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Study the efficacy of the indigenous ointment as local application on microbiological flora of the wounds along with scar quality

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Original Research Article

Abstract: Wound and their management are the basics of surgery and the practice of surgeon is very much dependent on the wound healing process. For centuries people are using various topical agents for healing of wounds and have improvised the agents according to the need. Since the beginning of medical history recorded, topical agents have been used for wound management and to control bacterial infection. Infection of burn not only causes the conversion of second degree burn into a third degree burn but is also the fundamental cause of sepsis and septicemia. The study has been undertaken to observe the efficacy of the indigenous ointment as local application on microbiological flora of the wounds along with scar quality. **Methodology-** The study has been carried out on 50 patients at a tertiary care center. An indigenous product ointment was used, with various types of wounds, as a topical agent for dressing, from time of admission till complete wound cover is achieved. The ointment is an extract of barks of 5 trees having antibacterial activity. After completion of the study, the data obtained was analyzed and interpreted. **Result-** 37 wounds grew various microbiological flora at inclusion but were sterile at completion. A wide spectrum of micro-biological flora was detected in wounds of 37 patients. Wounds of 13 patients did not grow any micro- organisms on the wound culture and remained sterile throughout the study. In all patients the scar quality was seen to be good and maturation was observed to progress satisfactorily without any evidence of hypertrophic scar even in post burn scars. **Conclusion-** The indigenous product is highly effective against large spectrum of microbiological flora of wounds. It is also effective in achieving good scar quality.

Keywords- Wound, burn, indigenous, ointment, healing, flora, microbiological.

Introduction:

Wounds and their management are fundamental to the practice of surgery and all surgeons depend on wound repair process,[1] Any surgical intervention will result in a wound in order to gain access to and deal with the underlying pathology. In both situations the surgeon's task is to minimize the adverse effects of wound, remove and / or repair damaged structures and harness the process of wound healing to restore function. The past decade has seen an explosive growth of wound healing research that promises to facilitate clinical wound repair. For centuries people are using various topical agents for healing of wounds and have improvised the agents according to the need. Since the beginning of medical history recorded, topical agents have been used for wound management and to control bacterial infection. In India history goes back more than 5000 years B.C. where in Ayurveda use of turmeric (Haldi) as a topical antimicrobial agent was shown to be effective and emphasized. The use of plants and trees extracts as topical agents in management of wounds in a cultures such as Indla[2] and China had been greater than that of nomadic tribes of the desert due to wider variety of plant life and the settled nature of culture.[3] The developing use of plants and their natural substances is clearly identified in historical records.[4] In India, medical system, Ayurveda, promotes the knowledge and use of medicinal plant extracts as topical agents in wound management.[5]

Despite the relatively efficacious antimicrobial treatment and improved supportive measures, invasive infections of burn wounds continue to be a great threat for patient survival in extensive burns.[6] After the successful treatment of initial shock, bacterial infection has been recognized since ancient times as the most serious complication of burn

injury and is probably the most frequent cause of death. Burn injury destroys the skin which functions as barrier, leaving behind large raw area with its exudate of serum which serves as an excellent culture medium on which organisms multiply. The burn wound infection is very difficult to control using only systemic antibacterial therapy since the drug administered by the parenteral route cannot reach the cutaneous lesions in effective concentration. In last decade a large number of effective topical agents for prevention of burn wound sepsis have come upon the scene. Among the substances available for effective topical antimicrobial use are silver nitrate, mafenide acetate, silver sulfadiazine and gentamicin. Until recently all these methods of topical therapy of burn wound had fallen into dispute because of toxicity of the substance applied either local or systemic or failure to show any beneficial results of both. Indiscriminate use of these antibiotics has further complicated the problem of nosocomial infections, particularly due to survival and multiplication of resistant microorganisms in hospital environment.[7]

