

A Comparative Study Of Hydrogel Dressing Versus Conventional Dressing In Burns

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Abstract

This study was done for comparative evaluation of Hydrogel dressing with conventional dressing in 2nd degree burns involving up to 25 % of the total body surface area in our S.S.G. Hospital, Vadodara, Gujarat state, India from June 2005 to November 2006. In one group treatment with Hydrogel dressing was continued every three days and in the other group conventional dressing with Silver Sulfadiazine & dry gauze was continued every day till complete epithelisation occurred.

The time required for complete epithelisation decreased in the Hydrogel dressing group as compared to the conventional dressing group. Hydrogel dressing was found to be more effective for reducing the pain of burns than conventional dressing with Silver Sulfadiazine & dry gauze. Infection rates were nearly equal in both groups.

INTRODUCTION

Burn injuries are extremely complex. When skin is burnt, its functions are lost and loss of the stratum corneum allows invasion of microorganisms.

Partial thickness burns have been treated by daily, painful washing and cleansing of burn wounds followed by topical application of antimicrobials. Pain as well as impaired wound healing is the main problem.

Clinicians are still searching for an ideal wound dressing which would provide prompt adherence, water vapour transport, good elasticity and durability. It would create a bacterial barrier, have good antiseptic effects and lack toxicity and antigenicity. It could be easily applied and removed, and would have a long shelf-life and minimal storage requirements. It would have a low cost and markedly reduce the total required treatment cost. Above all, it should limit or eliminate pain.

This study attempts to compare a newer dressing material (Hydrogel dressing) versus regular conventional dry gauze dressing with Silver Sulfadiazine which is used routinely in our setup in burns.

AIMS OF STUDY

To compare Hydrogel dressing with the conventional method of dressing in burns with regard to:

- Pain during dressing change.
- Time required for epithelisation.
- Infection rate.

MATERIAL AND METHODS

This study was done for comparative evaluation of Hydrogel dressing with conventional dressing in 2nd degree burns involving up to 25 % of the total body surface area in the burns ward of our Shree Sayaji General Hospital, Vadodara, Gujarat state, India from June 2005 to November 2006. Twenty-five cases were selected for treatment with Hydrogel dressing and 25 cases for treatment with conventional dressing of Silver Sulfadiazine & dry gauze.

Patients of all ages and both sexes were included in the study. Only second degree burns with an extent up to 25% of the total body surface area were included in the study. Percentages of burns on head and external genitalia were excluded. All patients having diseases like diabetes mellitus, tuberculosis or malignancy were also excluded.

Wallace rule of nine was adopted for determining the percentage of burns. In cases of smaller burn sizes, the patient's whole hand (digits and palm) represented 1% TBSA and was matched to the area of the burns.(1)

All the patients were kept in the burns ward along with the

rest of the patients. Three patients in the Hydrogel dressing group were treated on O.P.D. basis. All the admissions were direct and reached the hospital from within 1 hour to 24 hours.

Parkland's formula was used for fluid resuscitation.⁽¹⁾ Systemic antibiotics were given routinely in every patient. Parenteral antibiotics (Ampicillin and Cloxacillin) were given initially and then swithed on to oral preparation for the initial period of management. Antibiotics were then changed according to the culture report.

HYDROGEL DRESSING GROUP

Hydrogel dressing was applied over the burned parts after cleaning the burned area with saline. Hydrogel dressing was covered by pads and bandaged. Silver Sulfadiazine was not applied with this method of dressing. Dressing was continued every three days till complete epithelisation occurred.

CONVENTIONAL DRESSING GROUP

After cleaning the area with saline, Silver Sulfadiazine was applied over the burned parts and covered by pads and bandaged. Dressing was continued everyday till complete epithelisation occurred.

In both groups, face and external genitalia (if involved) were not covered and kept open. Framycetin ointment was applied over these parts.

Investigations: Hb, RBCs, B.Urea, S.Creatinine and Urine-Sugar were done in all the cases. A wound culture was taken from the burned area every week.

During removal of the first dressing, pain was assessed by visual analogue scales in adults while in paediatrics, in the non-verbal group (<3yrs), it was assessed using faces scales.⁽²⁾

RESULTS

Figure 1

Table 1: Number of Dressing Change

A: Hydrogel dressing group:

Number of Applications of Hydrogel dressing	Number of Patients (Total – 25)
	0
2	0
3	3(12%)
4	9(36%)
5	2(8%)
6	5(20%)
7	2(8%)
8	4(16%)

B: Conventional group:

Number of Applications of Conventional dressing	Number of Patients (Total – 25)
<10	1(4%)
10-15	7(28%)
16-20	4(16%)
21-25	2(8%)
26-30	7(28%)
31-35	2(8%)
36-40	1(4%)
41-45	0
46-50	1(4%)

In the Hydrogel dressing group, 56% of patients had up to 5 applications of Hydrogel dressing. In the conventional dressing group, 56% of patients had up to 25 applications of conventional dressing.

