www.ayurpharm.com
ISSN: 2278-4772

Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104

Research Article

CLINICAL EVALUATION OF SHIKARI (*Cordia macleodii*) GHRITA ON VRANA ROPANA (WOUND HEALING) PROPERTY

Sharma Ashish[1*], Acharya RN[2], Gupta SK[3], Dudhamal TS[4], Mohanto VD[5]

1. *MD Scholar, Dept. of Dravyaguna, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.*
2. *Associate Professor, Dept. of Dravyaguna, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.*
3. *Associate Professor, Dept. of, Shalyatantra, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.*
4. *Assistant Professor, Dept. of, Shalyatantra, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.*
5. *Assistant Professor, Dept. of, Shalyatantra, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.*

Received: 10-04-2013; Revised: 20-04-2013; Accepted: 25-04-2013

Abstract

The leaves of *Cordia macleodii* Hook. (Boraginaceae) is reported as a wound healing drug, by the tribal people of Odisha and Madhya Pradesh. An attempt has been made to evaluate the wound healing properties of the ghrita (cow's ghee) based formulation of its leaf scientifically, through an exploratory, open and controlled clinical study. 20 patients with classical signs and symptoms of shuddha vrana (fresh wound) were selected irrespective of their age, sex and religion. They were randomly allotted into two groups, one group was managed with *Cordia macleodii* ghrita and control group was treated with Povidone Iodine as local application, for duration of 21 days. The effect of drug on sign and symptoms was assessed at 7th, 14th and 21st days. Significant changes was observed in discharge, tenderness, wound margin and wound size in *Cordia macleodii* ghrita treated group while in Povidone Iodine treated group showed highly significant result.

Key words: *Cordia macleodii*, Ghrita, Shikari, Vranaropana, Wound healing.

***Address for correspondence:**
Dr. Ashish Kumar Sharma,
MD Scholar, Department of Dravyaguna,
I.P.G.T. & R.A., Gujarat Ayurved University,
Jamnagar, Gujarat, India – 361 008.
E-mail: drashishsharma@gmail.com

Cite This Article

Sharma Ashish, Acharya RN, Gupta SK, Dudhamal TS, Mohanto VD. Clinical evaluation of Shikari (*Cordia macleodii*) *g*hrita on Vrana ropana (wound healing) property. Ayurpharm Int J Ayur Alli Sci. 2013;2(4):98-104.

www.ayurpharm.com
ISSN: 2278-4772
Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104

INTRODUCTION

Wound is defined as a loss or break in anatomical and functional continuity of living tissue.[1] Wound healing is a complex phenomenon that results in restoration of anatomic continuity and function, accomplished by several processes which involve different phases including inflammation, granulation, fibrogenesis neovascularization, wound contraction and epithelization.[2]

Research on wound healing drugs is a developing area in modern biomedical sciences. Scientists who are trying to develop newer drugs from natural resources are looking toward the rich source in Ayurveda. Several drugs of plant, mineral and animal origin are described in the Ayurveda for their wound healing properties under the term Vranaropaka (wound healing). Most of these drugs are derived from plant origin.[3]

The leaf powder of *Cordia macleodii* Hook. (Boraginaceae) has been reported for antihypertensive activity,[4] for antimicrobial property.[5] Recent pharmacological studies have been reported on *Cordia macleodii* leaf powder for the week tensile strength promoting property in incision wounds, neo-vascularization and ground substance formation in the dead space of wounds[6] it's clinical scientific validation is yet to be proved. Ghrita alone also has been reported for its wound healing properties.[7] Ayurveda advocates different dosage form including ghrita base formulations for vrana shodhana (Cleansing) and ropana (Healing) through external application.[8] In the present study, an attempt has been made to evaluate the wound healing property of ghrita base formulation of *C. macleodii* leaf clinically.

MATERIALS AND METHODS

Preparation of formulation

The drug (Fresh leaves of *C. macleodii*) collected from its reported habitat.[9] Cow's ghrita was procured from Khadi Gramodyoga Bhandara, Jamnagar. The formulation was prepared by following the standard procedure of Sneha Kalpana described in Sharangdhara Samhita[10] and the prepared drug was labeled as Cordia macleodii ghrita (CMG).

