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Case Report

A case series of second-degree burn patients managed with *Patoladi vikeshika*, an Ayurvedic contact layer dressing

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ABSTRACT

Management of burn injury is a challenging task as it can lead to considerable amount of agony and disability to the victims. An estimated annual burn incidence in India is 6–7 million. Depending on the degree of burn or the thickness of skin involved, the healing period will vary from 1 to 3 weeks. The aims of dressing in burn injury are to decrease the agony from pain in the wound, to protect or isolate the burn wound from the irritation caused by the dress worn and external environment, and to the hasten the healing of the wound. There are several established advanced dressings in use which hold the qualities of ideal contact layer dressing. *Patoladi vikeshika* is an attempt to bring in such contact layer dressings in Ayurveda. *Patoladi vikeshika* was prepared by impregnating *Patoladi sikta taila,* which was prepared as per *Taila paka vidhi*, over 10 cm × 10 cm sterile gauzes. These impregnated gauzes were packed and sterilized. The prepared *Vikeshika* was applied as a contact layer dressing over second-degree burn wounds of 3 patients, after cleaning with normal saline once in every 48 h. Within 4-5 dressings, wounds healed completely without any complications like infection. *Patoladi vikeshika* seems to have the qualities of an ideal contact layer dressing and therapeutically it has shown good results in the above cases.

1. Introduction

India, being a developing country with no organized burn care facilities nor a proper safety awareness in the public, has an estimated annual burn incidence of 6–7 million, based on largest group of injuries after road accidents [1]. Burn injury can lead to considerable amount of agony and disability among the victims. These injuries need proper wound care and they are more susceptible for infection. Post healing, the most common problem is scarring and contractures, so the process of wound healing and the final outcome of this process all depends on the way it is being managed throughout the stages of wound healing. Burn wound healing is a complex process including inflammation, granulation, and remodelling of the tissue [2] and depending on the degree of burn or the thickness of skin involved, the healing period may vary from 1 to 3 weeks. When it comes to second-degree burns, the affected area is mottled, red, painful, with blisters, heals by epithelialisation in 14–21 days. Superficial second-degree burn heals, causing pigmentation whereas deep second-degree burn heals, causing scarring and pigmentation [3]. *Acharya Sushruta* has classified *Dagdha vrana* (~traumatic burn) depending on the depth and severity of the burn, among which *Durdagdha* [4] has similar presentations to that of second-degree burns wherein, the treatment is more emphasized over *Sheetala chikitsa* [5] (~cooling therapies).

Usually conventional dressing methods like topical application of silver sulfadiazine, framycetin etc, [6] adheres to the wound bed, leading to formation of pseudoescar, and making dressing change painful and traumatic. The dressing often needs to be soaked before removal, thus making every dressing laborious. Sometimes, a residual silver staining is left over the wound, which is temporary and will wear off with time or washing, but is unsightly and distressful to the patients [7]. Moreover, all these factors have a detrimental effect on wound-healing. The aims of an ideal dressing are to decrease the agony from pain in the wound, to protect or isolate the burn wound from the irritation caused by the dress worn and external environment, and to hasten the healing of the wound [8]. To overcome these issues, many advanced dressings like paraffin

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gauze, biosynthetic dressing, hydrocolloid dressing, silicone sheets etc., are used [6], which hold the qualities of ideal contact layer dressing like sterility, easy availability, easy application, non-adherent, protecting wound from infections, promoting healing, facilitating easy and painless dressing change, maintaining adequate moisture, and promoting exude drainage [9].

Even though there are references for *Vikeshika* [10] (~a fine fabric mesh or a gauze) in Ayurveda classical texts, unlike modern system of medicine, there aren't much research works being published regarding the application and standardization of *Vikeshika*. It is the need of the hour for such Ayurvedic advanced dressing techniques to come into limelight.

This is a case series of 3 accidental second-degree burn patients, who were treated with *Patoladi vikeshika* dressing.

