Intravenous extravasation: A comprehensive management algorithm

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Disclosure Statement

No disclosures.
Objective

Plastic surgeons are often requested to play a role in the management of intravenous extravasation injuries. Given the deficiency in the literature, our goal was to construct a comprehensive algorithm for the management of common extravasation injuries.
Methods

- A thorough literature search of IV extravasation and management was completed with 129 publications reviewed.
Methods

• We evaluated information pertaining to the most common categories of extravasated material managed at our institution.

• A treatment algorithm was developed integrating information culled from articles reviewed independently by two of the co-authors.
Results

- One hundred and twenty nine publications were reviewed for content related to the management of extravasation injury. From this assembled information we constructed a comprehensive algorithm for the management of extravasation injury.
# Staging of Intravenous Infiltration

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Pain: None</th>
<th>Percentage: &lt;25%</th>
<th>Exam: No to minimal swelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
<td>Pain: Mild</td>
<td>Percentage: 25-50%</td>
<td>Exam: Mild swelling,</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Pain: Moderate</td>
<td>Percentage: 50-75%</td>
<td>Exam: Moderate swelling, ulceration</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Pain: Severe</td>
<td>Percentage: &gt; 75%</td>
<td>Exam: Marked swelling, absent or diminished pulses, skin necrosis</td>
</tr>
</tbody>
</table>

*Based on percentage of affected area with clinical signs of injury.

** Staging based on most severe component
Management of acute extravasation injuries.

Initial Steps
1. Stop infusion
2. Aspirate from IV
3. Document exam and photograph affected site
4. Identify and quantify agent
5. Serial monitoring every 4 hours for the first 24 hours
6. Classify severity based on proposed staging system

Unable to Identify Agent
1. Elevation of extremity
2. Serial monitoring every 4 hours for first 24 hours with photo documentation
3. Expectant management (unless Stage 4 injury)

Agent: Low osmolar substances
- Contrast material, parenteral nutrition, electrolytes, antibiotics
  1. Elevate affected extremity
  2. Local application of heat
  3. Hyaluronidase administration through IV and surrounding tissue
  4. Removal of IV

Agent: Chemotherapeutic agents
- Vinkal alkaloids (e.g. Vinblastine, Vincristine)
  1. Elevate affected extremity
  2. Local application of heat
  3. Hyaluronidase administration through IV and

Agent: Vasoactive substances
- Anthracycline and antitumor antibiotic vesicants
  1. Local application of cold compresses
  2. Vescant specific antidotes Dimethylsulfoxide (DMSO), sodium thiosulfate, and dextrazoxane

Stage 3 and 4 injuries according to the proposed classification system require plastic surgery consultation. Stage 3 injuries require evaluation for drainage and washout with the specific agent considered. Stage 4 injuries and rapidly worsening injuries require surgical drainage and washout.
Conclusion

• IV extravasation can be a severe injury.
• There is no published management algorithm.
• Standardization of classification is essential to guiding treatment.
• Multi-disciplinary, protocol driven approach is essential to promote patient safety, limit morbidity, and reduce cost.
References

Full list upon request

