THE THERAPEUTIC EFFICACY OF PHARMACOLOGICAL VERSUS NON-PHARMACOLOGICAL MEASURES IN THE MANAGEMENT OF POST BURN ITCH

Abdul Razak Memon, S.M. Tahir, Firdous Mumtaz Memon, Bilal Fazal Shaikh

Liaquat University of Medical and Health Sciences Jamshoro (Sindh)

ABSTRACT

Objective: To standardize the management protocol of post burn itch by comparing therapeutic efficacy of pharmacological with non-pharmacological measures.

Study Design: A prospective, clinical investigative and quasi-experimental study.

***Place & Duration* of Study:** This study was conducted at Burn emergency Unit, Liaquat University of Medical & Health Sciences Jamshoro for the period of 18 months from January 2006 to June 2007.

Patients and Methods: A total of 80 patients were included in the study, and equally divided into 2 groups. Group A received an oral antihistamine with topical Ibuprofen while Group B received olive oil massage followed by wearing of compressive garments. The demographic data and initial assessment of the severity of itch on linear descriptive scale was made by the research team; while subsequent data for the entire study period was obtained by the attending burn clinician who was blind to the allocated regimen. Results were analyzed using computer statistical software SPSS®.

Results: Group A included 40 patients with 23 males and 17 females having mean age of 28.13 (SD ± 13.03) and mean body surface area affected 15.387% (SD ± 5.408) and mean itch scale of 5.500 (SD ± 2.219). Group B comprised of 40 patients with 21 males & 19 females with a mean age of 29.38 (SD ± 14.35) with mean affected body surface area of 16.150% (SD ± 5.555) and mean itch scale of 5.350 (SD ± 1.762). The main outcome measure was the improvement in burn itch. The results after 12 weeks of treatment for both groups showed a remarkable improvement in Group B when compared to Group A (p-value 0.000 and 0.365 respectively).

Conclusion: The non-pharmacological measures are superior to the pharmacologic measure with respect to their clinical efficacy and their improvement is highly significant after 4 weeks of treatment.

Keywords: Post burn itch, compressive garments, olive oil, oral antihistamines

INTRODUCTION

Burn injury, whether limited or widespread, frequently leads to long-lasting physical, aesthetic, functional, psychological, and social consequences. One of these is the problem of post burn itch. This would have been as old as the burn itself however it was first focused in 1988 when, Gordon wrote "Burn-related pruritus is a serious problem that often receives little attention, even though it continues to aggravate burn patients during their rehabilitation" [1]. At the same time; Bell, et al., added, "No succinctly defined method of treatment for post burn itch is found in the literature" [2]. Still we know very little about the exact mechanism of post burn itch that can be attributed to the complex nature of the

Correspondence: Dr Firdous Mumtaz, Associate Prof of Gynae/Obst, Liaquat University of Medical and Health Sciences, Jamshoro [Sindh].
E-mail: razakmemon@hotmail.com

Received Feb 6, 2008: Accepted Feb 24, 2008

injured skin and the nerves of the skin [3-9], but it must also be emphasized that very little research has so far been done on this subject.

Itching in a burn wound usually begins at the time of wound closure and peaks after about two to six months. Typically itching persists at this level for months, markedly impairing quality of life. Resolution often occurs with scar maturation, which often takes 12 to 18 months [10,11]. The size of the burn is not a valid indicator of the degree of post-burn itch. As for the depth, longer the time taken for healing or re-epithelization, higher is the risk of significant itch. Burns healed in less than 10 days rarely itch. Burns requiring over three weeks healing usually have some degree of itching. Grafted burns are insensate for months and do not itch [12,13]. There is no current effective treatment for this problem. The standardized treatment protocols are also lacking. Sheila Kavanagh et al from Nursing Committee of the International Society for Burn Injuries have classified various available modalities for the management into pharmacological and non-pharmacological measures [14].

