High pressure subcutaneous injection of air and nepheline syenite into the lower limb from a sandblasting accident

Trevor Born MD, Ron Levine MD FRCSC
St Joseph's Health Care Centre, Toronto, Ontario

T Born, R Levine. High pressure subcutaneous injection of air and nepheline syenite into the lower limb from a sandblasting accident. *Can J Plast Surg* 1995;3(1):45-46. This is a case report of a high pressure injection injury to the lower limb that resulted from a sandblasting hose. The management of the patient's injury, as well as the current concepts of the treatment of high pressure injection injuries, are described.

Key Words: *High pressure injection injuries, Nepheline syenite*

Injection sous-cutanée d'air et de syénite de néphéline sous forte pression dans un membre inférieur des suites d'un accident de sablage au jet

RÉSUMÉ : Il s'agit d'un rapport de cas relatant une blessure par injection sous forte pression au niveau du membre inférieur, produite par un boyau de sablage au jet. Le traitement de la blessure chez le patient, de même que les concepts actuels de traitement des lésions infligées par injection sous forte pression sont décrits ici.

A 20-year-old male was operating a sandblasting machine when a link in the hose separated allowing the hose to whip around uncontrollably. In an attempt to gain control of the hose he trapped it under his body with the jet pointing at his right medial thigh for approximately three seconds. He was able to limp away from the location and was brought to the emergency department by a fellow worker.

CLINICAL FINDINGS

Examination in the emergency room demonstrated stable vital signs and a normal general examination, excluding the right lower abdomen and right leg. There was a 4 cm diameter hole in the skin of the right medial thigh at the junction of the proximal one-third distal two-thirds, with exposed gracilis muscle (Figure 1). Subcutaneous emphysema could be palpated circumferentially around the thigh, leg and over the right lower quadrant of the abdomen. The neurovascular examination was normal. Fine sand-like material was present in the wound.

The white cell count was elevated at $15,000 \times 10^9/L$ and radiography of the right leg and right lower quadrant confirmed the presence of air subcutaneously. No foreign bodies could be detected distant from the wound (Figure 2).

TREATMENT

In deciding on a course of management it was necessary to know what material was used in the sandblaster. The fellow employee was able to obtain a copy of the safety directive. The compound used was not silica but nepheline syenite. Neither employee knew of any possible reactions to this compound. No mention of subcutaneous injection was found on the safety directive that was distributed with the material. It was not known whether this material would cause an inflammatory response or tissue necrosis possibly compromising the extremity.

The patient was given broad spectrum antibiotics (cefazolin, gentamycin and metronidazole) and taken to the operating room for local wound exploration and debridement. The wound was irrigated with 3 L of bacitracin and saline solution using an asepto syringe. Examination of the wound demonstrated that the air had dissected between the subcutaneous fat and the fascia lata of the thigh. Sand-like material could be felt throughout. After debridement of the wound margin the leg was placed in a modified Jones dressing (with framycetin sulphate and wet saline gauze over the wound) and elevated.

Treatment with intravenous antibiotics was continued for five days with gradual ambulation. The patient was discharged home on day 6 (with oral cefalexin), with a considerable amount of subcutaneous emphysema remaining (Figure 3). The level of discomfort and subcutaneous emphysema re-

Correspondence and reprints: Dr Ron Levine, St Joseph's Health Centre, 30 The Queensway, Toronto, Ontario M6R 1B5

Figure 1) Injury caused to patient following high subcutaneous injection of air

Figure 3) Injury at time of patient discharge

Figure 2) Radiographs of injured limb showing the presence of subcutaneous air

Figure 4) Closure of the wound two-and-a-half weeks following the injury

solved and delayed primary closure of the wound was performed two-and-a-half weeks following the injury without complication (Figure 4).

DISCUSSION

There is considerable literature on the management of injection injuries to the hand, with an overview by Fialkov et al (1). No reports in the literature could be found on sandblasting injuries to the lower extremity. The compound nepheline syenite is not referenced in the literature. It is an inorganic feldspathic mineral and is nontoxic, nonteratogenic and has no mutagenicity. A report of an air injection injury to the hand by Peters (2) describes conservative management with splinting, elevation, close monitoring and intravenous antibiotics. There is mention of the use of systemic corticosteroids in injection injuries by Phelps et al (3) (although no clinical trials had been carried out) but the concern for possible infection was a contraindication to the use of steroids.

An issue that remains to be resolved is the long term sequelae of the foreign material that remains in the subcutaneous tissue. Will the material migrate to other areas of the

body? Will it form granulomata or become infected? If the patient becomes symptomatic does the entire subcutaneous plain need to be debrided?

At the time of writing, the patient is four weeks post injury and continues to improve. He is ready to return to work and has a normal gait.

This was an unusual accident without any previous similar reports in the literature. Treatment of a sandblast injury to the trunk and extremity, excluding the hand or when there is possible acute neurovascular compromise, should follow the protocol of antibiotic prophylaxis, local wound debridement and irrigation and close observation.

REFERENCES

1. Fialkov JA, Freiberg A. High pressure injection injuries: an overview. *J Emerg Med* 1991;9:367.
2. Peters W. High pressure injection injuries. *Can J Surg* 1991;34:511-3.
3. Phelps D. Systemic corticosteroid therapy for high pressure injection injuries of the hand. *J Trauma* 1976;17:206-10.