

Raal ointment compared with 1% silver sulfadiazine cream for the treatment of second degree burns

Parag B. Sahasrabudhe, Rajendra D. Dhondge, Nikhil Panse

Department of Plastic and Reconstructive Surgery, B. J. Government Medical College and Sassoon Hospital, Pune, Maharashtra, India

Correspondence to:

Dr. Rajendra D. Dhondge,

Khamlon, Post Dyane, Tal-Satana, District Nashik - 423 204, Maharashtra, India. E-mail: raj2185@gmail.com

Abstract

Aim: The aim of the following study is to assess the efficacy of Raal ointment (herbal plant resin) compared with 1% silver sulfadiazine cream as a burn dressing for the treatment of second degree burns covering less than 30% of the body surface area. **Materials and Methods:** A randomized comparative study was carried out at our institute during August 2010 to June 2012. Ethical committee permission was obtained. Written informed consent was taken from each patient. Fifty patients with second degree burn wounds of approximately equal size present on both half of the body were selected. One side of the wound was treated with silver sulfadiazine cream and the other side of the wound was treated with Raal ointment. Raal ointment is an herbal product made up of resin of *Shorea robusta* plant. Both the wounds were assessed for parameters such as pain, infection, rate of healing and resultant scar. **Results:** The average pain score was 7.02 (Scale 0-10) in silver sulphadiazine cream group when compared with 5.14 in the Raal ointment group at the end of 24 h ($P < 0.0001$). At 48 h the average pain score was 6.12 in silver sulfadiazine group, whereas it was 3.86 in the Raal ointment group ($P < 0.0001$). The result was statistically significant. Infection rate was 20% in silver sulfadiazine group and was only 12% in Raal ointment group. In Silver sulfadiazine group healing was achieved on an average of 19.06 days. In Raal ointment group, it took an average of 17.2 days ($P < 0.0001$). This shows that Raal ointment dressing helps in decreasing healing time when compared with silver sulfadiazine cream dressing. Resultant scar of both groups were assessed using Vancouver scar scale at the end of 10 weeks and 14 weeks. Both the treatment groups had equal quality of scar at 10 and 14 weeks. Cost-effectiveness was calculated by comparing the cost of the same amount of silver sulfadiazine cream and Raal ointment. Raal ointment was a cost-effective alternative to silver sulfadiazine cream for treatment of burn wound. **Conclusion:** Raal ointment was found superior in pain control, rate of healing, control of infection and cost-effectiveness than silver sulfadiazine cream for treatment of second degree burns.

Key words:

Burns healing, Raal ointment, second degree burns, *Shorea robusta*, silver sulfadiazine cream

Access this article online

Quick Response Code:



Website:

www.ijburns.com

DOI:

10.4103/0971-653X.146999

INTRODUCTION

Ever since man has discovered fire by accidental friction of stone, he is experiencing both advantages and disadvantages of its utility. On one side it is used as a main source of energy on the other side it can cause most disastrous effects.

Burn is one of the most agonizing conditions that a doctor treats. Alleviation of pain and prevention of early and late complications is a formidable task to accomplish. Since most of the patients in government hospitals are economically handicapped, the cost of treatment is the main hindrance in the proper management of burns. An effective treatment at an affordable price is the need of the day.^[1]

We decided to evaluate the effectiveness of Raal ointment prepared by our ayurvedic department in the treatment of burns. Raal ointment is an herbal product made up of resin of *Shorea robusta* plant. Raal ointment has been used since ancient times and modern research has supported the effectiveness of this natural herbal remedy to treat burn wounds. It relieves pain and inflammation and speeds up the healing process.^[2] Raal ointment contains triterpenoids, which relieve pain, reduce inflammation and decrease redness and swelling. It also has important antibacterial and antifungal properties that help to prevent infection.^[3]

Ethical committee permission was obtained. Written informed consent was taken from each patient. We compared 50 patients with second degree burn wounds of approximately equal size on both sides of the body. One side was treated with silver sulfadiazine cream and the other side with Raal ointment. Both sides were assessed for parameters such as pain, infection rate, rate of wound healing and quality of resultant scar.