2. Methodology

2.1. Preparation of Patoladi vikeshika

Under aseptic conditions, *Taila* (~oil) was prepared using *Patoladi gana* [11] (~group of herbal drugs) – *Patola* (~*Trichosanthus Dioica/Tricuspidata*), *Chandana* (~*Santalum Album*), *Kuchandana (raktachandana)* (~*Pterocarpus Santalinus*), *Murva* (~*Marsedenia Tenacissima/Volubilis*), *Guduchi* (~*Tinospora Cordifolia*), *Pata* (~*Cissampelos Pareira*), *Katurohini* (~*Picrorhiza Kurrooa*) as per *Taila paka vidhi* [12] (~standard medicated oil preparation procedure). *Madhuchishta* (~bee wax) was added to this *Taila* in 1:10 proportion respectively to make it a *Sikta taila* (~mixture of oil and bee wax) and was impregnated over 10 cm × 10 cm sterile gauze (Fig. 1A). All parameters of the prepared *Sikta taila* were in the expected range prescribed by CCRAS for *Lepa/Malahara*/medicated wax (Table 1). Each gauze was standardized to contain approximately 5ml/100 cm^2 of prepared formulation and was packed with parchment paper and silver sachet (Fig. 1B,C). Finally, these prepared *Patoladi vikeshikas* were subjected to ethylene oxide sterilization (Fig. 1D).

2.2. Application

Wounds were cleaned with normal saline. After drying with a sterile gauze, *Patoladi vikeshika* was applied over the wounds followed by sterile pads as absorbent layer. The dressings were secured with bandages, without compromising the circulation. Each dressing was changed once in 48 h

2.3. Case 1

A 35 year-old female patient presented with a history of accidental boiling water spillage over right hand and sustained 1% superficial second-degree burn over dorsum of right hand and wrist (Fig. 2A). Patient reported no comorbidity. The wound was dressed with *Patoladi vikeshika* once in 48 h (Fig. 2B).

2.4. Case 2

A 40 year-old female patient, with no significant medical history, approached with the history of accidental splash of hot oil during cooking causing 1% deep second-degree burn over upper outer quadrant of right breast (Fig. 3A). First aid was given with continuous cold water wash immediately after the incident, before