Selection of patients

Twenty patients of shuddha vrana (clean and fresh wounds) selected from post operative created wound of piles fissure and cyst and wound of accidental injuries from the OPD and IPD of Shalya Tantra department and Dravyaguna department for the present study, irrespective of their age, sex and religion. Patients suffering from wounds associated with systemic diseases like diabetes mellitus, tuberculosis, malignancy burn wounds, wounds occupying large surface area, chronic infected wounds, non-healing ulcers etc. were excluded from the study.

Laboratory Investigation

Routine blood examination for TLC, DLC, Hb%, ESR, Fasting blood sugar and routine and microscopic examination of urine was conducted to exclude any pathological condition. The trial was registered in CTRI and conducted after getting clinical clearance from Institutional Ethics committee.

Statistical analysis

The data collected on the basis of signs and symptoms is presented here after application of paired 't' test and unpaired 't' test for assessment of results.

www.ayurpharm.com
ISSN: 2278-4772
Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104

Grouping and management of patients

The selected patients were allotted into two groups i.e. *Cordia macleodii* ghrita group termed as CMG and Povidone Iodine ointment group termed as PI. Patients of both groups were treated for 21 days and the assessment of parameters was done at 7th, 14th and 21st day of treatment.

Criteria for assessment

The assessment was done on the basis of changes observed in the signs and symptoms of *vrana*. The subjective parameters of pain, tenderness, and objective parameters of size, colour, floor, margin, discharge, granulation tissue and swelling were recorded on the basis of scoring pattern adopted with grading (0, 1, 2 and 3)

RESULT AND DISCUSSION

Wound healing is the process of repair that follows injury to the skin and soft tissues. There are three stages in the process of wound healing i.e. inflammation, proliferation and remodeling.

Following injury, an inflammatory response occurs and the cells below the dermis begin to increase collagen (connective tissue) production. Later the epithelial tissue is regenerated. The proliferative phase is characterized by angiogenesis, collagen deposition, granulation tissue formation, epithelialization and wound contraction. Angiogenesis involves new blood vessels growth from endothelial cells by granulation tissue formation; fibroblasts excrete collagen fibronectin to form a new provisional extracellular matrix. Subsequently, epithelial cells crawl across the wound bed to cover it and the wound is contracted by myofibroblasts, which grip the wound edges and undergo contraction takes place, using a mechanism similar to that in smooth muscle cells.[11]

General clinical features

It was observed that maximum number of the patients had the wounds with granulated wound bed (85%), sloping edge (60.00%) with mild or moderate discharge all patients were having vrana of Agantuja in nature. It was also observed that Maximum no. of the patients were addicted to tobacco consumption, which has been reported as a causative factor for delaying wound healing.[12]

Effect of therapy

In CMG group, on 7th day of observation, significant change in sign and symptoms was observed only in discharge, tenderness, wound margin and wound size. On 14th day of observation significant change in sign and symptoms was observed only in discharge, tenderness, wound margin and wound size, unhealthy granulation and swelling and no change was observed in pain, wound floor and colour of wound. At 21st day significant effect was observed in all parameters. (Table 1)

In PI group, highly significant change were observed in all parameters at 7th, 14th as well as 21st days of observational periods except wound floor at 7th day. (Table. 2)

In CMG group, 40% of the patients were cured and 60% showed marked improvement, while in PI group, 100% patients were cured. (Table. 3)

It has been reported that leaf of *C. macleodii* contains tannin[13] and it may up-regulate immune-histochemical, transcriptional and translational levels of vascular endothelial growth factor A (VEGFA) expression, increasing the amount of newly formed capillaries at the inflammatory phase as well

AYURPHARM IJAAS
www.ayurpharm.com
ISSN: 2278-4772
Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104

Table 1: Effect of therapy on different sign and symptoms of patients in group treated with CMG