The oral and topical antihistamines, topical analgesic and Doxepin cream 5% are examples of pharmacological measures while non-pharmacological measures include use of moisturizing cream, colloidal oatmeal product, cool bath/shower and compressive garments. The rationale to use topical Ibuprofen cream is adopted from the fact that Itch is considered by many investigators to be a form of pain [15]. The similarity is that itch shares with pain a peripheral group of C fibers, a group of dorsal horn interneurons and a specific pathway in the anterolateral spinal cord to the brain. Both itch and pain disappear when this pathway is cut. The C fibers carry both itch and pain stimuli. However, itch can only be produced by the superficial skin. Deeper stimuli produce pain [8-10].

To standardize the management protocol of post burn itch by comparing therapeutic efficacy of pharmacological with non-pharmacological measures.

PATIENTS AND METHOD

A quasi-experimental study was carried out at Burn emergency unit, Liaqat University of Medical & Health Sciences Jamshoro for the period of 18 Months from January 2006 to June 2007. Eighty patients, presented with itch of variable intensity, having healed burns resulting from different etiologies (flame, scald, electrical, chemical) with body surface area (BSA) affected up to 25% and without associated dermatological or systemic diseases like diabetes, hypertension arthritis were enrolled for this study. Patients with larger than 25% BSA involvement have other serious rehabilitative issues and were not included in this study.

The patients were allocated randomly in two different groups after obtaining written consent. Forty patients (group A) were given pharmacological regimen consisting of oral antihistamines and topical use of ibuprofen cream while group B had non-pharmacological regimen consisting of the olive oil massage along with the use of compressive garments. The olive oil massage was done for 30 minutes twice a day followed by wearing of compressive garments. For group A, oral antihistamine in the form of Tab: Atarax (Hydroxyzine) 10 mg twice a day and local application of Ibuprofen cream twice a day to itch area was applied and rubbed in gently.

Olive oil was used for this study in its natural form. Olive oil is a fruit oil obtained from the olive (Olea europaea; family Oleaceae along with lilacs, Jasmine and ash trees), a traditional tree crop of the Mediterranean basin. It is commonly used in cooking, cosmetics, soaps, as a fuel for traditional oil lamps and pharmaceutical preparations especially for the preparation of lipophilic drug ingredients. Olive oil is a rich source of fat because of its high content of monounsaturated fat (mainly oleic acid) and polyphenols with a powerful antioxidant

Hydroxytyrosol. Olive oil also has demulcent properties.

The allocated treatment regimen was continued for 12 week period and each patient was followed on weekly basis.

The demographic data was obtained and a questionnaire was filled to characterize the itch pattern in our local population with a hope that its results may prove useful for further research.

Extensive literature search failed to find any itch scale that can be used to measure the precise magnitude of itch that patients experienced. Universal pain assessment tool version 2 [17] was modified according to the requirement of the study. This tool was made of a linear scale with description of each scale in order to assist patients to rate their itch as accurately as possible. The use of this tool was explained thoroughly to the patient before their responses were sought. It allowed them to rate their itch between 0 for no itch and 10 for the worst itch. The demographic data and an initial assessment of the degree of itch was made by the research team, while the subsequent data for the entire study period was obtained by the attending burn clinician who was blind to the assigned regimen.

STATISTICAL ANALYSIS

Data has been analyzed using SPSS version 10. Descriptive statistics were used to describe the data. Wilcoxon signed rank test was used to compare pre and post treatment itch scale within the group. Mann – Whitney test was used to compare the itch scale between both the groups at different times. P-value <0.05 was considered as significant.

RESULTS

The mean age for both groups was almost the same, so was the body surface area affected. The pretreatment mean itch scale also does not differ significantly (table-1).

The most common cause of burn in non pharmacological group was scald (42.5%) followed by flame (13%). These causes accounted for 45% and 17% of burns cases respectively in the pharmacological group. In both groups electrical injury was responsible for 10% of cases. The only remarkable difference between the two groups was that non-pharmacological group had 5 cases (12.5%) of chemical burn while pharmacological group had none. The male patients were 23 (57.5%) in Pharma group and 21 (52.5%) in non pharma group. Surgery was performed for 55% of cases in non pharma group as compared to 45% in the pharma group. The lesion healed naturally or assisted by surgery within 4 weeks in 25% cases in pharma group and in 35% cases in non-pharma group. While lesion took more than 4 weeks for healing in 57.5% cases in pharma group and 47.5% cases in non-pharma group (table-1).