MATERIALS AND METHODS

Method of preparation of Raal ointment

S. robusta resin is available in the local market as white to brown colored crystals. A total of 500 g of resin is taken and is converted to powder form. This powder is mixed with 500 ml of boiling coconut oil and completely dissolved in it. The mixture of coconut oil and resin is then allowed to cool to room temperature and mixed with water. After emulsification, a white supernatant

is formed which is collected in a container and used as Raal ointment for dressings. Sample is sent from each pack for culture sensitivity before use to confirm sterility [Figures 1 and 2]. This technique of preparation is used by our ayurvedic department and is adopted from some old ayurvedic books.

The objective of the study was to compare the effectiveness of Raal ointment as a topical dressing with 1% silver sulfadiazine cream in the treatment of second degree burns covering less than 30% of the body.

Ethical committee clearance

Institutional Ethical Committee clearance was taken.

Reference no.: BJMC/IEC/Pharmac/D 091111-40.

A total of 50 patients with second degree burns on both half of body and meeting the inclusion criteria were studied. Written informed consent was taken from each patient. The patients included both males and females. Each patient acted his own match or control having burns on both half of the body. Thus, two treatment modalities were applied to the same patient and compared more effectively and accurately.

Inclusion criteria

- Less than 30% burns
- Second degree burns
- Recent burns within 48 h
- Patient's age more than 15 years

Exclusion criteria

- More than 30% burns
- First degree burns
- Third degree burns
- Electrical burns

Second degree burn wounds of approximately equal size present on both half of the body were selected. General management of the patients, as well as the initial management of the wound regarding cleaning and debridement was the same for both halves of



Figure 1: *Shorea robusta* resin



Figure 2: Raal ointment formed as a supernatant

the body. Patients were also given intra venous fluids, broad spectrum antibiotics and intramuscular analgesics according to need.

A thin layer of silver sulfadiazine cream was applied on one side and equally thin layer of Raal ointment was applied on the other side. These applications were done twice daily. After application, we preferred to leave burn wound open. No closed dressings were done. Both wounds were assessed for following parameters:

- Pain
- Infection
- Rate of healing
- Resultant scar

After 24 h and 48 h after treatment pain was assessed by using visual analogue scale.^[4] Infection was assessed by visually inspecting for the presence of pus under the dressing. Pus when present was sent for culture and sensitivity. Rate of healing was measured by the number of days required for complete epithelization of wound. Patients were examined daily until complete epithelization of wound occurred. The patients were then followed-up at 10 and 14 weeks and the resultant scars between the two groups were compared using the Vancouver scar scale (VSS).^[5]

RESULTS

Pain

Pain was measured on visual analog scale at 24 and 48 h after applying dressing. The average pain score in the range of 0-10 was 7.02 in silver sulfadiazine cream group, whereas it was 5.14 in the Raal ointment group at 24 h. $P < 0.0001$: Statistically significant [Table 1].

At 48 h the average pain score was 6.12 in silver sulfadiazine group, whereas it was 3.86 in the Raal ointment group. $P < 0.0001$: Statistically significant [Table 2].

Infection

Presence of infection was assessed by checking for any pus under the dressing visually. And when pus was present it was sent for culture and sensitivity. Infection rate was 20% in silver sulfadiazine group and was only 12% in Raal ointment group and 4% patients had an infection in both wounds. This indicates lower rate of infection with Raal ointment dressings [Table 3].

Rate of healing

It was calculated as the time taken for complete epithelization of wound counted in number of days. In silver sulfadiazine cream group healing was achieved on an average of 19.06 days whereas in Raal ointment dressing it took an average of 17.2 days. $P < 0.0001$. This shows that Raal ointment dressing helps in decreasing healing time when compared with silver sulfadiazine cream dressing [Table 4].

Resultant scar

Resultant scars of both groups were assessed by using VSS at the end of 10 weeks and 14 weeks. The average VSS score at 10 weeks was 7.92 in silver sulfadiazine group and 7.86 in Raal ointment group. $P > 0.001$ means it is not statistically significant [Table 5].

The average VSS score at 14 weeks was 6.86 in silver sulfadiazine group and 6.80 in Raal ointment group. $P > 0.001$ means it is not statistically significant. Hence, both treatment groups had equal quality of scar at 10 and 14 weeks [Table 6] [Figures 3 and 4].

