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Original Research Paper Surgery COMPARATIVE STUDY OF COLLAGEN VERSUS. SILVER FOAM DRESSING IN SECOND DEGREE SUPERFICIAL BURNS: AN INSTITUTIONAL STUDY MBBS, DNB, MCh PLASTIC SURGERY Assistant Professor Department of Dr Hemang Plastic and Reconstructive surgery Jubilee mission medical college Thrissur Sanghvi (Kerala) India MBBS, MS, MCh PLASTIC SURGERY Professor and Head of Unit Department of Plastic and Reconstructive surgery Bangalore medical Dr Smitha Segu\* college and research institute Bangalore Karnataka India \*Corresponding Author MBBS, MS OBSTETRICS & GYNAECOLOGY Consultant Obstetrician & Dr Shikha Sanghvi Gynaecologist Gem hospital and research centre Thrissur (Kerala) India

ABSTRACT Aim: To compare the efficacy of collagen dressing with that of Silver foam in the management of Second Degree superficial burns. Material and methods: A prospective study was done at our Department of burns and plastic surgery from a period January 2016 to December 2016. Patients with less than 40% second degree superficial burns who consented were included in the study. Collagen dressing was done on one hand or leg and on other hand or leg we did silver foam dressing. Wound epithelisation, exudates of wound, patient tolerance to pain while change of dressing and requirement of Split thickness skin graft in non healed wound were noted and analysed using 'Pearson Chi-Square test' . Results: A total of 30 patients were included in our study. 16 were males and 14 were females.21 out of 30 patients in whom collagen was applied had complete epithelisation in 10 days whereas 19 out of 30 patients in whom silver foam dressing was done had epithelisation in 10 days. 26 out of 30 patients in whom collagen was applied had complete epithelisation in 14 days whereas 24 out of 30 patients in whom silver foam dressing was done had epithelisation in 14 days. There was no statistically significant difference in the completeness of healing of wounds in 2 weeks. 4 patients treated with collagen dressing and 6 patients having silver foam application required split thickness skin grafting. Pain was significantly less statistically on application of silver foam dressing compared to collagen treated wounds. CONCLUSIONS: Collagen dressing does not offer significant better results over Silver foam dressings in terms of completeness of healing of burns. Pain tolerance is better in silver foam dressing. Silver foam dressing works better in exudative wounds.

KEYWORDS: Silver foam dressing, Collagen dressing, Split thickness skin graft, Second degree burns.

# INTRODUCTION

Burns injury is a major cause of morbidity and mortality in India. Accidental Thermal burns, scald burns and contact burns are major causes of burns resulting in significant admission in our hospital. (1) Burn wounds are highly susceptible to infection since first line of defence i.e. skin is lost from the body. If not intervened properly then zone of stasis will go into zone of coagulation i.e. partial thickness burns will be converted to deep thickness burns which may require skin grafting.(1) Collagen dressing is an artificial skin substitute carries out the function of skin in its absence.(2) It is derived from bovine intestine. It is sterile, non-allergenic, and nonimmunogenic and pain free. (3) It is to be applied within 24 hours of burns injury. (4) Silver foam is made of a spongelike polyurethane material with an antibiotic layer of silver that is impregnated in it. It can stay for 5-7 days on wound without being changed. It has high capacity to absorb fluid and has antibacterial property .(5) The study was done to compare collagen dressing and silver foam dressing in second degree superficial burns in terms of wound epithelisation, pain tolerance while changing of dressing and requirement of split thickness skin graft in non-healed wound.

# Material and methods

A retrospective study was carried out in a tertiary care centre in south India during the period from January 2016 to December 2016.