All cases from both groups were followed on fortnightly basis on 6 consecutive occasions and their response to assigned treatment protocol recorded according to linear descriptive itch scale. The pretreatment mean itch scale and post treatment mean itch scale for both groups (table-2).

The patients from both groups were analyzed for improvement in their symptom of itch comparing with pretreatment itch scale. The within group results of their response to the allocated treatment (table-3).

It is evident from (table-4) that the patients in pharma group responded well initially with regard to improvement in itch but there was no significant improvement after words, while patients from non-pharma group showed a steady improvement that persisted throughout their follow up period. It showed significant difference between the two groups and improvement with non-pharmacological treatment regimen found statistically highly significant throughout the period of treatment. Between groups comparisons summarized (table-4) that initial response was almost identical for both groups, but in middle and terminal part of study the improvement with non-pharmacological measure found highly significant.

Considering how various independent variables are related to the severity of itch it

was noted that itch scale for patients who had surgery for their lesion was less as compared to patients whose lesion healed naturally. Itch scale was 5 or above for all patients whose lesion healed naturally in both groups. 18 patients from non pharma group had surgery and yet had an itch scale of 5 or above. Kendall's tau-b value=.548 & p-value= 0.000 for non pharma versus Kendall's tau-b value=0.743 & p-value=0.000 for pharma group. We observed that the time taken for the lesion to heal has good correlation with the severity of itch scale. Greater the time taken for complete healing of the lesion, more severe is the itch. Kendall's tau-b value=0.640 & p-value= 0.000 for non pharma versus Kendall's tau-b value=0.233 & p-value=0.004 for pharma group. The results of this study showed that itch is more troublesome during night time but has no clear relationship with itch scale. Kendall's tau-b value= -0.037 & p-value= 0.764 for non pharma versus Kendall's tau-b value=0.123 & p-value=0.325 for pharma group.

The result of questionnaire revealed that itch was more severe when it started at the site of healed lesion rather than starting along the healed margins. Kendall's tau-b value= -0.603 & p-value= 0.000for non pharma versus Kendall's tau-b value= -0.418 and p-value=0.002 for pharma group. In 80% (32/40) and 72.5% (29/40) of cases of pharma and non-pharma group respectively it started at the site of healed lesion. The itch scale 5 or more is seen in 72% (23/32) and 86% (25/29) of cases of pharma and non-pharma group. The itch causes temptation to scratch. When asked whether scratching relieves itch, the answer from 70% of patients from both groups was NO, while it was YES in only 6.25% patients. 23.75% of patients stated that scratching makes itch worse.

DISCUSSION

Current measures for controlling post burn itch are quite insufficient and therefore, for majority of burn survivors the itch becomes a quality of life Issue [1,2,18-20]. So far much effort is directed to reduce morbidity from thermal injury; therefore, post burn itch remains a neglected subject and still poses therapeutic problem [21].

The grafted area itches less then the naturally healed lesion; this is probably due to the fact that grafts remain insensitive for months [13,14]. The severity of itch is directly proportional to the time taken for healing. The severity of itch increases when lesion heals in more then 4 weeks as mentioned in literature [2]. Different people can tolerate different amounts of itch, and anyone's threshold of tolerance can change due to stress, emotions, and other factors. In general, itching is more severe if the skin is warm, and if there are few distractions as, for example, at night time. This is why people tend to notice itching more at night.

It is stated that itch shares with pain a peripheral group of C fibers, which carry both itch and pain stimuli to a group of dorsal horn interneurons and a specific pathway in the anterolateral spinal cord to the brain. Both itch and pain disappear when this pathway is cut [16,17]. The recent experiment based on clinical observations has observed that itch and pain have separate sensory modalities [17]. The post burn itch can start at the site of healed lesion or along the site of healed lesion. The itch scale was on much higher side when itch started at the margins of healed lesion when compared where itch started along the healed margins and the difference was statistically much significant. Scratching of the lesion did not relieve the itch and brought no change in severity of itch in majority of cases (70%), however it led to partial relief in a few cases (6.25%). Instead, scratching of the lesion may worsen the itch in most cases (23.75%).

