

# Effect of Liquid Paraffin Gauze Dressing In Burn Wounds: A Prospective Study

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## Abstract

**Introduction:** Burn injury causes a considerable amount of disability, prolonged hospital stay, and burden on the public health sector. Main requirement in burn wound management is an economical, easy to apply, readily available dressing, or method of coverage that will provide good pain relief, protect the wound from infection, promote healing, prevent heat and fluid loss, be elastic, non-antigenic, and adhere well to the wound while waiting for spontaneous epithelialization of superficial partial thickness burns. The sterilized paraffin gauze dressing is non-adherent and non-allergenic and helps in speedy recovery of burn wounds.

**Materials and Methods:** A prospective study of 90 patients with partial thickness burns who were salvageable ( $\leq 40\%$  body surface area), admitted to Burn unit of Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital, Rewa from June 1, 2017, to May 31, 2018. The autoclaved liquid paraffin gauze was applied over burn wound. Patients were assessed on the basis of subsidence of pain, time of epithelialization if occurred after liquid paraffin gauze dressing. Patients' blood investigations were noted and the assessment of the effect of hemoglobin (anemia) and platelet counts in burn wound healing in terms of mean epithelialization time were done.

**Results:** Mean epithelialization time was 16 days. In 25% of cases epithelialization developed in 10–12 days. Post-burn pain subsided in 4–6 days in maximum in 54.44% cases. Mild and moderate anemia had no significant effect on wound healing time (mean epithelialization time). Patient with less than normal platelet counts ( $< 1.5$  lakh/cumm) had more epithelialization time and with normal platelet count had less epithelialization time. 15 patients developed complications and most common complication was hyper granulation (11.11%).

**Conclusion:** Burn wounds pose a great burden on health-care infrastructure and burn units. We can conclude that liquid paraffin gauze dressing has good patient acceptability and less painful, it is easily available and relatively less expensive. In developing and resource-poor countries, most of the patients are from the rural background so these patients will need a dressing that is relatively less expensive and easily available such as liquid paraffin gauze dressing.

**Key words:** Burn wound, Epithelialization time, Liquid paraffin gauze

## INTRODUCTION

Burn injury causes a considerable amount of disability, prolonged hospital stay, and burden on the public health sector. Previous studies showed that the incidence of burn injury in different parts of the world is high and proper

treatment and rehabilitation of burn patients is an uphill task for public health systems. For survivors, the most common problem is scarring, so the process of wound healing and the final outcome of this process is under investigation with the hope of decreasing the complications related to scar.

Burn wound healing is a complex process including inflammation, granulation, and remodeling of the tissue.<sup>[1]</sup> Burn patients have many problems during the stages of recovery from a burn injury. Majority of patients have associated problems of healing and final outcomes of healing in terms of scarring. It is, therefore, appropriate that the process and problems of wound healing

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should be vigorously addressed by all practitioners and investigators involved in the treatment of burn patients and the development and use of new wound repair material. Irrespectively, the main requirement in burn wound management is an economical, easy to apply, readily available dressings or method of coverage that will provide good pain relief, protect the wound from infection, promote healing, prevent heat and fluid loss, be elastic and non-antigenic, and adhere well to the wound while waiting for spontaneous epithelialization of superficial partial thickness burns.

Liquid paraffin also known as paraffinum liquidum. It is a highly refined mineral oil used in cosmetics and for medical purposes. Paraffin is a mixture of hydrocarbons derived from petroleum and coal. Paraffin has many properties, but the best and most demanded is its moisturizing properties, which are why it is used a lot in beauty treatments and has therapeutic uses. Liquid paraffin gauze has interlocking threads which minimize fraying when the dressing is cut to shape.

Paraffin gauze dressings are used to dress denuded areas and burn wounds, and hence, these gauzes are especially coated with soft paraffin. The paraffin gauze dressing is non-adherent, non-allergenic, and sterilized, which helps in speedy recovery of wounds used in the treatment of ulcers, burns, skin grafts, and various traumatic injuries.