S.No	Parameters	Mean value at different Observational periods				Percentage change %			P value		
		BT	7th day	14th day	21st day	7th Day	14th day	21st day	7th day	14th day	21st day
1.	Pain	1.2	0.9	0.9	0.4	25.00	25.00	66.66	0.081	0.081	<0.001
2.	Discharge	1.4	0.9	0.3	0.1	35.71	78.57	92.85	0.015	<0.001	<0.001
3.	Tenderness	1.3	0.9	0.9	0.5	30.76	30.76	61.53	0.037	0.037	0.003
4.	Wound floor	1.1	1.0	0.9	0.2	09.09	18.18	81.81	0.343	0.343	<0.001
5.	Wound margin	1.4	1.0	0.9	0.2	28.57	35.71	85.71	0.037	0.015	<0.001
6.	Colour	1.0	1.0	0.8	0.2	00.00	20.00	80.00	1.000	0.168	<0.001
7.	Wound size	3.0	2.5	1.5	0.8	16.66	50	73.33	0.015	<0.001	<0.001
8.	Unhealthy granulation	1.0	1.0	0.4	0.0	00.00	45.45	100.00	1.000	0.005	<0.001
9.	Swelling	1.1	1.0	0.6	0.3	9.09	45.45	72.72	0.343	0.015	<0.001

Table 2: Effect of therapy on different sign and symptoms of patients treated with PI

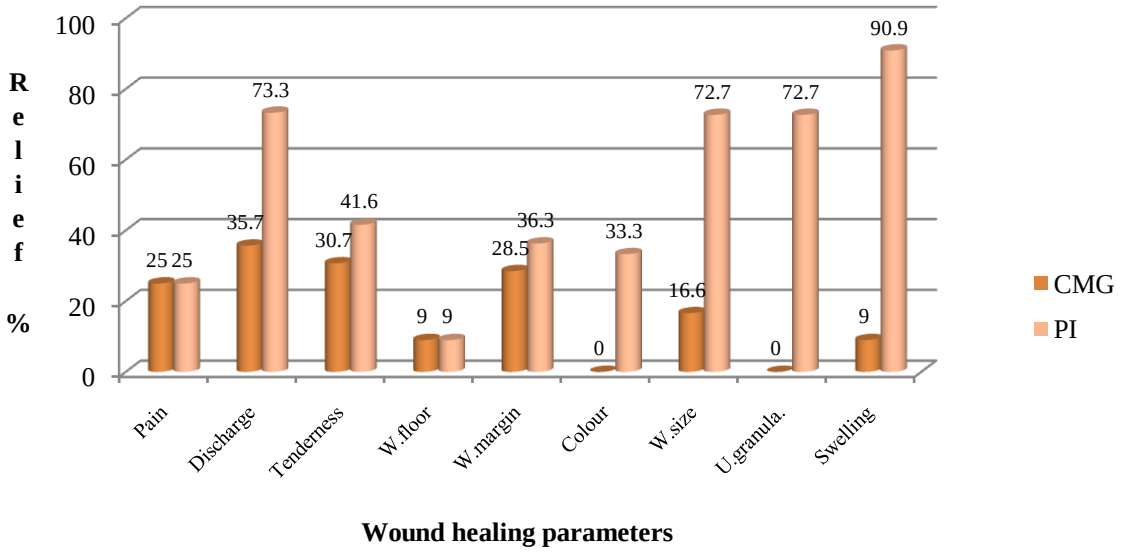
S.No	Parameters	Mean value at different Observational periods				Percentage change %			P value		
		BT	7th day	14th day	21st day	7th Day	14th day	21st day	7th day	14th day	21st day
1.	Pain	1.5	0.6	0.0	0.0	25.00	100	100	<0.001	<0.001	<0.001
2.	Discharge	1.5	1.1	0.0	0.0	73.33	100	100	<0.001	<0.001	<0.001
3.	Tenderness	1.2	0.7	0.0	0.0	41.66	100	100	<0.001	<0.001	<0.001
4.	Wound floor	1.1	1.0	0.0	0.0	9.09	100	100	0.343	<0.001	<0.001
5.	Wound margin	1.1	0.4	0.1	0.0	36.36	90.90	100	0.037	<0.001	<0.001
6.	Colour	1.2	0.8	0.0	0.0	33.33	100	100	0.037	<0.001	<0.001
7.	Wound size	3.0	1.3	0.0	0.0	56.66	100	100	<0.001	<0.001	<0.001
8.	Unhealthy granulation	1.1	0.3	0.0	0.0	72.72	100	100	<0.001	<0.001	<0.001
9.	Swelling	1.1	0.1	0.0	0.0	90.90	100	100	+inf	<0.001	<0.001

