch
Mild to moderate pain
Possible numbness

**Grade 4**
Skin blanched, translucent
Skin tight, leaking
Skin discolored, bruised, swollen
Gross edema >6 inches in any direction
Deep pitting tissue edema
Circulatory impairment
Moderate to severe pain
Infiltration of any amount of blood product, irritant or vesicant

Infiltration Presentation

Grade 1
Grade 2
Grade 3
Grade 4

References