For patients of pharma group, pretreatment itch severity (mean 5.50, SD ± 2.22) was compared with post treatment itch severity. The results showed that the improvement was statistically significant between 2 to 8 weeks of treatment, (p-values =0.001 & 0.000 at 2 & 8 weeks respectively), after this period, results became equivocal (p-

Table-1: Various features, including pretreatment itch scale of patients included in the study (n=80).

Mean Age	28.13	29.38	0.696
Mean I SD			2 Sample T test
Sex Ratio (M: F)	23:17	21:19	0.377
Mean BSA affected %	15.39	16.15	0.509
Etiology			
No of patients (%)			
Scald	18(45.00%)	17(42.50%)	
Flame	17(42.50%)	13(32.50%)	
Electric	04(10.00%)	04(10.00%)	
Chemical	00	05(12.50%)	
Others	01(2.50%)	01(2.50%)	
Surgery Healing Time	18(45.00%)	22(55.00%)	
No of patients (%)			
Within 2 weeks	2	01	
Within 3 weeks	05	06	
Within 4 weeks	10	14	
More then 4 weeks	23	19	
Itch Scale			
No Itch	00	00	
1	01	00	
2	03	01	
3	04	04	
4	07	09	
5	05	04	
6	05	08	
7	05	05	
8	07	05	
9	03	04	
10	00	00	

Table-2: Mean itch scale of two groups after treatment (n=80).

Mean itch scale (sd±) Group	Pre-treatment	After 2 wks Treatment	After 4 wks Treatment	After 6 wks Treatment	After 8 wks Treatment	After 10 wks Treatment	After 12 wks Treatment
Pharma	5.50 (2.22)	5.15 (1.97)	4.87 (1.79)	4.25 (1.74)	3.77 (1.67)	3.68 (2.02)	3.55 (2.53)
Non-Pharma	5.35 (1.76)	4.60 (1.48)	3.83 (1.53)	3.18 (1.58)	2.53 (1.62)	1.90 (1.61)	1.15 (1.41)

Table-3: Within group post treatment Improvement at different follow-up period

Pharma Group			Non-Pharma Group		
Improvement	**P-Value***	**Itch Scale****	**Improvement**	**P-Value***	**Itch Scale****
At 2 weeks	0.239	5.15	At 2 weeks	0.000	4.60
Between 2-4 weeks	0.001	4.87	Between 2-4 weeks	0.000	3.83
Between 4-6 weeks	0.000	4.25	Between 4-6 weeks	0.000	3.18
Between 6-8 weeks	0.000	3.77	Between 6-8 weeks	0.000	2.53
Between 8-10 weeks	0.414	3.68	Between 8-10 weeks	0.000	1.90
Between 10-12 weeks	0.365	3.55	Between 10-12 weeks	0.000	1.15

** Wilcoxon Signed Ranks Test* *** Mean Itch Scale at Fallow up*

value 0.414 and 0.365 at 10 & 12 weeks respectively). The initial improvement may be a placebo effect or the antihistamines lose their therapeutic potency to cope with increased histamine release as time passes. This finding is consistent with results of prospective trial conducted by Vitale, et al [2].

Patients of non-pharma group were evaluated; the results showed a steady improvement when compared to their pretreatment itch scale (Mean 5.35, SD ± 1.76). In this group the severity of itch reduced gradually and after 12 wks itch severity was very low almost equal to zero. (Mean 1.15, SD

Table–4: Pharmacological versus non-pharmacological group.

Treatment Period	P-Value*
After 2 weeks treatment	0.1512
After 4 weeks treatment	0.0075
After 6 weeks treatment	0.0059
After 8 weeks treatment	0.0013
After 10 weeks treatment	0.0001
After 12 weeks treatment	0.0000

** Mann-Whitney Test*

± 1.41 and p-value of 0.000) These significant results may simply be the synergistic effect of two components of the regimen. All researchers agree that massage therapy reduces almost all types of pain, including pain associated with debridement [8,20-22]. Whether it was simply massage that improved itch or it was the effects of massage with olive oil that resulted in significant improvement, is still to be discovered. The use of compressive garments serves two advantages. Firstly it reduces the secretion of histamine from mast cells [9-11] and secondly, it provides the barrier to repeat scratching that excoriates itchy wounds which, in turn, favors secondary infection and worsens the situation [23].