In quest for alternative sources of antimicrobials we have turned back towards. Ayurveda, the ancient system of medicine in India. In study conducted above the ointment used is an extract of barks of 5 trees having antibacterial activity. The milky juice is an astringent, tonic and lessens inflammation. It is considered as a valuable application to the soles of the feet when cracked or inflamed. In 1961, Shukla *et al*..[8] reported the bacteriolytic activity of the latex of this plant against micrococcus lysodeikticus. In 1981, Bhatt and Kore found the ethanolic extract of the bark antibacterial against all the pathogens causing burn wound infections.[9] Alcoholic extracts of the bark of F. religiosa showed bacterial activity against aerobes and anaerobes.[1,10] This activity against the anaerobes was due to glycosides present in the bark. Bhatt and Kore, 1984[11] in their work showed that the alcoholic extract of bark is effective in inhibiting burn wound infecting bacteria. Shivalkar 1986[12], showed the most active fraction in the bark extract to be a glycoside.

Therefore, the above study was undertaken to study the efficacy of the indigenous ointment as local application on microbiological flora of the wounds along with scar quality.

Materials And Methods

Study place- The study was conducted at tertiary care center in Mumbai for a period of six months**.**

Study Design-Prospective interventional study.

Inclusion Criteria-Patients between age of 12-65 years having infected wounds, clean wounds, burn wounds (15%-30%), diabetic ulcers, amputation stumps, pressure sores, post-operative wounds and those who were ready to give written informed consent.

Exclusion Criteria-Pregnant females, leprosy patients, patients with peripheral neuropathy, severe systemic disease and those not willing to give written informed consent.

Sample size-50 patients were considered for the study**.**

Data analysis- After completion of the study, the data obtained was analyzed and interpreted.

Ethical Considerations-Institutional Scientific and Ethical Committee approval was obtained before starting the study.

Patient were selected as per the criteria. Basic data regarding patient's history and other parameters was recorded. Baseline blood investigations and wound swab for culture and sensitivity were sent prior to ointment application. Wound evaluation was scored in a tabulated format as in case record forms (CRFs). Post wound evaluation, the product was given for topical application. A thin film of ointment covering the entire wound surface was applied and further covered with dry gauze. The dressing was changed every 24 hours. Wound status was recorded timely on day 1, day 3, day 7 and day 10. After complete healing of wound final photo of the wound was taken depending on patient compliance.

Result

Table 1: Age and Sex Ratio

AGE GROUP	MALE	FEMALE	TOTAL
12 to 25 years	7	5	12(24%)
26 TO 50 years	12	12	24(48%)
51 to 65 years	12	2	14(28%)
TOTAL	**31**	**19**	**50(100%)**

TABLE 2: TYPES OF WOUNDS COVERED

TYPE	NO. OF PATIENTS
Ulcers	20
Burns	9
Pressure sores	6
Post-op wounds	8
Amputation stumps	7
Total	**50**

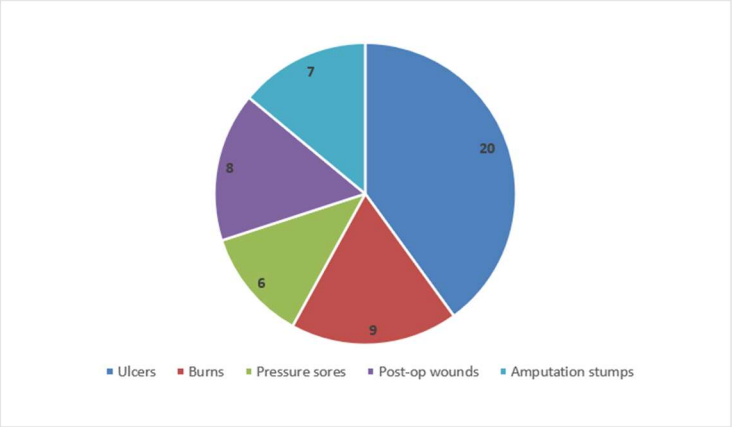

Figure 1

Table 3: MICROBIOLOGICAL FLORA ISOLATED FROM VARIOUS WOUNDS

MICROBIOLOGICAL FLORA	NO. OF PATIENTS
Pseudomonas Aeruginosa	12
Escherichia Coli	3
Staphylococcus Aureus (MRSA)	1
Citrobacter	1
Acinetobacter	2
Staphylococcus Aureus	10
Proteus Mirablis	5
Klebsiella	3
No growth	13
Total	50

