

Case Report

Hot-press hand injury caused by roller type ironing machine

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ABSTRACT

Thermal crush burn injury due to roller type ironing press machine is relatively rare and can cause destructive effects with significant morbidity. These injuries can be avoided by taking some basic precautions. Early debridement after admission and definitive treatment after the extent of injury are delineated and these are the preferred approaches in the management. We present a case of thermal crush injury of the hand caused by laundry roller type ironing press machine.

KEY WORDS

Crush; hand injury; ironing machine; thermal burn

INTRODUCTION

Hot-press injuries are relatively rare type of burn and more common in industrial settings. The effect of simultaneous mechanical and thermal component is combined in these injuries. These injuries generally occur in the upper extremities and may cause amputations or deformity of the involved segment.^[1] We present a case of hot-press injury of the hand caused by laundry roller type ironing press machine.

CASE REPORT

A 47-year-old man presented at the emergency room with thermal crush injury of his left hand. History revealed compression of his left hand by a roller type ironing press

machine while ironing clothes about half an hour ago. On examination, he had 2nd and 3rd degree burns on the dorsal aspect and ulnar side of the volar region, and the dorsal aspect of the 2nd, 3rd, 4th and 5th fingers of the left hand [Figure 1]. No fracture was in the hand X-ray. Normal radial and ulnar pulses were palpable. The patient was hospitalised immediately for close monitoring. Sterile dressings were applied to the hand on the 1st day and subsequent days. The debridement of the wound was done during the dressings. In the area of burn, granulation tissue developed without any tendon or bone exposure and grafting was performed in the 3rd week [Figure 2]. After the successful surgery, the patient started to use pressure gloves and physical therapy exercises was maintained [Figure 3].

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Figure 1: Appearance of thermal crush burn at admission



Figure 2: Early period following skin grafting



Figure 3: Late period following skin grafting

DISCUSSION

There are two types of industrial machines used in the press being the common causative agents of thermal

crush injuries. The first one is a roller type pressing machine that is commonly used in the laundries for ironing. Another type of machine is used for sealing plastic bags or manufacturing plastic moulds.^[1] Even though the modern ironing presses have built-in devices to prevent injuries, even in the ironing phase, undesirable injuries still occur. The surface heat of roller press machine may reach a temperature of 160°C and this may cause severe deep thermal burns requiring amputation.^[2] The transmission of heat to the hand under pressure is intensified and more heat jeopardises the viability of the tissues that are mechanically traumatised.^[1]

These injuries are severe causes of burns with significant functional morbidity and the therapy should be decided carefully. The combined effects of heat and pressure on tissues are obviously more severe than the simple additive effect. These thermal injuries are more serious than others because heat conducts more deeply through the crushed tissues. For this reason, simultaneous crush and burn injury not only affect the skin and subcutaneous tissues but also neurovascular, tendinous and muscular systems.^[2]

In the actual burn management, early debridement and soft tissue coverage by a simple skin autograft are advised in 3rd-degree burns. However, in those cases with deep burns together with crush injury, serial debridements and dressing changes provide better results. In addition, in extensive exposure of structures, only skin grafts are not successful and multistage reconstructions are needed. Sometimes, necrosed and viable tissue may not be distinguished in the early stages and surgical procedures may be inadequate and therefore further debridements may be needed.^[2,3] If the zone of injury can be determined with reasonable certainty, severe wounds should be radically debrided, anticipating the possible need for complex flap closure. If staged reconstruction has been planned, a relook surgery should be done within 48–72 h. This provides an opportunity to reassess the wound for tissue viability and infection. At this point, definitive reconstruction can be performed if the wound is clean and no further debridement is necessary. If the wound is not ready, regular relook surgery and debridement are performed until the wound is clean with no infection and non-viable tissue.^[4] In our case, recurrent debridements were done during the dressings and after the appearance of granulation tissue, grafting was performed without the need for multistage reconstructions.

CONCLUSION

These complex burns are preventable and some simple measures may diminish the incidence. Employees in these occupations should be warned about the risk involved in these injuries. Early debridement should be done as early as possible during the treatment. Definitive treatment may be delayed until the extent of injury is demonstrated. Early wound excision, aggressive perioperative hand therapy and rehabilitative support were recommended.

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Conflicts of interest

There are no conflicts of interest.

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