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Post burn pruritus in pediatric burn patients

Sophie Maria Pierrette Nieuwendijk^{a,b}, Iris Johanne de Korte^{a,b},
Mereille Marren Pursad^b, Monique van Dijk^{a,b,*}, Heinz Rode^b

^a Department of Pediatric Surgery, Erasmus MC-Sophia Children's Hospital, Rotterdam, The Netherlands

^b Department of Pediatric Surgery, Red Cross War Memorial Children's Hospital, Cape Town, South Africa

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ABSTRACT

Background: Pruritus is a common problem seen in the healing process of a burn wound and gives great discomfort for the patient. Most research in this field has been done in the adult population, so evidence in the pediatric population is still lacking

Purpose: The aims of this study were to assess the incidence and severity of post-burn pruritus, identify predictors for pruritus and evaluate the pharmacological treatments in a pediatric setting.

Methods: Pruritus was assessed in this prospective observational study using a numeric rating scale and the Itch Man Scale applied by the patients' caregiver. The predictive values of candidate predictors for pruritus were compared using Fisher exact tests and Kruskal-Wallis tests.

Results: 413 patients were included in this study. Pruritus was reported in 71.7% of the patients. Complete symptom relief was only achieved in 29.8% of the patients who used medication. Time since burn ($p < 0.001$), depth of the injury ($p = 0.017$), TBSA burned ($p = 0.001$) and skin grafting ($p = 0.001$) were found to be significant predictors for post-burn pruritus.

Conclusion: Post-burn pruritus is still a highly prevalent problem in pediatric burn care. Its intensity and frequency are higher especially in the first three months or with a deeper wound or a higher TBSA.

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1. Introduction

1.1. Background

Burns are a major public health concern, in particular in the developing world. Over 95% of fatal burn injuries occur in low- and middle-income countries [1]. While flame injuries are the main cause of burns in the adult population, children and especially toddlers are at higher risk of hot water burns. These burns account for approximately 5% of all burn deaths but account for a much higher proportion of non-fatal burns [2,3]. The

survivors have to cope with problems such as disfigurements and pruritus (itch). Previous studies have reported that 87–93% of adult patients suffered from pruritus at 3 months post burn [4,5].

Histamine plays a main role in one of the known mechanisms of post-burn pruritus. Especially in the hypertrophic phase of the healing process a large amount of mast cells are attracted and result in an increased level of histamine [6–8]. Pruritic stimuli, like histamine, activate a specialized subpopulation of C-fibers [9]. These C-fibers convey the impulses to the dorsal horn of the spinal cord and from here on to the different areas in the cortex [10,11].

* Corresponding author at: Department of Pediatric Surgery, Erasmus University Medical Center-Sophia Children's Hospital, Room SK 1276, Wytemaweg 80, 3015 CN Rotterdam, The Netherlands.

E-mail address: m.vandijk.3@erasmusmc.nl (M. van Dijk).

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Several therapeutic strategies are used to treat the itching sensation. Some, such as antihistamines or compression garments, intervene in the peripheral aspects of the pruritic pathway. Others, such as gabapentin or massage therapy, intervene in the central aspects of the pruritic pathway [11]. The current mainstay of treatment are antihistamines, although a combined approach using centrally and peripherally acting agents has been found most effective in the treatment of acute post burn pruritus [12].

Known predictors for post burn pruritus are number of surgical procedures, i.e. a measure of deep dermal injury, post-traumatic stress symptoms, total body surface area (TBSA), female gender [4], younger age, post burn dry skin and raised/thick scars [5]. Heat, sweating, fatigue and pain in the burned area can trigger or exacerbate the itching sensation. On the other hand, cold temperatures, cold water and rest may help alleviate the itch [13].

Like the majority of burns research conducted so far, the above-mentioned studies concerned adult populations. One pediatric study demonstrated decrease of the intensity and frequency of itch over time [14]. Evidence of possibly other predictors and triggers of post burn pruritus in the pediatric population is still lacking. We performed a study aimed at assessing the incidence and severity of post-burn pruritus, identifying risk factors for pruritus and evaluating the pharmacological treatments in a pediatric setting.

2. Materials and methods

2.1. Study design

This was a prospective observational study approved by the University of Cape Town Human Research Ethics Committee under HREC REF: 473/2015. Data were collected from April 2016 to August 2016.

2.2. Subjects

This study was conducted at Red Cross War Memorial Children's Hospital in Cape Town, South Africa and included children till the age of 13 with burn injuries. They were recruited either at the ward upon admission (just after the burn injury had taken place), or at one of the two outpatient clinics during a first or repeat visit. Because of the different

departments patients were seen at, data could be collected at different points in time after the burn incident and a part of the patients could be seen for follow up. Children who were not accompanied by a caregiver were excluded, as well as accompanied children for whom the caregiver would not give consent.

2.3. Consent

One of the researchers explained the purpose of the study and presented an information sheet for further reading. Children of the age of 6 years or older were also informed and asked to provide consent. The caregiver, and the patient, if 6 years or older, signed the informed consent form if they agreed to participate in the study.

2.4. Data collection

For the study either only the caregiver, in case the patient was younger than 6 years, or both the caregiver and patient were asked questions regarding the itch and medication in the past week and were administered several assessment scales (described below). If no itch was experienced in the past week, they were asked if there was itch at any point in time after the burn. Information about the burn injury (TBSA, depth of the wound, injury etiology, surgery, scars) and prescribed medication was retrieved from the patient's medical file.

2.5. Medicament prescription policy

Gabapentin, 5 mg per kg bodyweight, and/or an antihistaminic (chlorpheniramine (Allergex)), 1mg till 10kg and then 0.1mg per kg bodyweight, were prescribed in the wards and outpatient clinics to treat the itch.

2.6. Itch Man Scale and numeric rating scale

Severity of the itch was measured with the Itch Man Scale (Fig. 1), which was specifically developed for pediatric burn patients and found valid and reliable in a population till the age of 18 years [15]. Permission to reprint this scale was granted by Shriners hospital for children. The score ranges from 0 to 4 and is supported by 5 illustrations showing an itching man. 0 is a happy man with no itch and 4 a man with the most terrible itch, impossible to sit still and concentrate. First the participants

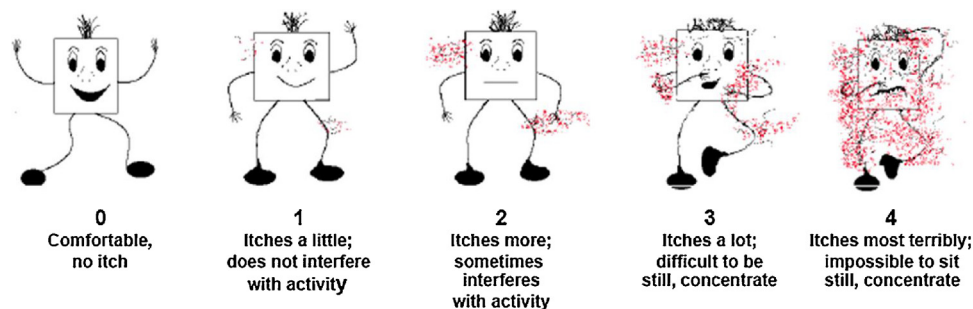


Fig. 1 – Itch Man Scale (©2000, Blakeney and Marvin). Permission was granted by the copyright owner Shriners Hospitals for Children[®].

Ref. [16].

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