Cost-effectiveness

Cost-effectiveness was calculated by comparing the cost of the same quantity of Raal ointment and silver

Table 1: Pain score at 24 h

Pain score at 24 h	Silver sulfadiazine	Raal ointment
Mean	7.02	5.14
SD	1.10	1.28
Observations	50	50
P value	<0.0001	

SD: Standard deviation

Table 2: Pain score at 48 h

Pain score at 48 h	Silver sulfadiazine	Raal ointment
Mean	6.12	3.86
SD	1.02	0.88
Observations	50	50
P value	<0.0001	

SD: Standard deviation

Table 3: Rate of infection

Infection	Silver sulfadiazine (%)	Raal ointment (%)
Present	10 (20)	6 (12)
Not present	40	44
Total	50	50

Table 4: Rate of healing

Rate of healing (no. of days)	Silver sulfadiazine	Raal ointment
Mean	19.06	17.2
SD	2.40	2.21
Observations	50	50
P value	<0.0001	

SD: Standard deviation

Table 5: VSS score at 10 weeks

VSS score at 10 weeks	Silver sulfadiazine	Raal ointment
Mean	7.92	7.86
SD	0.63	0.73
Observations	50	50
P value	0.1095	

SD: Standard deviation, VSS: Vancouver scar scale

Table 6: VSS score at 14 weeks

VSS score at 14 weeks	Silver sulfadiazine	Raal Ointment
Mean	6.86	6.80
SD	0.67	0.70
Observations	50	50
P value	0.5182	

SD: Standard deviation, VSS: Vancouver scar scale

sulfadiazine. 1 kg of silver sulfadiazine costs around Rs. 1200 (20.28\$) while the cost of 1 kg of Raal ointment is only Rs. 200 (3.38\$). As the duration of wound healing with Raal ointment was lesser when compared with 1% silver sulfadiazine in our study, it required lesser number of dressings. This further reduced the cost of treatment with Raal ointment. We did twice a day application of both creams to wounds on both sides till wound epithelialization was visibly complete.

DISCUSSION

The purpose of this study was to highlight the benefits of Raal ointment for treatment of second degree burn wounds. Although beneficial uses of Raal ointment have been known to mankind since long and its role in the treatment of burns has also been discussed in Ayurveda but, there is no scientific study reported^[2] [Figure 5].

The denuded areas of skin pose a real challenge to surgeons who treat burns. Raw areas of skin cannot prevent the loss of body heat as the normal skin does by controlling vasodilatation and sweat formation. These areas continuously lose protein rich fluid and electrolytes, since the barrier of intact skin is not present to prevent the same.

The principle of burn wound management is to achieve healing as quickly as possible with minimal scarring.

Silver sulfadiazine cream dressing for burns has been used as one of the standard dressings in many centers. It prevents the growth of a wide array of bacteria, as well as yeast on the damaged skin.^[6] Studies however have found that it increases healing time.^[7]

Offsetting the benefits of Silver sulfadiazine topical treatments are the reported side-effects that include allergic reactions or sensitivity, frequent and painful dressing changes, delayed healing and staining/dyscoloration of the wound bed, which confound wound evaluation and depth determination.^[8]

In this study, Raal ointment was used as an alternative to silver sulfadiazine dressing to cover the raw areas of second degree burns during the initial phase of healing in 50 patients.

Raal is a Sanskrit word. The medicinal uses of Raal are well-described in old ayurvedic books [Figure 5].



Figure 3: 48 h after treatment



Figure 4: Resultant scar after 10 weeks

रालः स्वादुः कषायोष्णः स्तम्भनो व्रणरोपणः ।
विषादिभूतहन्ता च भग्नसन्धानकृत् यतः ॥ धन्वन्तरि निघण्टु ३/११२
शालः कषायो ग्राह्यसदग्ध रुक् कफजिद्धिमः ।
कर्णरोगहरो रुक्षो विषहा व्रणशोधनः ॥ कैयदेव निघण्टु १/८०९-८१०

Figure 5: Raal ayurvedic reference

Raal — the resin of *S. robusta* herb is sweet, astringent, hot in nature, has anti-microbial properties. Bhagnasandhanakrut — useful in fracture healing Asradagdhruk — relieves pain due to wounds and burns. Vishaha — anti-toxic Vranashodhana — cleanses wounds and quickens wound healing.

The resin is used as an astringent and detergent in diarrhea, dysentery and gonorrhoea.^[9] With Bee wax it acts as an ointment base for foot cracks, psoriasis, wounds, ulcers, burns, chronic skin diseases and ear and eye troubles;^[10] whereas its seeds are used for pus forming wounds.^[11] A combination of oleoresin with cow ghee is claimed to control burning sensation of hemorrhoids, pain and swelling.^[12] A recent study with methanol extract of mature leaves reported anti-inflammatory and antinociceptive activity.^[13]

S. robusta leaf extract was found to possess significant analgesic activity^[13] and its resin along with some other constituents has also been used for wound healing.^[14]

Resin has been reported to contain several known triterpenoids, which are widely distributed in nature in both the plant and animal kingdom, are made up of units of 5-carbon compound isoprene. Triterpenoids are 30-carbon substances that often contain ring systems and a number of functional groups^[15] [Figure 6].