CONCLUSION

We conclude that olive oil massage followed by wearing of compressive garments is a promising approach to manage the post burn itch. Not only does this regimen has superior therapeutic efficacy but also the ability to eliminate the sedation usually associated with the use of antihistamines.

REFERENCES

1. Demling R, DeSanti L. The itching Burn Wound [Web document]. 2002 [cited 2004 July 7]. Available from: URL. www.linkinghub.elsevier.com.
2. Gordon M. Pruritus in burns. J Burn Care Rehabil. 1988; 9: 305.
3. Vitale M, Fields-Blache C, Luterman A. Severe itching in the patient with burns. J Burn Care Rehabil. 1991; 12: 230-3.
4. Bell L, McAdams T, Morgan R, Parshley PF, Pike RL, Riggs P, et al. Pruritus in burns: A descriptive study. J Burn Care Rehabil. 1988; 9(3): 305–11.
5. Baker RAU, Zeller RA, Klein RL, Thornton RJ, Shuber JH, Marshall RE, et al. Burn wound itch control using H_1 and H_2 antagonists. J Burn Care Rehabil. 2001: 22(4): 263-8.
6. Simone DA, Ngeow JY, Whitehouse J, et al. The magnitude and duration of itch produced by intracutaneous injections of histamine. Somatosens Res. 1987: 5; 81-92.
7. Helvig E, Engrav LH, Cain VJ, et al. Patient's report of itching post-burn injury. J Burn Care Rehabil. 1999; 20 (pt 2): S259.
8. Low MH, Bernhard JD. Pruritus. Sem Neurol. 1992: 12; 374-84.
9. Schmelz M. A neural pathway for itch. Nat Neurosci. 2001: 4; 9-10.
10. Andrew D, Craig AD. Spinothalamic lamina I neurons selectively sensitive to histamine: a central neural pathway for itch. Nat Neurosci. 2001; 4: 72-7.
11. Phillips L, Robson M. Pruritis in burns. J Burn Care Rehab. 1988; 19: 306.
12. Nelson R, Horran MJ, Salem L. Burn wound pruritus: a role for substance P and eosinophils. J Burn Care Rehab. 1998 Jan-Feb: 215.
13. Marvin J. Pain assessment versus measurement. J Burn Care Rehab. 1995; 3(16): 348.
14. Sheila Kavanagh, Alette de Jung, Care of burn patients in the hospitals; Nursing Committee of the International Society for Burn Injuries. Burns. 2004; 30: A2–6.
15. Greaves MW, Wall PD. Pathophysiology of itching. Lancet. 1996; 348; 938-40.
16. http://en.wikipedia.org/wiki/Olive_oil

17. http://www.anes.ucla.edu/pain/FacesScale2.jpg

18. Gibran NS, Heimbach DM. Current status of burn wound pathophysiology. Clin Plast Surg. 2000; 27: 11–22.

19. Fruhstorfer H. Sensory receptors mediating itch. Skin Pharmacol. 1990; 62: 113

20. Field TM. Massage therapy effects. Am Psychol. 1998 Dec; 53(12): 1270-81.

21. Weerapong P, Hume PA, Kolt GS. The mechanisms of massage and effects on performance, muscle recovery and injury prevention. Sports Med. 2005; 35(3): 235-56.

22. Field T, Peck M, Krugman S, Tuchal T, Schanberg S, Kuhn C, et al. Burn injuries benefit from massage therapy. J Burn Care Rehabil. 1998; 19: 241–4.

23. Barone CM, Mastropieri CJ, Peebles R, Mitra A. Evaluation of the Unna boot for lower-extremity autograft burn wounds excoriated by pruritus in pediatric patients. J Burn Care Rehabil. 1993; 14: 348–9.