Figure 2

Table 2 : Time required for epithelisation

Days	Hydrogel dressing group Total – 25	Conventional dressing group Total - 25
<8	0(0%)	1(4%)
8-9	2(8%)	0(0%)
10-11	3(12%)	0(0%)
12-13	7(28%)	1(4%)
14-15	2(8%)	6(24%)
16-18	3(12%)	2(8%)
19-21	3(12%)	3(12%)
22-25	3(12%)	1(4%)
26-30	1(4%)	7(28%)
>30	1(4%)	4(16%)

In the Hydrogel dressing group, 56% of patients showed healing within 15 days while in the conventional dressing group, 52% of patients showed healing within 21 days. P value was 0.02 which is less than 0.05 suggesting that Hydrogel dressing is more effective than conventional dressing in epithelisation of second degree burns.

Figure 3

Table 3: Pain Assessment during dressing change

Pain Score	Study group (Hydrogel group)	Control group (Conventional group)
0-2	18(72%)	0
3-4	6(24%)	2(8%)
5-6	1(4%)	17(68%)
7-8	0	5(20%)
9-10	0	1(4%)

In the Hydrogel dressing group, 72% patients showed a pain score up to 2 while in the conventional dressing group, 76% patients showed a pain score up to 6. P value was 0.0001 which is significant, suggesting that Hydrogel dressing is more effective than conventional dressing in decreasing pain in second degree burns.

Figure 4

Table 4: Positive culture with various dressings

Dressing group	No. of pts.	Microorganism seen in	%
Conventional	25	23	92%
Hydrogel	25	22	88%

Infection rates were nearly equal in both groups. In the Hydrogel dressing group, microorganisms were seen in wound culture in 88% and in the conventional dressing group in 92%.

DISCUSSION

A faster healing time was seen with Hydrogel dressing as compared to Conventional dressing; this might be because daily dressings expose wounds to mechanical and chemical

manipulation and leads to damage to granulation tissue.⁽³⁾ In the Hydrogel dressing group, 56% of patients had up to 5 dressing changes while in the conventional dressing group, 56% of patients had up to 25 dressing changes.

In the Hydrogel dressing group, 56% of patients had up to 15 days of healing time while in the conventional dressing group, 56% patients had up to 25 days of healing time.

A similar study conducted in 46 patients from November 2002 to June 2003 in the Burns and Plastic Surgery Department of the Civil Hospital Ahmedabad, Gujarat State, India, showed similar results.⁽⁴⁾ In their study, 43.48% of patients in the control group with vaseline gauge dressing showed healing in 14-16 days while 45.45% of patients in the Hydrogel dressing group showed healing in 12-14 days.

Maximum pain was perceived with conventional dressing with Silver Sulfadiazine & dry gauge, probably because of drying-up of gauge as compared to Hydrogel dressing which contains more than 90% water. ⁽⁵⁾ Partial thickness burns are known to cause a high level of pain which is often exacerbated by dressing changes.⁽⁶⁾ Pain was decreased with Hydrogel dressing. In the Hydrogel dressing group, 72 % of patients showed a pain score up to 2 while in the conventional group, 76 % of patients showed a pain score up to 6.

In one article published in Annals of Burns and Fire Disasters, Osti E. and Osti F. also noted that Hydrogel has good pain control in burns. ⁽⁷⁾

A Similar study conducted in 46 patients from November 2002 to June 2003 in the Burns and Plastic Surgery Department of the Civil Hospital Ahmedabad in partial thickness burns of <20% of the total body surface area showed similar results. In their study, 73.9% of patients in the control group with vaseline gauge dressing showed pain a score up to 6 while in the Hydrogel dressing group, 72.72% showed a pain score up to 2. ⁽⁴⁾

Infection rates were nearly equal in both groups. In the Hydrogel dressing group, microorganism were seen in wound culture in 88% and in the conventional dressing group in 92%.

A similar study conducted in 46 patients from November 2002 to June 2003 in the Burns and Plastic Surgery Department of the Civil Hospital Ahmedabad in partial

thickness burns of <20% of the total body surface area showed similar results. In their study, the positive culture rate with vaseline gauze dressing was 91.3% and in the Hydrogel dressing group it was 86.36%.⁽⁴⁾

Hydrogel dressing is costly compared to conventional dressing which is a drawback. But as we have found in our study that, as compared to conventional dressing, the time required for complete epithelisation was less in the Hydrogel dressing group, this prompt healing decreases the requirement of Hydrogel dressings. So over all, the difference of the cost is not a significant one.

On the whole, Hydrogel dressing may provide a good answer for the treatment of second degree burns with rapid epithelisation and decreased pain.

CONCLUSION

- Hydrogel dressing was found to be more effective for reducing the pain of burns than conventional dressing with Silver Sulfadiazine & dry gauge.
- Hydrogel dressing had an improved healing rate as compared to conventional dressing in burns.
- Infection rates were nearly equal in both groups.

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