



# Teaching Module VI

## Extravasation





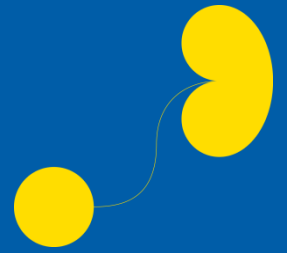
# Extravasation

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# Extravasation



- A well-recognized complication of contrast-enhanced imaging studies
- Prevalence of 0.04%-1.3% with automated power injectors
- Vast majority of extravasation of CM causes only mild soft-tissue injury
- Severe skin ulceration and necrosis may rarely occur



# Risk factors

## Patient-related factors

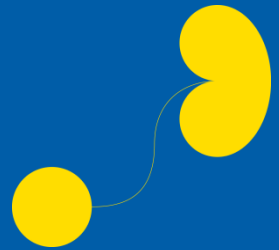
- Inability to communicate (infants, small children, unconscious patients, language barrier)
- Fragile or damaged veins (chemotherapy, steroids, IV drug abuse)
- Obesity
- Arterial insufficiency
- Compromised venous or lymphatic drainage



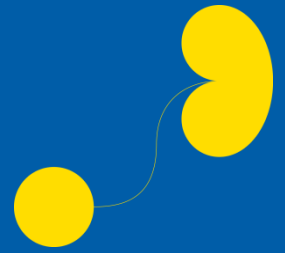
# Risk factors

## Technique-related factors

- Use of power injector
- less optimal injection sites; lower limbs and distal veins
- Large volume of CM
- High-osmolar CM
- Use of indwelling IV lines for CM injection
- Use of metal needles vs plastic cannulae



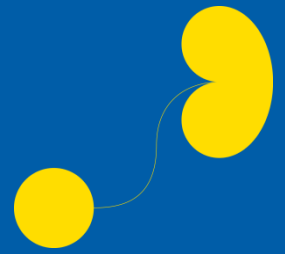
# Mechanism



- Osmotoxicity (osmolality above 1025-1420 mOsm/kg water) and associated phlebitis
- Chemotoxicity of contrast media
- Large volume of extravasated contrast medium causing mechanical compression and compartment syndrome
- Acute inflammation followed by chronic inflammatory process, fibrosis, and muscle atrophy



# Clinical picture



- Varies from minor erythema to tissue necrosis
- May rarely lead to sequelae and permanent disability
- Skin blistering, altered tissue perfusion, paresthesia, and increasing pain may develop in severe cases

Figure 4: Courtesy of Annunziato Amendola, MD

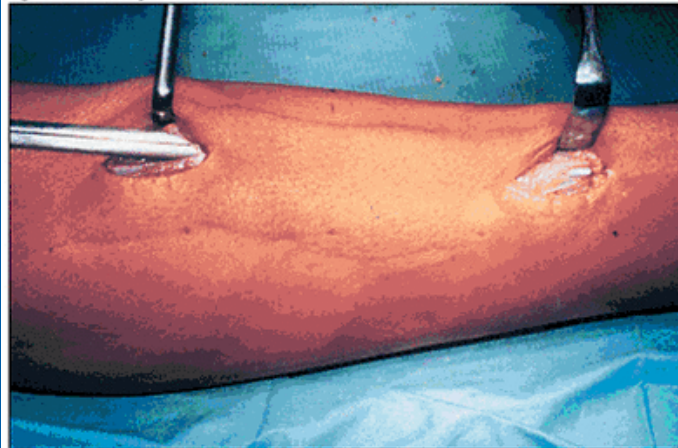
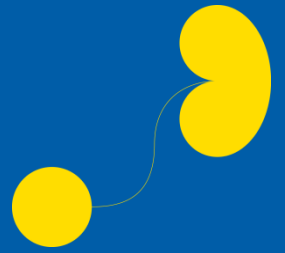


FIGURE 4. Intraoperative photo of the two-incision technique for release of the anterior and lateral compartments. The patient is a 26-year-old female recreational runner with bilateral exertional compartment syndrome.

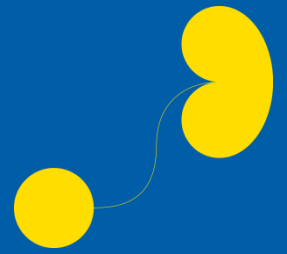


# Clinical picture

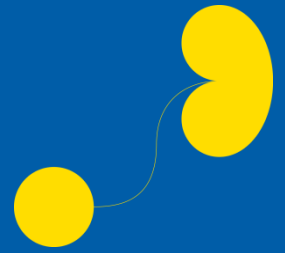




# Clinical picture



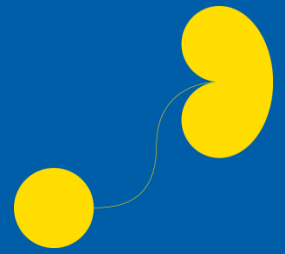
# ESUR guidelines for prevention



- Meticulous IV technique
- Use appropriate size plastic cannula placed in a suitable size vein to handle the flow rate used during the injection
- Test injection with normal saline
- Use non-ionic contrast medium



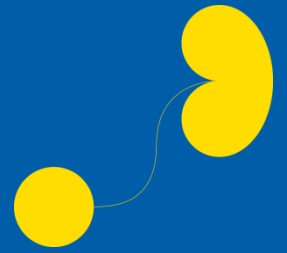
# ESUR guidelines for management



- **Conservative treatment** is adequate in most cases:
  - limb elevation
  - ice packs
  - careful monitoring
- **If serious injury** is suspected, seek the advice of a surgeon



# Conclusions



- Extravasation often involves large volumes and nearly always resolves with conservative treatment
- Moderate injuries occur in a small number of patients
- Severe injuries are rare





**Thank you for your attention**