Triterpenoids have potent anti-inflammatory and antibacterial action which is very important for wound healing. Triterpenoids obtained from *S. robusta* exhibits significant activity against *Bacillus coagulans*, *Escherichia coli*, *Bacillus cereus* and moderate inhibition on *Salmonella typhi* and *Bacillus subtilis* and lesser activity against *Proteus vulgaris* and *Pseudomonas fluorescence*. However, ethanolic extracts also exhibited significant activity against *Staphylococcus aureus*, *Staphylococcus epidermidis* and *E. coli*, moderate inhibition on *Candida albicans* and *B. coagulans*.^[3]

Burns are painful due to exposed nerve endings and as a result of this reduction of pain significantly reduce patient morbidity.

Raal ointment when used as a burn wound dressing due to its analgesic action and non-irritant nature provides good coverage for sensitive nerve endings, thereby diminishing degree of pain significantly.

Change of dressing was also less painful in those dressed with Raal ointment because it was easily washed with saline as compared to 1% silver sulfadiazine which formed a thick layer over the wound and had to be rubbed off. Good patient compliance was noted as a

result of comfortability of dressings as it significantly reduced pain.

Infection of the wound is one of the most common complications because of the presence of necrotic tissue and tissue ischemia in burns. Infection in turn leads to delayed healing of the wound. Decreasing the infection rate improves the healing rate and quality of scar as well reduces the pain. Due to antibacterial activity of *S. robusta* resin, Raal ointment is effective in control of infection in burn wound. None of the cases showed any adverse reaction to the Raal ointment proving its safety.

In the majority of the patients the side on which Raal ointment was applied healed with complete visible epithelization at a rate faster rate than silver sulfadiazine cream side. However a wound biopsy will be required to prove histological and ultra-structural evidence of early epithelization.

By decreasing the number of days required for healing patient can return back to normal activities faster. It also reduces hospital stay and financial burden to the patient.

Since most of the patients in the public sector hospitals are economically backward, the cost of treatment is the main hindrance in the proper management of burns. An effective treatment at an affordable price is the need of the day. Raal ointment is a cost-effective alternative to silver sulfadiazine cream for treatment of burn wounds.

Raal ointment is not available commercially, but it is easy to prepare at home with all the ingredients easily available locally at a very low price.

CONCLUSION

In this study, Raal ointment was found to be a suitable alternative to silver sulfadiazine cream for treatment of second degree burns. In spite of all the advantages, it is unfortunate that Raal ointment is not known to many health care providers and burn patients. We suggest the benefits of Raal ointment must be publicized widely and attempts must be made for commercial availability of Raal ointment. This study also highlights the need for studies involving more number of patients with detailed parameters and long-term follow-up to establish Raal ointment as one of the promising modality of treatment for burn wounds. Our early results are promising.

REFERENCES

- Ryan CM, Schoenfeld DA, Thorpe WP, Sheridan RL, Cassem EH, Tompkins RG. Objective estimates of the probability of death from burn injuries. *N Engl J Med* 1998;338:362-6.
- Warrier PK, Nambiar VP, Ramakutty C. *Shorea robusta*. In: *Indian Medicinal Plants: A Compendium of 500 Species*. New Delhi: CSIR; 1994. p. 124-8.
- Misra LN, Ahmad A. Triterpenoids from *Shorea robusta* resin. *Phytochemistry* 1997;45:575-8.