Table 3: Overall effect of therapy

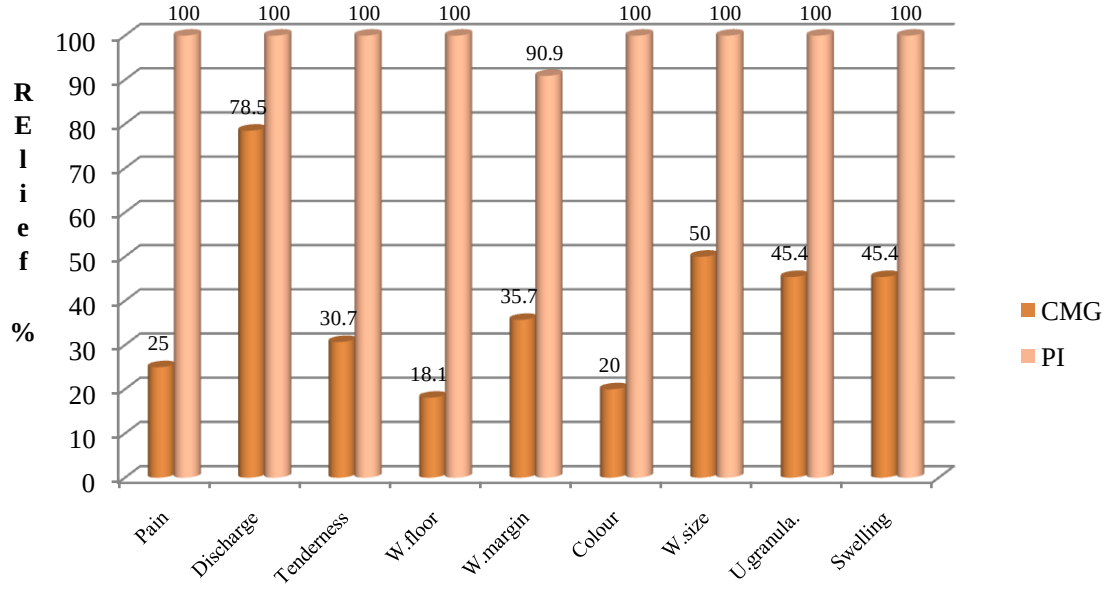
Result	CMG		PI Group	
	N	%	N	%
Cured	4	40	10	100
Marked Improvement	6	60	00	000
Moderate Improvement	0	00	00	000
Mild Improvement	0	00	00	000
No improvement	0	00	00	000

www.ayurpharm.com
ISSN: 2278-4772
Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104

