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Role of Topical Feracrylum in Management of Second Degree Scald Burns

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ABSTRACT

Partial and deep partial thickness burn wounds present a difficult diagnosis and prognosis. Management of burn wound inflicted by the different physical and chemical agents require different regimes which are poles apart from the regimes used for any of the other traumatic wounds. In extensive burn, because of increased capillary permeability, there is extensive loss of plasma leading to shock while whole blood loss is the cause of shock in other acute wounds. Even though the burn wounds are sterile in the beginning in comparison to most of other wounds, yet, the death in extensive burns is mainly because of wound infection and septicemia, because of the immunocompromised status of the burn patients. Current techniques of burn wound care have significantly reduced the incidence of invasive burn wound infection, altered the organisms causing the infections that do occur, increased the interval between injury and the onset of infection, reduced the mortality associated with infection, decreased the overall incidence of infection in burn patients, and increased burn patient survival.

Feracrylum, a water-soluble combination of partial ferrous salts (II and III) of polyacrylic acid, is one of the chemical hemostatic agents and an antibacterial agent. Its molecular weight ranges from 500,000 to 800,000 Daltons, which prevents systemic absorption and prevents any negative effects on the liver, kidney, adrenals, cardiovascular, or hemostatic systems. Feracrylum has antibacterial properties, which lowers the risk of wound infection.

Keywords: Topical; Feracrylum; Management; Second degree scald burns.

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INTRODUCTION

A variety of factors guides the evaluation and management of burns. First is the type of burn such as thermal, chemical, electrical or radiation. Second is the extent of the burn usually expressed as the percentage of total body surface area (%TBSA) involved. Next is the depth of the burn described as superficial (first degree), partial (second degree) or full thickness (third degree).[1] Finally, other factors include specific patient characteristics like the age of the patient (< 10 or > 50 years old); other

medical or health problems; if there are specialized locations of the burn (face, eyes, ears, nose, hands, feet and perineum); and if there are any associated injuries, particularly smoke inhalation and other traumatic injuries.

Burn wound infections can be classified on the basis of the causative organism, the depth of invasion, and the tissue response.[2] Diagnostic procedures and therapy must be based on an understanding of the pathophysiology of the burn wound and the pathogenesis of the various forms of burn wound infection. The time related changes in the predominant flora of the burn wound from gram-positive to gram negative recapitulate the history of burn wound infection. Burn wound infections can be classified on the basis of the causative organism, the depth of invasion, and the tissue response.[3] Diagnostic procedures and therapy must be based on an understanding of the pathophysiology of the burn wound and the pathogenesis of the various forms of burn wound infection.[4] The time related changes in the predominant flora of the burn wound from gram positive to gram negative recapitulate the history of burn wound infection.[5]

MATERIALS AND METHODS

As pilot research, the investigation was carried out in a higher education facility in july 2023. The research was entirely descriptive; no statistical analysis was carried out. After gaining informed consent, the patient with the scald burn (Fig. 1) was included. The patient was 3 years old admitted for second degree scald burns. Feracrylum in solution form was used as antimicrobial solution (Fig. 2). Serial changing of dressings of the burns wound was done.

RESULTS

In this study, we had a child with second degree scald wounds due to boiling water. The wound at the end of 3 weeks (Fig. 3) showed a significant reduction in treated area measured by digital planimetry with a new epithelium development. After treatment, the size of the raw area surface decreased (Fig. 3). Due to the application of feracrylum no pain, soaking was observed, good hemostasis and no infection was observed.

Fig. 1: Wound at Presentation

Fig. 2: Application of feracrylum over burn surface

Fig. 3: Healed second degree superficial burns

DISCUSSION

Feracrylum is a water soluble mixture of incomplete ferrous salt II and III of polyacrylic acid containing 0.05–0.5% of iron. It is biodegradable and hygroscopic.[6] The molecular weight is about 5,00,000–8,00,000 Daltons, due to which there is no systemic absorption. No noted side effects on major organs like liver, kidney, adrenal gland,

cardiovascular system and hemopoietic system. It has antimicrobial and wound healing properties.[7]

Feracrylum has multiple actions for wound care

Antimicrobial action: Feracrylum is not only haemostatic but also anti-infective against a number of Gram-positive and Gram negative pathogenic, bacterial and fungal strains like

Staphylococcus aureus, Streptococcus pyogenes, Corynebacterium diptheriae, Salmonella typhi, Shigella dysentriae, Pseudomonas aeruginosa, Proteus vulgaris, Escherichia coli.

Trichoderma viridae and Candida albicans.[10]

It ruptures microbial cell wall causing cell lysis. Feracrylum is superior to povidone iodine for its antimicrobial properties and its efficacy is comparable to that of povidone iodine.[11]

Feracrylum decreases risk of wound infection which delays wound healing.

Hygroscopic action: Feracrylum is hygroscopic in nature and maintains a moist environment at wound site resulting in faster healing and easy dressing removal. It promotes growth of healthy granulation tissue. Feracrylum is available in the form of a solution (1% w/v feracrylum), gel and tubes (1% feracrylum) and tulle (3% feracrylum).

Haemostatic action**:** It causes activation of thrombin (factor IIa) which is a serine protease that converts soluble fibrinogen into insoluble strands of fibrin thus forming clot as well as catalyzing many other coagulation related reactions in blood coagulation.[8]

Also, feracrylum on coming in contact with blood proteins especially albumin, it forms a biodegradable water insoluble synthetic complex creating a large rubbery clot which forms a physical barrier on wound surface and stops capillary bleeding and oozing in 2-3 minutes. It is non allergic with no systemic absorption.[9]

CONCLUSION

The present study, results may conclude that better size reduction of raw area (high percentage of epithelized area) and lesser incidence of wound infection when Feracrylum was used.Topical feracrylum can be used to manage burn wounds with satisfactory results. The time taken by the patients to recover from pain, resume their normal activity and also with regard to normal food intake was rapid.

It is a good topical agent for prevention of infection of the burn wounds. Further studies are recommended with large sample size to confirm these findings.

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