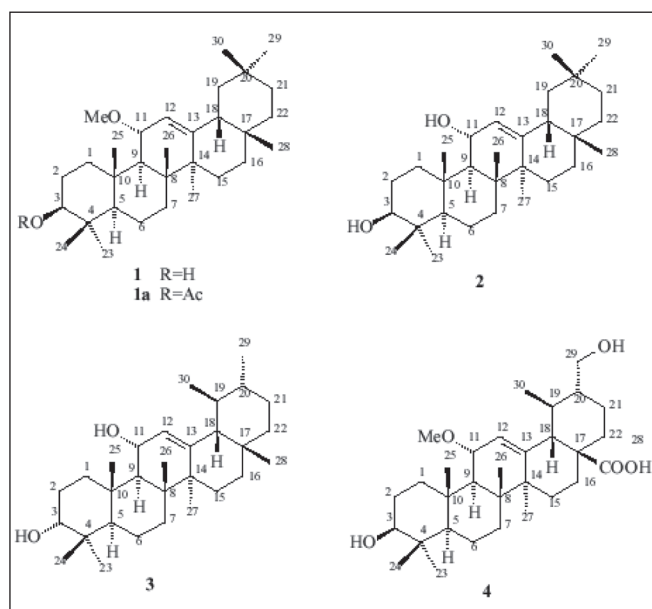
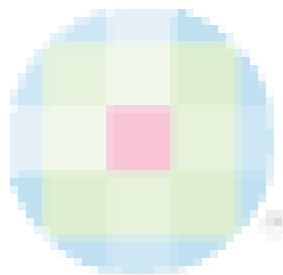


Figure 6: Chemical structure of triterpenoids

Sahasrabudhe, *et al.*: Raal ointment for second degree burns

4. Wewers ME, Lowe NK. A critical review of visual analogue scales in the measurement of clinical phenomena. *Res Nurs Health* 1990;13:227-36.
5. Roques C, Teot L. A critical analysis of measurements used to assess and manage scars. *Int J Low Extrem Wounds* 2007;6:249-53.
6. Fisher NM, Marsh E, Lazova R. Scar-localized argyria secondary to silver sulfadiazine cream. *J Am Acad Dermatol* 2003;49:730-2.
7. Wasiak J, Cleland H, Campbell F. Dressings for superficial and partial thickness burns. *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD002106. DOI: 10.1002/14651858.CD002106.pub3
8. Madden MR, Nolan E, Finkelstein JL, Yurt RW, Smeland J, Goodwin CW, *et al.* Comparison of an occlusive and a semi-occlusive dressing and the effect of the wound exudate upon keratinocyte proliferation. *J Trauma* 1989;29:924-30.
9. Verma DM, Balakrishnan NP, Dixit RD. *Flora of Madhya Pradesh*. Vol. 1. Kolkata: Botanical Survey of India; 1993.
10. Available from: <http://www.himalayawellness.com/herbfinder/shorea.robusta.htm>.
11. Singh YN. Traditional medicine in Fiji: Some herbal folk cures used by Fiji Indians. *J Ethnopharmacol* 1986;15:57-88.
12. Kaur S, Dayal R, Varshney VK, Bartley JP. GC-MS analysis of essential oils of heartwood and resin of *Shorea robusta*. *Planta Med* 2001;67:883-6.
13. Jyothi G, Carey WM, Kumar RB, Mohan KG. Antinoceptive and antiinflammatory activity of methanolic extract of leaves of *Shorea robusta*. *Pharmacologyonline* 2008;1:9-19.
14. Datta HS, Mitra SK, Patwardhan B. Wound healing activity of topical application forms based on ayurveda. *Evid Based Complement Alternat Med* 2011;2011:134378.
15. Lavic D, Frolow, Meshulam H, *Tetrahedron* 1984;40:419-20.

How to cite this article: Sahasrabudhe PB, Dhondge RD, Panse N. Raal ointment compared with 1% silver sulfadiazine cream for the treatment of second degree burns. *Indian J Burns* 2014;22:37-42.
Source of Support: Nil, **Conflict of Interest:** None declared.



New features on the journal's website

Optimized content for mobile and hand-held devices

HTML pages have been optimized for mobile and other hand-held devices (such as iPad, Kindle, iPod) for faster browsing speed.

Click on **[Mobile Full text]** from Table of Contents page.

This is simple HTML version for faster download on mobiles (if viewed on desktop, it will be automatically redirected to full HTML version)

E-Pub for hand-held devices

EPUB is an open e-book standard recommended by The International Digital Publishing Forum which is designed for reflowable content i.e. the text display can be optimized for a particular display device.

Click on **[EPub]** from Table of Contents page.

There are various e-Pub readers such as for Windows: Digital Editions, OS X: Calibre/Bookworm, iPhone/iPod Touch/iPad: Stanza, and Linux: Calibre/Bookworm.

E-Book for desktop

One can also see the entire issue as printed here in a 'flip book' version on desktops.

Links are available from Current Issue as well as Archives pages.

Click on  View as eBook