# Inclusion Criteria:

Exclusion Criteria:

1. Patients with second-degree superficial burns admitted within 24 hours of burn injury 2. Patients with 0-40% accidental thermal or scald burns

1. Patients with more than 40 percent burns

2. Patients with comorbidity.

- $3. \, Patients \, with \, electrical \, burns \, / Chemical \, burns.$
- 4. Patients who did not give consent

The patients were assessed for the depth of burns clinically at the time of admission, and the percentage of burns was calculated by Wallace formula or Lund and Browder formula for paediatric patients. Initial fluid was given based on Parkland formula. Broad spectrum antibiotics were started on day 1 and on day 5 depending on culture reports and clinical symptoms antibiotics were changed. The wound was cleaned and the blisters were removed. Wound dressing was done with collagen dressing on one side of hand or leg and silver foam dressing on other side of hand or leg on day 1 for comparison. Various sizes of collagen are available 5 x 5 cm 10 x 5 cm 15 cm x 10 cm. It is washed with normal saline in bowl under aseptic precaution and with the help of forceps it is spread on wound uniformly and then it is covered with pad and bandage. If the wounds heal then it peels of spontaneously on 10 to 12 days. If there is soakage or infection then wound is opened and dressing is changed. Silver foam dressing comprising polyurethane foam and silver sulphate was used (Mepilex® Ag; Molnlycke Health Care) applied on day 1 on other side of hand or leg. The dressing was assessed daily to see any soakage or clinical symptoms like fever, tachycardia or increased total count. In presence of soakage, the dressing change was carried out earlier by 3rd or 4th day; otherwise it was allowed to remain on wound till 5 to 6 day and changed afterwards. The wound healing was assessed at regular intervals in terms of re-epithelialization, granulation tissue, discharge, slough, on day 10 and 14. Photographic record was maintained to see the progress of the wound. Patient tolerance in terms of pain during dressing change was assessed using visual analogue scale on day 1.

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Patients in whom wound got infected or not responded to conservative treatment was later treated by skin grafting after adequate granulation tissue was formed. A P value < 0.05 was considered significant.

#### **RESULTS:**

A total of 30 patients were included in the study. Out of 30 patients, 6 (20%) belonged to the age group 01-20 years, 16 (57%) to 20-40 years, and 8 (23%) were more than 40 years of age. 16 were males and 14 were females. Thermal burns contribute to (70%), scald burns contribute to (20%) and contact (10%) burns in our study group. The number of patients with complete re-epithelialization was 21 out of 30 in collagen treated group versus 19 out of 30 in silver foam treated group at day 10. At 14 days, 5 out of 30 patients had complete epithelisation in collagen and 5 out of 30 patients had complete epithelisation in silver foam treated group. The average time for complete epithelisation was 10 days in collagen treated group and 12 days in silver foam treated group. 4 out of 30 patients in Collagen treated group did not epithelise and required skin grafting at the end of 3 weeks whereas 6 out of 30 patients required skin grafting in silver foam treated group by the end of 3 weeks. These patients either got infected or didn't respond to antibiotics and got converted to deep burns. Pain was less while application or change of silver foam dressing compared to collagen dressing according to Visual analogue scale.

#### Table 1: Age and sex distribution



#### Table 2: Etiology of burns



## Table 3: Healing on Day 10

TYPE OF DRESSING	HEALED	NON HEALED	TOTAL
COLLAGEN	21	9	30
SILVER FOAM	19	11	30

Pvalue: 0.8607, not significant

#### Table 4: Healing on Day 14

TYPE OF DRESSING	HEALED	NON HEALED	TOTAL
COLLAGEN	26(86%)	4	30
SILVER FOAM	24(80%)	6	30

Pvalue: 0.7866, not significant

Table 5: Need of skin graft

TYPE OF	NEED OF	DID NOT NEED	TOTAL
DRESSING	SPLIT	SPLIT	
	THICKNESS	THICKNESS	
	SKIN GRAFT	SKIN GRAFT	
COLLAGEN	4	26	30
SILVER FOAM	6	24	30

