



Clinical Practice Guidelines: Trauma/Fluid injection injury

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Date	February, 2021
Purpose	To ensure a consistent approach to the management of a patient with fluid injection injury.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless stated otherwise.
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Fluid injection injury

February, 2021

The high pressure injection of a fluid such as hydraulic oil, grease, or paint constitutes a medical and surgical emergency. This requires rapid access to appropriate specialist surgical review. The injury is frequently worse than it will initially appear and clinicians must have a high level of suspicion of injury.

After the initial injection, the fluid travels in a stream until resistance (e.g. from muscle or bone) is encountered.^[1,2]

The fluid then rapidly disperses in all directions along tissue planes, potentially causing traumatic dissections and compressing neurovascular bundles, leading to vascular spasm, ischaemia and thrombosis. Furthermore, the presence of the fluid and subsequent tissue oedema, can cause a pressure build up, reducing perfusion and resulting in a form of compartment syndrome.^[1,2]

Two additional issues are the chemical composition of the fluid, which can have cytolytic properties, and infection, which can occur during the injection, or subsequent to the tissue damage and ischaemia.^[1]

Due to the initially benign symptoms, these injuries are often complicated by a delay to seek medical assistance, often several hours. **Without adequate and timely treatment there is a high rate of amputation.**^[1]

Clinical features



- Early examination may reveal a point of entry that is very small (pinpoint), or may not be visible at all.^[5]
- The area of injury will usually be on the working surface of the hand, however it may be located on any body area.^[3]
- At first, the patient may not complain of pain but may have a feeling of numbness, or increased pressure within the affected part.
- Damage in the early stage is normally related to the physical injury as well as damage from the chemicals in the injected material.
- The affected body part will progressively become increasingly irritated, with the patient complaining of throbbing pain.
- ‘It may take several hours for swelling, numbness and vascular insufficiency to occur.’^[5]
- ‘Without treatment, irreversible tissue necrosis will occur within 12 hours or less.’

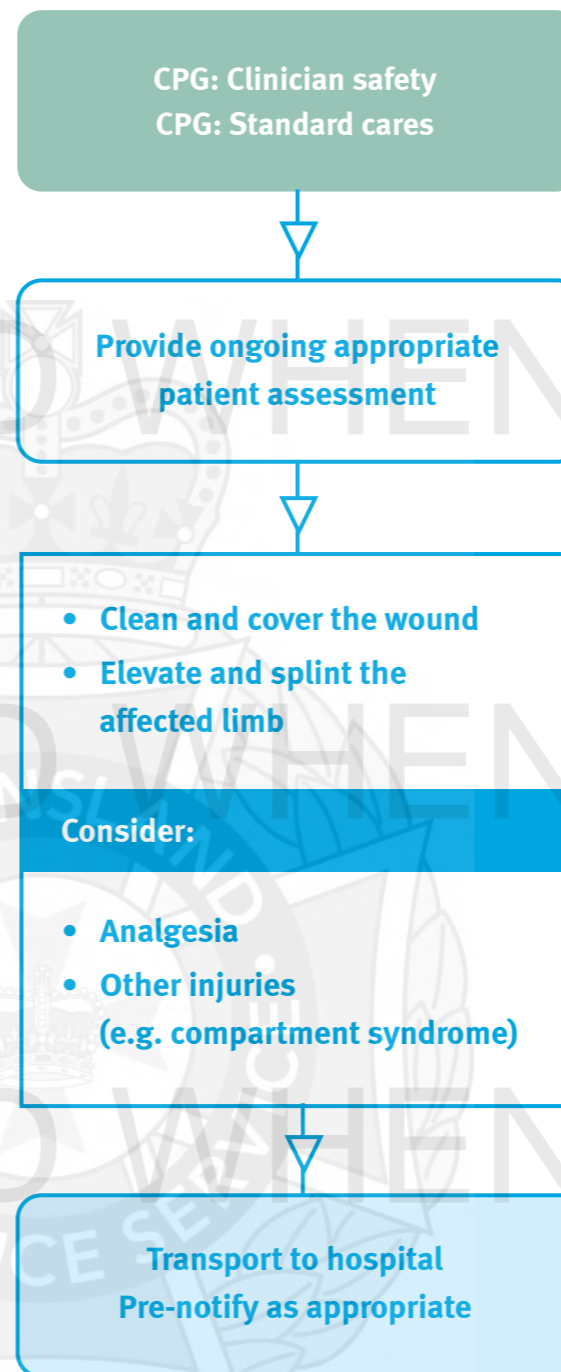


Risk assessment

- If the fluid is a smaller hydrocarbon compound such as white spirit or kerosene, local anaesthetics must NOT be administered as they will potentiate the effects.^[4]
- With larger sized compounds such as those typically used as hydraulic mineral oils, the higher viscosity usually results in less penetration but is often more difficult to remove.^[4]

+ Additional information

- Intact skin can be penetrated by pressures of 7 bar (≈ 101 psi), but this requires direct contact. Much higher pressures exist within industrial machinery, such as paint guns and hydraulic lines, where infiltration of subcutaneous tissues can occur when the liquid is fired from a distance.^[1]
- Dependent upon the entry pressure, injected fluid can travel a significant distance from the initial site of entry, resulting in more widespread tissue damage.



Note 1: These patients require urgent transfer to medical facilities with surgical capability. There are some situations where, due to the isolation of the patient, the clinician may wish to liaise with RSQ via the appropriate OpCen for advice about the transfer.

Note 2: Clinicians must only perform procedures for which they have received specific training and authorisation by the QAS.