## MATERIALS AND METHODS

A prospective study of 90 patients with partial thickness burns who were salvageable ( $\leq 40\%$  body surface area), admitted in Burn unit of Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital, Rewa from June 1, 2017, to May 31, 2018.

Patients were admitted to the burn unit from surgery outpatient department (OPD) or emergency department. A detailed history was recorded regarding name, age, sex, religion, occupation, education, date and time of admission and discharge, referral, and final outcome. On admission, the patient was initially resuscitated with intravenous fluid (crystalloid/colloid) along with analgesic, tetanus toxoids and antibiotics were given. A thorough general and systemic examination were done and burn area was examined for extent and type of burn wound and the total percentage of the burn was calculated by Lund and Browder charts and rule of nine and superficial, and deep burns were classified according to the depth of burn and degree of burn.

Local care of wound was done by cleaning of the wound. Sterile gauze was soaked with liquid paraffin and then autoclaved. This autoclaved liquid paraffin gauze was

applied over burn wound. Patients were assessed with subsidence of pain, time of re-epithelialization if occurred in days after liquid paraffin gauze dressing. Patients' blood investigations were noted and the assessment of the effect of hemoglobin (anemia) and platelet counts over burn wound healing in terms of mean re-epithelialization time were done.

During treatment patient was monitored for any local and systemic complications and managed accordingly. Patients were discharged after recovery with advice for follow-up in surgery OPD with an oral antibiotic, analgesic, and liquid paraffin dressing. Patients were also encouraged for skin grafting and physiotherapy.

## RESULTS

It is evident from Table 1 that maximum of patients developed epithelialization in 10–12 days (25%) followed by 13–15 and 16–18 days. 10 patients were excluded because they did not developed re-epithelialization. Mean duration of development of epithelialization tissue was 16 days.

It is evident from Table 2 that pain was relieved in maximum (54.44%) of patients in between 4 and 6 days.

It is evident from Table 3 that mild and moderate anemic patients had no significant effect on mean epithelialization time. Patients with less than normal platelets ( $< 1.5$ ) had more mean epithelialization time (19.86 days) and normal (1.5–3) or more ( $> 3$ ) had less mean epithelialization time (15.6 days) and (13.35 days), respectively.

It is evident from Table 4 that in out of 90 patients, 16.66% patients developed various types of complications. The most common complication was hypergranulation.

## DISCUSSION

Burn is a serious traumatic wound produced by excessive heat on the protective covering of the body, damaging the underlying tissues causing circulatory disturbances, and mild or severe constitutional disturbances. If untreated burn injuries result in intense suffering and protracted course of illness, possible disfigurement with physiological and psychological trauma to patients, huge cost and suffering to the patients family.

Burn wounds pose a great burden on health-care infrastructure and burn units, although morbidity and mortality has been decreased with a better understanding of the pathophysiology and greater stress on correction of fluid loss and electrolyte imbalance, improved methods of

**Table 1: Distribution of cases according to the development of epithelialization tissue in patients with liquid paraffin gauze dressing (n=80)**

S. No.	No. of days	Total cases	Percentage (%)
1	7-9	11	13.75
2	10-12	20	25
3	13-15	13	16.25
4	16-18	13	16.25
5	19-21	09	11.25
6	22-24	04	5
7	25-27	05	6.25
8	28-30	04	5
9	31-33	01	1.25
Total		80	100

**Table 2: Distribution of cases based on the subsidence of post-burn pain in patients with liquid paraffin gauze dressing (n=90)**

