Case Report

OIL PRESSURE INJECTION INJURY: A CASE REPORT

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ABSTRACT
High-pressure injection injuries of the hand are rare. The incidence is becoming more common with increasing industrialization. Generally, the entry hole is small, but emergency surgical intervention may be necessary as a result. Foreign substances easily navigate through the soft tissue due to the high pressure of the impact and ultimately lead to serious complications. The case of accidental hydraulic oil injection into the hand of a 36-year-old male that came to the emergency department (ED) is presented. The patient was followed up with for approximately three months. Post treatment, full recovery was observed. This case report aims to emphasize the necessity of close monitoring and treatment of patients suffering from high-pressure injection trauma in the ED. We want to emphasize that the injection trauma patients need to be evaluated immediately in ED and followed up in ED if necessary.

Keywords: Injection Trauma, High Pressure Trauma, Oil Injection

INTRODUCTION
The entry hole of the injection trauma is small. Because of high pressure, foreign substances can travel easily in the soft tissues and can cause serious complications. The materials that cause injection trauma are generally water, oil, grease, air, paint, thinner, molten metal, and wax. Hand and finger fascia, tendon sheaths, and neurovascular structures may be damaged temporarily or permanently. Amputation of the fingers can occur. In progressive cases, resistant infections and sepsis may be seen. High-pressure injection injuries of this kind must be taken seriously. Treatment should be initiated quickly; tetanus prophylaxis should be administered, and if necessary, incision and drainage should be performed immediately. Early intervention and treatment reduces the risk of amputation. Drainage and close follow-up is important in these patients while hospitalization is essential.

CASES
36-year-old male patient came to the emergency department (ED). He was working as a ready-mixed concrete pump operator. He said oil was leaking from the hydraulic pump, so he wore gloves and tried to block with his hands the leakage, but suddenly oil was injected into his right hand due to high pressure.

Figure 1: Hand trauma (1 Hour)
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During physical examination, an entrance hole of about 0.5 x 0.5 cm in size in the middle portion of the proximal phalanx of the fourth finger on the right hand was observed (Figure 1). There was slight discoloring in the injured finger. Although the pain was very severe, neurovascular and tendon examination seemed normal. The hand was slightly swollen. There were no necrosis or ischemic areas. Local dressings, tetanus prophylaxis, analgesia, and antibiotic prophylaxis were performed. The patient's radiographs were normal. No fractures were found. The patient was consulted by orthopedics. Patient was monitored to see whether there was compartment syndrome progression. As his hand was elevated, hand washing, dressing, and tiny incision at the impact point were performed. Patient’s hand was massaged to extract the hydraulic oil out through the impact point. Five hours later, edema and swelling were observed in the injured hand but more so in the dorsal (Figure 2).

![Figure 2: Edema (5 hours)](image)

Cyanosis was present on the fourth right finger. Fasciotomy was performed by orthopedics on the first day. Patient was followed up with for two days in the hospital and was discharged after. The Patient was followed later on the seventh and fifteenth days of the accident in the emergency room (Figure 3). Necrosis developed on the distal part of the fourth right finger.

![Figure 3: Distal necrosis (7 days)](image)
Dexpanthanol, nitrofurantoin, mupiromisin, Polyvidone-iodine were administered in dressing. In addition, prophylactic antibiotics were prescribed. Local medical treatment was continued. Approximately three months later, nearly complete recovery was observed during follow-up (Figure 4).

Figure 4: Posttraumatic image after 3 months

DISCUSSION
High-pressure injection injuries have such small impact points that they can remain unnoticed by both physicians and patients (Smith, 2005). Dailiana and his friends found out that in similar cases patients and doctors had to be vigilant while treating these patients (Dailiana et al., 2008).

In our case, the entrance hole of the injection was indeed small. The patient had severe pain. It wasn’t hard to find the entrance hole in the light of what the patient told us about what happened. Some unconscious patients might not be able provide much detail in a similar situation, so high-pressure injection injuries with small entrance holes should be kept in mind. High-pressure injection injuries are often seen as work-related accidents. The prevalence of these accidents are significantly high towards the end of the workers’ shift (Dagh et al., 2012; Hart et al., 2006). In our case, it occurred at 23:00 at night. High-pressure injection injuries often occur while the patient is using or repairing machines or pumps. Hart and his colleagues found out that high-pressure injection injuries mostly affect farmers, artists, and workers in heavy industry. Our patient was working in a similar job that uses high pressure. (Hart et al., 2006).

The traumas due to high-pressure machines have different treatment times and morbidity rates depending on the type and quantity of the injected substance. For such agents to be injected into the intact skin, pressure of about 7 bars is required. Grease guns operate with 350-450 bars of pressure, whereas diesel oil injectors use 150-200 bars, and industrial water guns have up to 400 bars pressure (Valentino et al., 2003). In our case, the average pressure in the hydraulic machine the patient was operating was 250 bars.

In addition, the distance of the entrance hole to the extremities is also important. In our case, the injection occurred while the patient was trying to block the leakage in a defective pump with his hand. He wore gloves, but they weren’t safe enough to protect him. Therefore, more foreign substances were injected into his hand. More protective and pressure-resistant gloves should be used in the industries that use high pressure.

Although early surgical debridement has favorable results, there are still some cases undergoing amputation (Dailiana et al., 2008; Borgette and Perrone, 2011). Valentino et al reported a case of a 20–year-old farmer who injected a kind of cattle vaccine in his hand by accident. Compartment syndrome developed, and early surgical debridement and antibiotic therapy
was applied, so regression was observed after all. In our case, early surgical incision and fasciotomy has been useful.

Generally pain develops as time passes, and it is absent at the beginning. In this case, the pain was severe from the beginning. The case was a legal case, so its details should be well documented and the neurologic examination should be done well. Radiography is useful while observing the air distribution and contrast differences of the soft tissue, but it may not be sufficient in distinguishing the type of material injected. General treatment involves the use of broad-spectrum antibiotics, tetanus prophylaxis, hand surgery or debridement. We applied early surgical debridement and antibiotics.

**Conclusion**

High pressure injection traumas rarely occur in our region, but as industrialization increases, we expect to see more similar cases in our ED. The amputation rates increase due to the patients’ negligence or delays in coming to the ED. Patient's hospitalization, early surgical interventions, and close monitoring reduce the risk of morbidity and mortality.

Pressure-resistant gloves and preventive equipment are required while working in industries that use high pressure. This equipment can reduce the harm of trauma.

**REFERENCES**