Graph 1: Comparative effect of therapy on wound healing parameters at 7th day

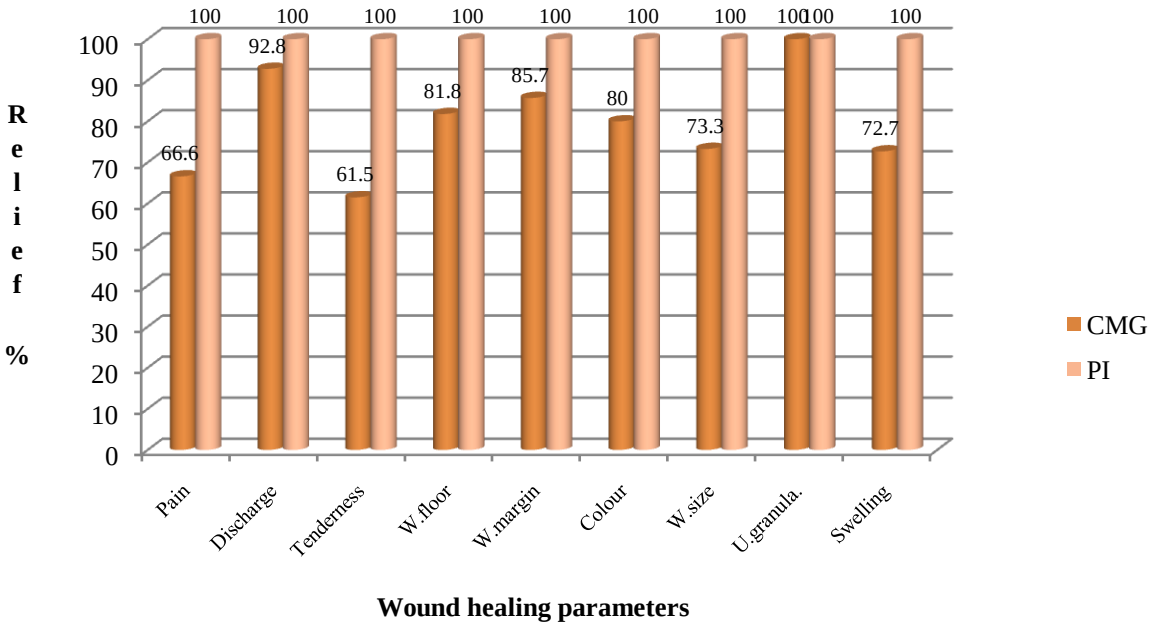


Graph 2: Comparative effect of therapy on wound healing parameters at 14th day



Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104
www.ayurpharm.com
ISSN: 2278-4772

Graph 3: Comparative effect of therapy on wound healing parameters at 21st day



as the percentage of wound contraction at the granulation tissue formation and scar remolding phases. In addition to promoting wound healing, when compared with erythromycin ointment or Vaseline, tannin extracts have a stronger angiogenic effect.

Tannin extracts promote wound healing, probably through their associated powerful angiogenic property. The reason may be related to neovascularity,[14][15]

Recent studies shows that an infected wound usually had poor blood circulation.[16] Application of botanical drugs containing condensed tannin can obtain satisfactory results in these cases. It decreases the permeability of capillaries in the wound and alleviates tissue edema and exudation, resulting in rapid scab formation. As a result, it can effectively prevent the invasion of foreign bodies and microbes, avoiding development of the infected wound.[17]

It has been reported that ghrita itself exhibits excellent wound healing property.[18] Ghrita contains several saturated and unsaturated fatty acids which are capable of taking part in metabolic processes involved in healing of any wound.[19]

CONCLUSION

C. macleodii ghrita showed highly significant effect on 21st day of observation while the standard drug i.e. Povidone Iodine shows highly significant effect on all observational periods in all parameters. *C. macleodii* leaf should be tried in other dosages forms to prove its clinical efficacy in wound healing.

ACKNOWLEDGEMENT

The authors would like to acknowledge the administrative authorities of the institute I.P.G.T. & R.A., Jamnagar for providing facilities to conduct this work. The authors pay their sincere thanks to Dr. Anil verma, Dr.

www.ayurpharm.com
ISSN: 2278-4772
Ayurpharm Int J Ayur Alli Sci., Vol.2, No.4 (2013) Pages 98 - 104

Sheetal, Dr. Jitendra, Dr. Joyal and all PG Scholars of Shalya department for their support during clinical study and Mr. P. Sahu, Pharmacognosy department S.S. Ayurvedic College, Paikmal, Odisha for his help in authentification and collection of the drug.

