DISCUSSION

Burns are notorious in the sense that they break the continuity of skin and produce greater raw area. Burns are ischaemic wounds. Confluent thrombosis which involves arterioles, capillaries, venules, and at times, even larger vessels, is characteristic of fine thickness burns. In partial thickness burns thrombosis is incomplete, the dermal circulation is deeper, viable segment of the dermis is gradually re-established within a few days, although the deep superficial portion of the dermis of course remains avascular.

Because of wound ischaemia only, systemically administered antimicrobial agents are not reliably delivered to the site where they are needed, as diffusion from the wound periphery, for a variable but often considerable distance is their only means of access, moreover the wound surface close to the heat source is at once the most severely injured and ischaemic and as well the original site of most burn wound infections. Topical therapy (daily cleaning with sterile 0.9% sodium chloride or topical agents) is therefore best used to treat burn.
Burn wounds in patients with large burns is equally as urgent a need as is fluid resuscitation.

Normal skin harbours few pathogenic bacteria. Most burns are sterile initially, although contamination usually by soil or water or dirty linen may occur after accident. Because of the greater raw area burn wounds are more prone to invasion by micro-organisms. In large burn areas; dense colonization of pathogens can occur within 24 hours in untreated patients. Immediately after injury, few bacteria can be recovered predominantly gram positive. The type and density of organisms present in the untreated burn wounds change with time, so that by the fifth post burn day Pseudomonas can be recovered. By the middle of second post burn week, the burn wound organisms are predominantly gram negative. By using only systemic antimicrobials without any topical therapy, the organisms penetrate the eschar by migration and extend down to viable non-viable tissue interface. At this site further microbial proliferation commonly occurs and promotes lysis of denatured collagen and spontaneous slough of eschar.

Therefore, the main aim in the treatment of burn is to re-establish the continuity of the skin by preventing the infection. Endogenous skin grafting is the best dressing material discovered so far but it has its own limitations as in extensive burns large amount of donor
area may not be available (50% full thickness burn in adult and of skin required to obtain wound closure has been estimated at 6000 square centimeters). Patients may be unfit for surgery due to shock and other reasons.

Alternatively homografts are used but again due to limited supply, other biological covering materials used are allografts skin, heterograft skin, foetal membrane. Although they are not cost effective but the problem is of very limited supply.

Thus if simple daily cleaning with sterile 0.9% saline alone is instituted, this may save the patients from the unnecessary expenditure of buying the costly drugs because cost is also an important factor.

Presently Povidon-Iodine with Neosporin powder are in as a topical antimicrobial agents in the treatment of burn. The present work is a study of the effects of Betadine-Neosporin dressings and simple daily cleaning with saline in superficial, deep and mixed burns.

A total number of 42 cases of burns were studied. These were divided into 2 groups. One group comprising of 18 patients of which 10 had superficial burns and 8 deep, was treated with daily simple cleaning with normal saline. The other group of 24 patients of which 6 had superficial and 18 deep burns.
The incidence of burns was highest in the age group of 16-30 years. This may be attributed to the fact that this was the age group which comprised the young housewives as well as the active working population. The majority of the cases were females, a fact due to most of the patients being housewives and actively involved in kitchen work and hence having contact with kerosene oil used in stoves and firewood. Most of the cases came from the rural area. With modernisation, cooking gas used by urban people places a much reduced hazard of burns. Since most of the burns were sustained during cooking or lighting kerosene lamps, the burns in most of our cases (83.3%) were sustained indoors. Obviously, as far as the occupation is concerned, most of the females were housewives, and fire during work or cooking was thus the commonest cause of burns. Most of the cases landed up in the hospital in about 2 days of the thermal injury and most had been left untreated. Most of the cases had 21-40% burns.

Nearly all the cases of burns had not received any kind of medical attention and had not been taken care of in any way. Infection was thus present in 39 out of 42 cases on surface culture. Staphylococci were the commonest offending organism followed by Pseudomonas.

