PRESENTATION

Extravasation (a perfusion incident) is a non exceptional complication (0.04% to 0.9%) of intravenous injections of contrast media.

It can be caused by a vein getting punctured when the injection equipment is put into place, but can also be the result of the breaking of a vessel wall because of high pressure. This rupture happens in the area where the injection device is placed, or near it.

Well tolerated in general, extravasation can be a source of pain, have after-effects and disrupt the examination. It is one of the risks inherent to the examination that the patient should be informed of.

RISK AND/OR SEVERITY FACTORS

- RELATED TO THE PATIENT
  - Extreme ages of life.
  - Turbidty.
  - Specific factors: poor arterial vascularisation, venous or lymphatic drainage, trophic disorder.
    Diffuse atherosclerosis, Raynaud’s disease, angeitis, diabetes mellitus, history of phlebitis, lymphatic affection, trophic disorder, previous radiotherapy or surgery on the treated limb, stigmas of repeated punctures…

- RELATED TO THE INJECTION SITE
  - topography = back of the hand, back of the foot, wrist, ankle… (thin hypodermic tissue).
  - old perfusion (≥24 hours).
  - injection above a recently punctured site.
  - Dressing hiding the injection site, and delaying the diagnostic of extravasation.
- RELATED TO THE INJECTION TECHNIQUE
  - use of a needle rather than a catheter.
  - use of a power injector.

- RELATED TO THE CONTRAST MEDIA
  - high osmolality contrast agent.
  - Diffusion of a high volume of contrast medium.

The injury is severe if:
  - More than 30cc of iodinated contrast agent with high osmolality or more than 100cc of non iodinated contrast agent with low osmolality.
  - Thin hypodermic tissue.
  - Vascular affection or trophic disorder.

PRACTICAL CONDUCT

BEFORE: PREVENTING EXTRAVASATION AND LIMITING ITS IMPORTANCE

- venous tract
  - Avoid using a venous tract that is already in place.
  - Use a short catheter and adapt the flow to the calibre.
  - If possible, use a vein in the crook of the arm; use hand or foot only if formally advised to do so by the radiologist; in that case, the injection must be monitored very closely.
  - Do not put any pressure on the treated limb. (armrest, blood pressure armband, …)
  - Check the quality of the catheterization with a test injection.

- In the presence of risk factors, use a low osmolality agent.

- Warn the patient of the potential risk and ask him to tell of any pain (but be aware that even a serious extravasation can be painless, and that the feeling of tenseness and/or pain can come later).

- Monitor the beginning of the injection before X-ray starts (visual and tactile monitoring).
IN CASE OF EXTRAVASATION

IMMEDIATE ACTION

- Stop the injection immediately if the patient complains of a pain or if a problem is perceived.

- Medical treatment
  - Try to aspirate the extravasated agent with the catheter left in place, then, once it has been removed, through the skin.
  - Elevation of the affected limb for the following 3 hours in case of potential severity.
  - Local hypothermia with the application of ice (at least for 20 minutes, then every hour for 6 hours) without direct contact between the ice and the limb (wrap the ice in cloth).

Please note that hyaluronidasis, which used to be recommended, is no longer available.

As for alcoholised dressing, its effectiveness has not been proved.

DELAYED ACTION

- Assess the potential severity of the accident.

- Assess the amount of extravasated produce (seeing how much contrast material is left in the syringe).

- Assess the extent and localisation of the extravasation with radiographs of the limb.

- Look for signs of intolerance with a clinical, vascular and neurological examination.
  - cardboard or phlyctenule-like skin.
  - Severe oedema.
  - Poor distal perfusion. (chamber syndrome): paraesthesia, rise in segment pain, hypoaesthesia, loss of muscular strength, slower pulse.

Such signs require a specialised surgical advice. However, most plastic surgeons believe that the majority of extravasation injuries heal without surgery and recommend a conservative approach. This is even truer when a low osmolality contrast agent has been used. Some operations (fasciectomia) have been advised on chamber syndromes and/or large volume extravasations, but no study validates this approach and operations should remain exceptional.
Inform the patient of the signs of intolerance requiring immediate intervention.

In case of severe extravasation, do a check-up the following day to make sure that it is healing well. However, one should know that in the initial stage assessing the severity of the extravasation and making a prognosis are difficult.

Mention the extravasation in the report and tell the patient's usual doctor.

**REFERENCES**


2. Manual on Contrast Media, Version 5.0, American College of Radiology