Pvalue: 0.7866, not significant

#### Table 6: Pain score on day 1 by Visual Analogue Scale

TYPE OF	Score 0-3	Score 4-7	Score 8-10	TOTAL
DRESSING				
COLLAGEN	3	11	16	30
SILVER	16	12	2	30
FOAM				

#### Pvalue: 0.000184, significant



**Fig 1:** (1a) Second degree superficial burns on both legs, (1b) Collagen dressing on right leg on day 1, (1c) Silver foam dressing on left leg on day 1, (1d) Wound healed on day 10 on both sides



Fig 2: (2a) Collagen dressing on right hand on day1, (2b) Silver foam dressing on left hand on day 1, (2c) Wound healed on day 10 of collagen dressing, (2d) Wound healed on day 14 of silver foam dressing



**Fig 3 :** (3a) Collagen dressing of right hand on Dayl, (3b) Status of wound with collagen dressing on day 7,(3c) Status of wound with collagen dressing on day 12, (3d) Silver foam dressing applied on day 1, (3d) Soakage of silver foam dressing on day 5 which was changed, (3f) Soakage of silver foam dressing on day 10 which was infected and later after 3 weeks, split thickness skin grafting was done.

#### DISCUSSION:

In India, the annual burn incidence is around 6-7 million which is based on the data from major hospitals of the country.

The incidence of burns in India is around 6–7 million which is a major cause of morbidity and mortality. Majority of burns is due to thermal, contact and scald burns. It is common in lower socioeconomic people were they use low quality cooking gas oil like kerosene.(6) Partial thickness burns remains a challenge to the treating surgeons. Proper intervention at this stage is needed to avoid risk of infection to avoid converting to deep burns which will require more aggressive treatment like skin grafting. Various techniques for dressing are available to treat second degree superficial burns. (7)

The study has shown that collagen and silver foam dressing both are effective in treating partial thickness burns. According to (Table 3), which compared wound healing with collagen dressing and silver foam dressing on day 10, p value is 0.867, which is statistically not significant. In exudative wounds silver foam dressing is good as it has a large surface area. In this study, the both types of dressings i.e collagen and silver foam were used on the same patient in comparable areas like hand leg hence, overcoming the potential patient confounding factors. There are many studies in the literature comparing the newer silver preparations with the collagen dressing.(8) Lazovic G et al. showed that Collagen sheet provides multiple benefits that cannot be provided by conventional dressing. It helps in controlling of infection, acts as template for infiltration of fibroblasts, macrophages, and lymphocytes and attracts additional monocytes to the wound, thus increasing the amount of debris removed and the capillaries forming the neovascular network.(3) As healing progresses, collagen is deposited by the fibroblasts, replacing the collagen portion of the collagen sheet. Singh et al. has shown that the use of collagen dressings hastens the wound healing in various types of wounds, reduces scar contracture, and reduces the need for skin grafting.(9) Silverstein et al. evaluated the cost-effectiveness, performance, tolerance, and safety of a silver-containing soft silicone foam dressing versus SSD cream (control) in the treatment of partial-thickness thermal burns. Both treatments were well tolerated; however, the total incidence of adverse events was higher in the control group. The silver-containing soft silicone foam dressing was as effective in the treatment of patients as the standard care (SSD).(6) In addition, the group of patients treated with the soft silicone foam dressing demonstrated decreased pain and associated with treatment.(10) The authors reported complete healing in 75% patients treated with the foam preparation. Similar results were reported in our study 86% for collagen dressing group and 80% for silver foam group (Table 4) p value 0.7866 which is statistically insignificant. Cutle et al. studied effect of collagen dressing on different type of burn wounds demonstrated complete closure by 5-6 weeks. The need for grafting was reported in 15% of patients treated with Acticoat in a large retrospective study.(11) 13 % patients in the present study needed grafting in collagen treated group and 10 % needed grafting in silver foam treated groups according to table (Table 5) p value 0.7866 which is statistically insignificant.1cPain during dressing change was assessed using Visual analogue scale. It demonstrated a significant reduction in the Nano silver foam group when compared with conventional silver preparations.(12,13) In the present study, the pain scores were better in silver foam dressing compared to collagen treated patient during and while change of dressing. The patients in the silver foam group were noted to be less apprehensive about dressing changes in the current study as noted by clinicians and supporting staff (Table6) P value: 0.000184, statistically significant.