The response of superficial burns to simple daily cleaning with saline was promising. 40% of the
burns had healed by the 15th day. In case of the superficial burns treated by PVP plus Neosporin, 37.5% had healed in this time. At one month, 70% of the superficial burns had healed in case of saline treated cases while 62.5% cases of the other group had healed. By 45 days healing was complete in all the cases in either group. Thus we can see that in case of superficial burns the responses after using the two kinds of treatment were comparable. This fact is important since we can infer from this fact that PVP plus Neosporin may not have additional benefit in superficial burns. Thus, if simple daily cleaning with saline alone is instituted, this may save the patients from the unnecessary expense of buying the relatively expensive drugs, and cost as we all know is a very important factor as far as the poor population of our country is concerned.

Table : Showing percentage of healed patients having both superficial and deep burns during 0-45 days.

<table>
<thead>
<tr>
<th>Total time of healing in days</th>
<th>Simple cleaning with Normal saline</th>
<th>PVP + Neosporin treated cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Superficial</td>
<td>Deep &amp; mixed</td>
</tr>
<tr>
<td>15</td>
<td>40.0%</td>
<td>12.5%</td>
</tr>
<tr>
<td>30</td>
<td>70.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>45</td>
<td>100.0%</td>
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In case of deep and mixed burns, 12.5% cases were showing good healing by 15 days in cases treated with saline, while in the PVP + Neosporin group, the figure was 25%. At one month, 50% of saline treated cases had healed while 66.25% of the other group had healed. The rate of healing was superior in the drug treated cases. 27% of patients treated with saline had counts less than $10^5$/cm$^2$ while the corresponding figure in the PVP + Neosporin group was 37%, after 15 days of treatment. Similarly, at the end of 30 days, as much as 39% cases treated with saline were having counts greater than $10^5$/cm$^2$, but only 25% of the PVP + Neosporin group had such elevated counts.

From these facts we can conclude that in cases of deep and mixed type of burns PVP + Neosporin had a greater role to play. The average healing time was shorter and the infection rate was lower as compared to the saline group. Also, since much more cases of deep burns were treated with PVP + Neosporin and since the rate of infection was higher in the cases kept in this group, the response can be assertively said to be superior in cases of deep burns treated by these drugs. Daily simple cleaning plus systemic antibiotics may not be able to control local infection effectively, owing to presence of necrosed or dying tissue, which is very unsuitable for penetration of systemic drugs, and this
may be the factor causing this somewhat lesser response. Presence of infection at local site will obviously delay healing. On the other hand, FVP + Neosporin by way of being a potent antibacterial combination, can be visualised to have controlled infection better in the same conditions, and this factor may have well been the cause of better healing rates.

As noted in table XVII, the overall incidence of soakage and pus formation was comparable in the two groups. However, recalling that more cases of deep burns which were comparatively more infected and complicated reflects on the fact that FVP + Neosporin does effectively combat infection and reduces soakage and pus formation consequently.

In conclusion, we can infer that in cases of superficial burns daily simple cleaning has an important role to play. Daily simple cleaning tends to keep the wound clean and thus ward off infection effectively. Control of infection helps to achieve the desired healing of the burn. In case of superficial burns FVP + Neosporin may not have an additional role to play. The application of these drugs will add to the cost of the treatment without any additional benefit. Only in cases where we find that the infection is severe, as reflected by bacterial counts, may it be of benefit to use this combination. Superficial burns otherwise may
well be expected to heal nicely with daily simple cleaning with normal saline and systemic antibiotic coverage which is given in all cases, whether treated with saline or any other method.

In case of deep burns control of infection is better with FVP + Neosporin and saline cleaning alone although it may achieve healing, it is relatively delayed. The incidence of soaking and pus formation may also tend to be higher. It may thus be advisable to use FVP + Neosporin dressing in such cases as compared to daily cleaning with saline.