The Devil’s in the detail: Illuminating the experience of pin site infection

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Background

- Painful
- Threatens success of treatment
- Repeated infections
- Antibiotic resistance
- Costly
- Difficult to diagnose infection
- Current assessment criteria are not patient-centred
- No difference between infection and ‘reaction’
Study 1 - Questions

• What makes patients suspect they have a pin site infection?

• What are patients’ experiences of the symptoms of suspected pin site infection?

• How do patients differentiate between pin site infection and other wound states?

  – Grounded Theory study
  – n=16 patients who had experienced pin site infection
Study 1 – results

- Absence of or minimal symptoms

Calm

Dimensions of inflammatory pin site states

Irritated
- Pain
- Redness
- Discharge
- Swelling
- General Symptoms

Infected
- Pain
- Redness
- Discharge
- Swelling
- General Symptoms
Study 2 – questions

• What is the frequency and severity of patient-reported symptoms of the pin site states, identified in the first phase of the study - ‘calm’, ‘irritated’ and ‘infected’?

• Can patient responses relating to the presence of and different levels of symptoms discriminate between three patient-reported clinical states of pin sites: ‘calm’, ‘irritated’ and ‘infected’?

• What is the underlying factor structure of the questionnaire?
Methods

- Pain
- Swelling
- Redness
- Discharge
- Weight-bearing
- Systemic symptoms

Scale of 1-5
Yes/No
Sample

n=165 Adults with lower limb external fixators

<table>
<thead>
<tr>
<th>Hospital</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
<td>12.1</td>
</tr>
<tr>
<td>B</td>
<td>17</td>
<td>10.3</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>D</td>
<td>24</td>
<td>14.5</td>
</tr>
<tr>
<td>E</td>
<td>7</td>
<td>4.2</td>
</tr>
<tr>
<td>F</td>
<td>13</td>
<td>7.9</td>
</tr>
<tr>
<td>G</td>
<td>78</td>
<td>47.3</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>165</td>
<td>99.9%</td>
</tr>
</tbody>
</table>
Findings 1 (One-way ANOVA and Cochrane’s Q)

- Redness, swelling, pain, discharge, heat & burning, shiny skin & smell were:
  - greatest in infected pin sites
  - less in irritated
  - not present at all or slight in calm

- Redness, swelling and pain demonstrated the greatest variability in scores between the three states

- Itchiness greater in irritated than infected

- Difficulty or pain in using leg greatest with infection

- Nausea & vomiting, feeling unwell, feeling feverish & shivering were largely features of infection

- Disturbed sleep worst with infection but was still present with irritated & calm pin sites
Findings 2 (Principal components analysis)

- PCA factor analysis indicated the presence of two ‘components’ for both infection and irritation

- Pain, redness, shiny skin and heat and burning were all features of the first component
  - Consistent with ‘classic’ inflammatory symptoms

- Itchiness, dry flaky skin and smell were features of the second
  - Appear to some degree consistent with symptoms that relate to contact dermatitis
Dermatitis

- **Contact dermatitis** (also known as contact eczema) - an inflammatory skin reaction caused by response to an external agent that acts as either an irritant or an allergen
  - **Allergic contact dermatitis** - the result of a hypersensitivity reaction following sensitisation and subsequent re-exposure to an allergen
  - **Irritant contact dermatitis** is an inflammatory response that occurs after damage to the skin (Bourke, Coulson and English, 2009) from an external irritant

- **Acute symptoms of both irritant and allergic dermatitis** are similar and include: vesiculation (blistering), erythema, itching (pruritus), oedema (swelling), papules (small solid elevation of the skin) and exudation
Possible irritants in external fixation

- The presence of metal in the tissue as a foreign body

- The use of agents such as Chlorhexidine gluconate (cause of hypersensitivity), alcohol solutions and other substances in the process of wound cleansing

- Difficulties for patients in carrying out normal care and the skin’s inability to shed dead cells and maintain a healthy state

- Metal allergy – sensitivity to nickel, cobalt, chromium common causes of allergic contact dermatitis
Implications for practice

- Infection should be diagnosed using patient reported signs and symptoms
- Patients need written and verbal information about what to look for
- Patient perceptions of the presence of infection should be taken seriously
- Dermatitis needs further consideration
### RaPiDO - proposed Assessment Tool for Pin Site Infection and Irritation

<table>
<thead>
<tr>
<th></th>
<th>Redness</th>
<th>Pain</th>
<th>Discharge</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calm</strong></td>
<td>None or minimal</td>
<td>None or minimal</td>
<td>None or minimal Transparent/straw coloured ‘serous’ ooze</td>
<td>No other symptoms</td>
</tr>
<tr>
<td></td>
<td>Looks like a ‘piercing’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Irritated</strong></td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate serous discharge</td>
<td>Any of the following:</td>
</tr>
<tr>
<td></td>
<td>Can be local or</td>
<td>Doesn’t prevent weight</td>
<td>Requires more frequent</td>
<td>• Itchiness</td>
</tr>
<tr>
<td></td>
<td>generalised</td>
<td>bearing or use of the</td>
<td>dressing changes</td>
<td>• Severe dry skin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>limb</td>
<td></td>
<td>• Scabbed skin</td>
</tr>
<tr>
<td><strong>Infected</strong></td>
<td>Extensive</td>
<td>Severe</td>
<td>Heavy discharge</td>
<td>• Feeling generally unwell like beginning</td>
</tr>
<tr>
<td></td>
<td>Spreading</td>
<td>Occurs at rest</td>
<td>Cloudy/coloured</td>
<td>of a cold or ‘flu’</td>
</tr>
<tr>
<td></td>
<td>Feels hot</td>
<td>Inability/difficulty</td>
<td>May include frank pus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Looks ‘angry’</td>
<td>bearing weight or use</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>of the limb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thank you

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