No. of Day	Total cases	Percentage
0-3	25	27.78
4-6	49	54.44
7-9	12	13.33
10-12	04	4.44
13-15	00	0.0
Total	90	100

resuscitation. The mesh paraffin gauze dressing has been the primary choice for the coverage of partial thickness burns, given its ease of application, conformability, low risk of infection, and minimal cost. The mean time to re-epithelialization was 16 days, and ranging from a minimum of 7 days to 33 days. Frequent inspections of the wound to assess epithelialization may damage the regenerating tissue. Overall wound healing, as measured by the percentage of the epithelialized dermis, was faster with paraffin gauze dressing than with dry dressing. The faster re-epithelialization rate that had been seen with the paraffin gauze dressing can partially be explained by its physical properties. Paraffin gauze dressing was found to form a fibrin layer between the dressing and the wound, creating a physical barrier that retains cytokines, particularly intrinsic growth factors.<sup>[2,3]</sup> Furthermore, epithelial cell proliferation and migration are believed to be optimal in a moist environment.<sup>[4]</sup> This concept seems to be supported by evidence from many skins graft donor site studies which have shown faster re-epithelialization rates when moist environment dressings are compared with the traditional dry dressing.<sup>[2]</sup> An paraffin gauze dressing helps in keeping the wound moist, inducing a favorable environment that facilitates recruitment of vital host defenses and necessary cell population for better wound healing.<sup>[2,5]</sup>

In the present study, we found that 15 patients (16.66%) developed complications. In the present study 15 patients(16.66%) were found to have developed complications

**Table 3: Distribution of cases according to the effect of blood investigation on epithelialization tissue in patients with liquid paraffin gauze dressing (n=80)**

Blood investigation	Values	Total cases	Mean time (Days)
Hb	<6 (severe)	3	23
	6-9 (moderate)	25	17.04
	9-12 (mild)	36	15.58
Platelet (lakh/cumm)	<1.5	15	19.87
	1.5-3	45	15.6
	>3	20	13.35

**Table 4: Distribution of cases according to the development of complications**

S. No.	Complications	Total no. of patients	Percentage (%)
1	Contracture	1	1.11
2	Hypergranulation	10	11.11
3	Infection	3	3.33
4	Gangrene	-	-
5	Bedsore	1	1.11
Total		15	16.66

of which 10 patients(11.11%) had hypergranulation, 3 patients developed infection, 1 patient complicated with contracture and 1 patient had developed bedsore. There was no significant role of paraffin gauze dressing in the reduction and management of local complication. Anemia is a common factor assigned to poor wound healing. However, clinical studies have shown over and over again, that in healthy normovolemic patients, mild to moderate anemia alone was not associated with impaired wound healing. Conditions which might accompany anemia such as malnutrition, impaired blood supply, and inflammation have a more dominant impact on wound healing abnormalities.<sup>[6]</sup> In the present study, results are the same to previous studies that mild and moderate anemia patients did not have a significant effect on burn wound healing time (mean epithelialization time). In mild anemia, patients had re-epithelialization, time was 15.58 days and in moderate anemia, it was 17.04 days. Platelets had a negative relation with mean epithelialization time. Patients with more platelets had less mean re-epithelialization time and patients with less than normal (<1.5 lakh/cumm) had more epithelialization time.

## CONCLUSION

Burn wounds pose a great burden on health-care infrastructure and burn units. Although morbidity and mortality has been decreased with a better understanding of the pathophysiology and greater stress on correction of fluid loss and electrolyte imbalance, improved methods of resuscitation. We can conclude that liquid paraffin gauze

dressing has good patient acceptability and less painful; it is easily available and relatively less expensive. In developing and resource-poor countries, most of the patients are from the rural background so these patients will need a dressing that is relative less expensive and easily available such as liquid paraffin gauze dressing. Liquid paraffin gauze dressing leads to early epithelialization of wound and also it provides a relatively less painful mode of wound coverage and helps in early healing of wounds.

On the basis of results of this study, it can be concluded that liquid paraffin gauze dressing can be an acceptable and cost-effective method of wound coverage in burn patients. It provides a good alternative for wound coverage in resource-poor countries where other types of dressings are not readily available and are not cost-effective.

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