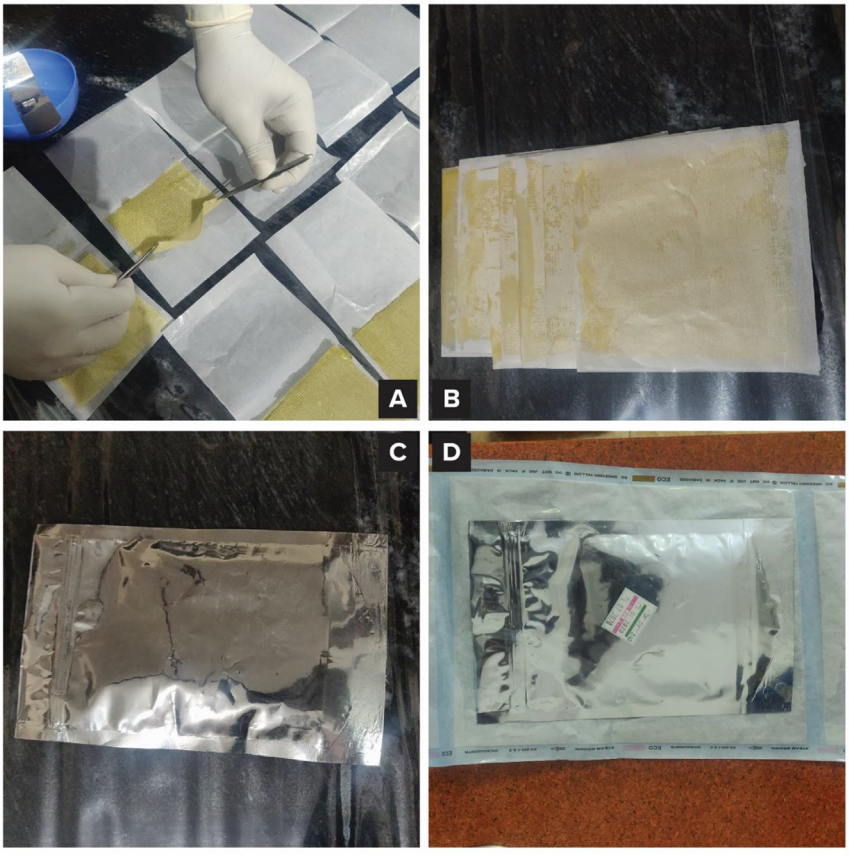

Fig. 1. **A**- Making of *Patoladi vikeshika*; **B,C**- *Patoladi vikeshika* packed with parchment paper and silver sachet; **D**- *Patoladi vikeshika* after ethylene oxide sterilization.

Table 1
Analysis of *Patoladi sikta taila*.

Sl.No	Parameter	Results	
1.	Color	Yellowish pale brown	
2.	Odor	Characteristic	
3.	pH	6.12	
4.	L.O.D(%)	0.15	
5.	Total Fatty Matter (%)	91.66	
6.	Thermal stability	Pass	
7.	Rancidity	Nil	
8.	Total Acidity (%)	7.37	
9.	Spread ability	Pass	
10.	Viscosity (cps)	980	
11.	TLC	Distance travelled	Rf values
		7.3	0.89
		6.6	0.80
		6.1	0.72
		5.9	0.71
12.	Microbiology test	*E. coli*	Absent
		Salmonella spp.	Absent
		Staphylococcus aureus	Absent
		Pseudomonas aeruginosa	Absent
		Total microbial count	30
		Total yeast and mold	<10

she approached the hospital. The blister was debrided and the wound was dressed with *Patoladi vikeshika* once in 48 h (Fig. 3B).

2.5. Case 3

A 27 year-old male patient sustained a flash burn due to accidental spillage of paint thinner near the stove while he was cooking, which caught fire and he suffered 2% deep second-degree burn over the dorsum of right foot (Fig. 4A). He was immediately rescued and brought to the hospital by his fellow mates. First aid was given with running water irrigation. The wound was cleaned with normal saline, dried with sterile gauze and was dressed with *Patoladi vikeshika* once in 48 h (Fig. 4B).

3. Results

In the first case, re-epithelialization of the wound was seen, with normal pigmentation in 7 days (Fig. 2C). Patient had reduction in pain and burning sensation from severe to no symptoms gradually in 6 days and had no discomfort during dressing change.

In the second case, the wound re-epithelialization was seen in 7 days and there was normal skin pigmentation which appreciated within 10 days (Fig. 3C). Patient had reduced pain and burning sensation from severe to no symptoms in 7 days and experienced no discomfort during dressing change.

In the third case, re-epithelialization of the wound was seen in 10 days, without any complication like infection. The pain and burning sensation reduced from severe to no symptoms in 10 days period. There was normal pigmentation and hair growth appreciated over the healed skin in 2 weeks' time (Fig. 4C).

4. Discussion

Ayurveda literature suggests, *Vikeshika* should not be *Ati snigdha* (~too moist), *Ati rooksha* (~too dry), and *Vishama* (~improperly prepared). If it is *Ati snigdha*, it leads to more *Kledha* (~excess moisture) while *Ati. rooksha*, leads to *Vrana chedha* (~further trauma to the wound). In case of *Durnyasa* (~not properly prepared), it will damage the margins of the *Vrana* (~wound), delaying wound-healing [10]. These quality standards mentioned by *Acharya Sushruta* are very near to those of an ideal contact layer dressing.

As per the analysis, *Patoladi vikeshika* is pathogen-free. The pH is slightly acidic as pH values within the wound milieu directly and indirectly influence all biochemical reactions taking place in the process of wound healing. It has been proven that the surface pH of a wound plays an important role in wound healing as it helps control infection and increase anti-microbial activity, oxygen release, angiogenesis, protease activity, and bacterial toxicity [13].