REFERENCES

1. Puratchikody C, Nithya Devi, G Nagalaxmi. Wound healing activity of *Cyperus rotundus* Linn. Indian Journal of Pharmaceutical Sciences 2006; 68 (1): 32-36
2. Clark RA. Wound repair: an overview and general consideration. In: Clark RA, Hensen PM, editors. Molecular and Cellular Biology of Wound Repair. New York: Plenum Press; 1996. p. 473-88.
3. Biswas TK, Mukherjee B. Plant medicines of Indian origin for wound healing activity: A review. Lower extremity wounds; 2003;2(1):25-39.
4. Mukul Dikshit, Mohan Lal Jaiswal. A study of antihypertensive action of *Dahimanth Hook. Cordia macleodii*, Journal of Ayurveda. 2011; 2(2), 59-64
5. Sharma Ashish, Acharya RN, Shukla VJ, Gupta SK. A comparative antimicrobial study on *Cordia macleodii*. Hook; leaf water extract, and its ghrita base formulation. International Journal of Ayurvedic Medicine 2013; 4(1): 9-16
6. Bhargav Bhide, RN Acharya, BK Ashok, B. Ravishankar. Antimicrobial and wound healing activities of *Cordia macleodii* Hook.f & Thoms. leaves. Indian journal of natural products & Resourses 2011; 1(2): 198-203.
7. Dinesh Motilal Biyani, Verma PRP, Dorle A K, Boxey V. Wound Healing activity of cow ghee: A Veterinary case report. International Journal of Ayurvedic Medicine 2011; 2(3):115-118
8. Sushruta. Sushruta Samhita. Anantrama Sharma, editor. 1st ed. Varanasi; Choukhambha Surbharati Prakashana; 2008.p.155.
9. Saxena HO. The flora of Orissa. Bhubaneshwar: Regional Research Laboratory, Orissa forest development Corporation Ltd.; 1995.p.1136.
10. Sharangadhara. Sharangadhara Samhitha. (Adhamalla's Deepika and Kashiram's Gudhartha Deepika commentary) Parshuram shastri vidyasagar, editor. 2nd ed. Varanasi: Krishnadas Academy 2000; p.212-215.
11. Nayak BS, Anderson M, Pereira LMP. Evaluation of wound healing potential of *Catharanthus roseus* leaf extract in rats. Fitotrpia 2007;78:540-4
12. John K Jones, Robert G Triplett. The relationship of cigarette smoking to impaired intraoral wound healing: A review of evidence and implications for patient care; Journal of oral and maxillofacial surgery; 1992;50(3):237-239.
13. Bhargav Bhide, RN Acharya, Pankaj Naria, APG Pillai, VJ Shukla. Pharmacognostic evaluation of *Cordia macleodii* Hook. stem bark, Pharmacognosy Journal. 2012;4:49-53.
14. Singer AJ, Clark RA, Cutaneous wound healing. New Engl J Med. 1999, 341:738- 746.
15. Simonetti O, Cirioni O, Goteri G, Ghiselli R, Kamysz W, Kamysz E, Silvestri C, Orlando F, Barucca C, Scalise A, Saba V, Scalise G, Giacometti A, Offidani A. Temporin A is effective in MRSA-infected wounds through bactericidal activity and acceleration of wound repair in a murine model. Peptides 2008; 29: 520-528.
16. Nayak BS, Steve Sandiford, Anderson Maxwell. Evaluation of the wound healing activity of ethanolic extract of *Morinda citrifolia* L. leaf. Evid Based Compl Alt 2009; 6(3):351-353.
17. Kun Li, Yunpeng Diao, Houli Zhang, Shouyu Wang, Zhen Zhang. Tannin extracts from immature fruits of *Terminalia chebula* Retz. Promote cutaneous wound healing in rats. BMC Complementary and Alternative Medicine 2011; 11:8.
18. Charde MS, Fulzele SV, Satturwar PM, Joshi SB, Kasture AV. Wound healing and anti-inflammatory potential of madhu ghrita. Indian J Pharm Sci. 2006;68(1):26-31.
19. Dinesh Motilal Biyani, Verma PRP, Dorle AK, Boxey V. Wound healing activity of Cow ghee: A Veterinary case report. International Journal of Ayurvedic Medicine 2011; 2(3):115-118.

Source of Support: Nil Conflict of Interest: None Declared