The study is based on findings in a small number of patients so it cannot be generalised to large number of population. There were no side effects of collagen or silver foam application. Larger comparative studies are needed to provide conclusive evidence.

# CONCLUSION

Collagen dressing and silver foam dressing had no significant difference in terms of epithelisation or healing of wounds. Pain tolerance was better in silver foam dressing compared to collagen treated patients. Both dressings were found to be safe.

#### REFERENCES

- Waghmare M, Shah H, Tiwari C, Makhija D, Desale J, Dwivedi P. Collagen dressings in the management of partial thickness pediatric burns: Our experience. Indian J Burns 2016; 24:53-7
- Mariappan N. Collagen dressing for thermal burns. Sch J Appl Med Sci 2015; 3:58

- Lazovic G, Colic M, Grubor M, Jovanovic M. The application of collagen sheet in open wound healing. Ann Burns Fire Disasters 2005; 18:151-6
- Motta G, Ratto GB, De Barbieri A, Corte G, Zardi L, Sacco A, et al. Can heterologous collagen enhance the granulation tissue growth: An experimental study. Ital J Surg Sci 1983; 13:101-104.
- Erring M, Gaba S, Mohsina S, Tripathy S, Sharma RK. Comparison of efficacy of silver-nanoparticle gel, nano-silver-foam and collagen dressings in treatment of partial thickness burn wounds. Burns. 2019; 45(8):1888-1894. doi:10.1016/j.burns.2019.07.019.
- Silverstein P., Heimbach D., Meites H., Latenser B., Mozingo D., Mullins F., et. al.: An open, parallel, randomized, comparative, multicenter study to evaluate the cost-effectiveness, performance, tolerance, and safety of a silvercontaining soft silicone foam dressing (intervention) vs silver sulfadiazine cream. JBurn Care Res 2011; 32: pp. 617-626
- Heyneman A, Hoeksema H, Vandekerckhove D, Pirayesh A, Monstrey S. The role of silver sulphadiazine in the conservative treatment of partial thickness burn wounds: A systematic review. Burns 2016; 42:1377-86
- Klasen HJ. Historical review of the use of silver in the treatment of burns. Burns 2000; 26:117–30
- Singh O, Gupta SS, Soni M, Moses S, Shukla S, Mathur RK. Collagen dressing versus conventional dressings in burn and chronic wounds: A retrospective study. J Cutan Aesthet Surg 2011; 4:12-6
- Gravante G., Esposito G., Delogu D., Montone A.: Silver dressings: a clinical perspective. PlastReconstrSurg 2007; 119: pp. 429-430.
- Cuttle L,SanjeevNaidu Hoskin J,Das K,Kimble R. A retrospective cohort study of Acticoat™ versus Silvazine™ in a paediatric population. Burns Volume 33, Issue 6, September 2007, Pages 701-707
- Mehta, MilindA & Shah, Sankit & Sarwade, Pradnya & Philipose, Atul. (2019). Comparative study of silver-sulfadiazine-impreg nated collagen dressing versus conventional hum dressings in second-degree hums. Journal of Family Medicine and Primary Care. 8. 215. 10.4103/jfmpc.jfmpc\_291\_18.
- Muangman P, Chuntrasakul C, Silthram S, Suvanchote S, Benjathanung R, Kittidacha S et al. Comparison of efficacy of 1% silver sulfadiazine and ActicoatTM for treatment of partial thickness burn wounds. J Med Assoc Thai2006;89(7):953.