There are many formulations which are mentioned in our classics which are not in practice till date. *Patoladi gana* is one such combination of drugs, possessing *Pitta kapha hara* (~pacifies *Pitta* and *Kapha doshas*), *Vrana ropaka* (~wound healing), *Rakta shodhaka* (~detoxifies blood), *Kushtaghna* (~cures skin ailments), *Kandughna* (~reduces itching), *Krimighna* (~anti-microbial), etc.,

Fig. 2. A- Case 1 before treatment; **B**- Dressing with *Patoladi vikeshika*; **C**- Healed wound on day 7.

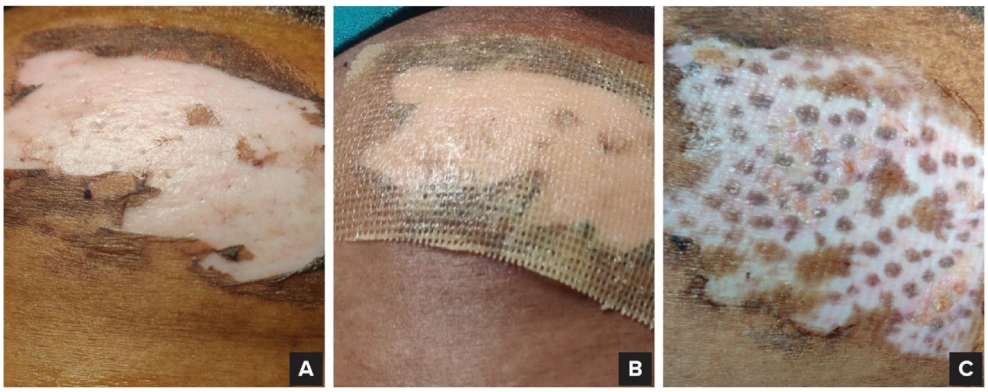

Fig. 3. A- Case 2 before treatment; **B-** dressing with *Patoladi vikeshika*; **C-** healed wound on day 10.

properties [11]. Owing to these qualities, this combination seemed to be more a target-specific approach for treating *Dagda vrana*. Unlike paraffin, *Madhuchishta* not only works as a base to hold the medicated oil, but is also *Vrana ropaka, Kushtagna, Visarpa hara* and *Rakta dosha hara* [14], and contributes to the effect of the drugs. Studies have shown the anti-microbial activity and the effectiveness in second-degree burn wound of bees wax as well [15]. *Vikeshika* has helped in maintaining uniformity in drug application and its sterility has lowered the risk of contamination. It is assumed to sustain a shelf-life similar to that of *Malahara* (~ointment) preparations, that is 3 years [16]. *Acharya Sushruta* has prescribed specific time durations for change of dressing depending on amount of *Srava* (~exudate) and seasonal variations, to regulate moisture in the wound and to give adequate resting period for it to heal [17]. Accordingly, the dressings were changed once in 48 h, keeping in mind about the sensitive nature of burn wounds and to provide resting period for wound healing. As per literature, it takes about 2–3 weeks' time for a second-degree burn to heal and is susceptible for secondary infections as well. But in the present study, the wounds were found to heal within 10 days suggesting that, along with the qualities of an ideal contact layer dressing, the formulation has also played a major role in the healing process of the wounds without any secondary infection. During this study, *Krishnikarna* (~normal pigmentation of the healed skin) and *Romasanjanana* (~regrowth of hair over the healed skin) were also well appreciated in 2 weeks' time.

Fig. 4. A- Case 3 before treatment; **B**- dressing with *Patoladi vikeshika*; **C**- Healed wound on day 14.

5. Conclusion

Patoladi vikeshika seems to have the qualities of an ideal contact layer dressing. Moreover, therapeutically it has shown good results in the above cases. There is scope for further studies on donor and recipient graft site dressing with *Patoladi vikeshika*. Randomized comparative studies with different established dressings are necessary to evaluate the pros and cons. Studies on different types of wounds and ulcers with this drug and various other drugs in similar form is the need on the hour.

Patient's perspective

The patients opined that the *Patoladi vikeshika* dressing caused no irritation during the application and even when the dressing was in situ. There was negligible discomfort on every dressing change. The whole process of wound care seemed easy and effective.

Informed consent

Informed consents were taken prior to the intervention.

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None.

Conflict of interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jaim.2021.03.011.

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