Case Report

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Role of Topical Heparin in Burn Wound

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Abstract

Burns can severely damage a patient's physical and mental health. We should consider pain, hospital stays, lost workdays, and financial strain while handling these patients. Burn patients need rapid specialist care to reduce morbidity and death. Heparin is anti-inflammatory, allergic, histaminic, serotonin blocking, and proteolytic enzyme-blocking. Topical forms have been used to prevent burn extension, limit skin tissue loss, promote quicker healing with fewer contractures, relieve pain, reduce tissue oedema and weeping, prevent infection, and promote revascularization, granulation, and epithelialization of deeply burned tissue. We discuss topical heparin and burn care in this review.

Keywords: Topical Heparin; Burn; Wound; Management.

INTRODUCTION

Burns are a severe physical injury that can drastically affect a patient's physical and mental well being. We must consider the suffering, prolonged hospital stays, missed work days, and financial burden when caring for these people.[1] Patients with burns require rapid specialised care in order to lower morbidity and mortality. Heparin is a multifunctional chemical with effects on inflammation, allergies, histamine, serotonin, and proteolytic enzyme.[2,3] It has been used to treat thermal injuries inhalational, parenterally, and topically to prevent lung damage in inhalational burns, to prevent burn extension, to limit skin tissue loss, to speed healing with fewer contractures, to relieve pain, to lessen tissue oedema and weeping, to prevent infection, and to encourage revascularization, granulation, and reepithelialization of deeply burned tissue. The importance of topical heparin in the treatment of Burns is highlighted in this review study.

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MATERIALS AND METHODS

This study was conducted in the Department of Plastic Surgery in a tertiary care institute. The

patient under study was a 1 year old male child, with no other known comorbidities presented with second degree mixed scald burns to the right chest, axilla and right upper limb. Constituting 10% of total burn surface area (Fig. 1). At the time

Fig. 1: Wound at Presentation

of admission, we managed the patient according to the WHO burns protocol. We used topical heparin for burn wound irrigation at the time of burn wound dressing. Child was irrigated for 10-15 minutes with heparin solution during each burn dressing during the hospital stay (Fig. 2). Post burn

Fig. 2: Topical heparin application during dressing

wound irrigation, collagen dressing was applied over the burn wound.

Topical Heparin Preparation

500 ml of regular saline solution and 20 ml of a 5000 IU/ml heparin solution were combined to create 520 ml of a 200 IU/ml concentration heparin sodium solution (heparin). Every time, a new solution was made. Starting on day 1, this diluted heparin solution was uniformly dripped or sprayed onto the exposed burn surfaces. Heparin was used topically until full recovery. With a 50 mL syringe, the drug was injected drop by drop onto the burnt area until the agony subsided. This procedure was repeated two to four times till blanching took place on day 1. Heparin was applied twice daily, starting on the second day, for a week in a decreasing dose. There was no surgery done during this time. After irrigation of burn wound, wound was dressed with collagen dressing.

RESULTS

The second-degree superficial burn wounds healed well. Patient was discharged successfully with all burn wounds healed well. Intraoperative and postoperative period was uneventful. (Fig. 3).

DISCUSSION

Based on the method of injury, burn wounds can be divided into six different categories: scalds, contact burns, fire, chemical, electrical, and radiation. Spill and immersion scalds are further categories for liquid burns. Flash burns and flame burns are two types of fire burn injuries. A predictor of outcome can be found in the mechanism of burn injury. For instance, people who suffer from flame burns and electrical burn injuries frequently need to be hospitalised. In contrast, the majority of patients with burns brought on by sun exposure or contact with hot surfaces are treated as outpatients.

Burn injuries are a terrible concern for critical

care. Burns in children continue to be an important global health issue that cause severe morbidity and mortality. It appears that there are considerable physiological and psychological differences between treating these burn injuries in children and adults, despite the similarities in treatment. In comparison to adults, the dermal layer of skin is often thinner in newborns, infants, and children. The danger of hypothermia in the pediatric population is increased by increased evaporative loss and the requirement for isotonic fluids.

Heparin has a flexible structure and a strong anionic charge, which enable it to interact electrostatically with a variety of other molecules. Although there is evidence that heparin and similar chemicals also have anti-inflammatory and wound healing activities, heparin has historically been used largely for its anticoagulant qualities.[4] Moreover, heparin may hasten the molecular process of wound healing, which has important implications for the treatment of both acute and chronic burn wounds. Heparin tends to inhibit fibrin build-up and scar development by initially speeding up collagen production and deposition and then later slowing it down and absorbing it. Examples of secretory neutrophil products that are detrimental to wound healing include elastase, cathepsin G, and proteinases because they degrade the extracellular matrix and growth factors while simultaneously luring additional neutrophils to the wound site. Heparin and comparable substances are thought to limit these secretory products' activities through electrostatic interactions. Because of its and similar chemicals' anticoagulant qualities, heparin is used to treat burns.[5,6] The investigations looked at heparin's various use in the management of burns. These functions included sepsis, inhalation injury, and venous thrombosis treatment in addition to wound healing and pain management.

It has been shown that heparin treatment for burns increases blood flow, prevents blood clotting and infarctions, reduces pain and inflammation, revascularizes ischemic tissue, promotes granulation, controls collagen, lessens scarring, and prevents contractures. Patients felt less pain, erythema, and oedema thanks to heparin therapy. The amount of heparin required to promote healing was inversely proportional to the extent of the burns. After irrigation, blisters lost their inflammatory exudates and worked as an autologous biological dressing. There was smooth new skin underneath the thin, dry blister, which frequently flaked off in 10 to 14 days. The revascularization of ischemic tissue was the key factor preventing the spread of burns and producing a better outcome in heparin treated individuals.[7,8] Heparin's neoangiogenic qualities were assumed to be the cause of these improvements. In the early aftermath of a burn, the benefits of heparin's hypothesised anti-inflammatory and enhanced wound healing properties.[9] Numerous publications claim that topical heparin promotes faster and scarless wound healing after burn injuries.[10] Heparin therapy gave great pain relief on the visual analogue scale.[11] There are a number of complications that have been reported, including heparin induced thrombocytopenia, osteoporosis, excessive bleeding from burn wounds, epistaxis, haemoptysis, haematuria, and an allergic reaction to heparin.[12] In addition to the usual blood tests, blood was collected to measure the bleeding, clotting, and activated partial thromboplastin times. The revascularization of ischemia-prone regions and the emergence of granulation tissue were used to gauge the dosage of heparin applied topically.[13,14] The price of a 5 ml heparin vial in India is about 2500 rupees. There is 5000 IU in every 1 ml. Heparin cannot be used in all centres due to the higher cost of the drug.

CONCLUSION

Topical heparin can be used to manage burn wounds with satisfactory results.

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