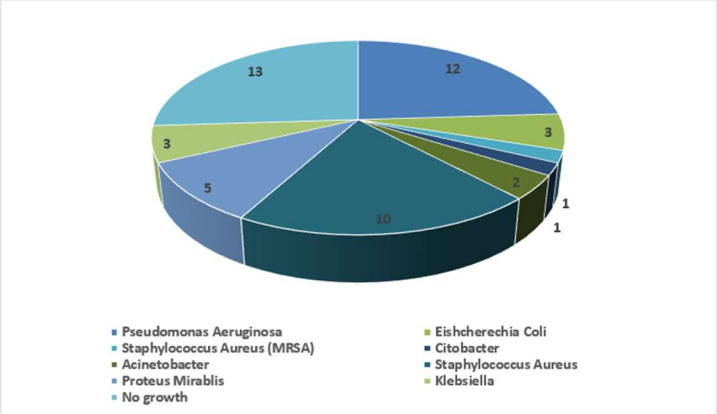

Figure 2

26% of the wounds were sterile at the inclusion in the study whilerest grew various organisms.37 wounds grew various microbiological flora at inclusion but were sterile at completion. 13 wounds were sterile at inclusion and remained sterile at completion.

TABLE 4: MODALITIES OF WOUND COVER

TYPE OF WOUND COVER	NO. OF PATIENTS
Split skin grafting	37
Secondary suturing	1
Wound contraction	7
Epithelization	4
Stump closure	1
Total	50

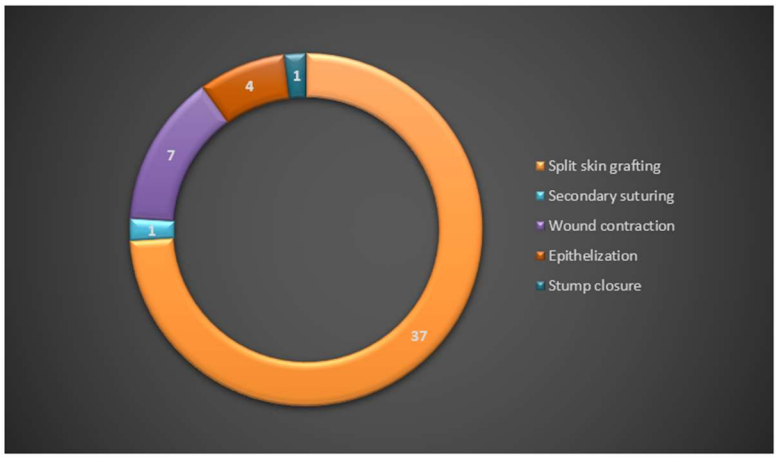

Figure 3

In majority of the patients wound closure was achieved with split skingrafting

TABLE 5: ADVERSE REACTIONS

ADVERSE REACTIONS	NUMBER
A) **Local**	
Itching	**1**
Redness	**Nil**
Burning sensation	**Nil**
Pain	**Nil**
B) **Systemic**	
Itching	**Nil**
Fever	**Nil**
Allergic reactions	**Nil**

Case 1:

Photo 1: Medical aspect of left foot of diabetic patient;
1. Wound unhealthy, 2. Areas of slough present, 3. Serous discharge present, 4. Pale granulation tissue present

Photo 2: Wound after 7 days
1. No slough, 2. No discharge present, 3. Wound contracted, 4. Healthy granulation tissue present, 5. Wound healthy

Photo 3: Post -SSG-Day-6 Wound closed.

Case 2

Photo 1: Oval ilcer over anterior aspect of right lower limb
1. Slough present, 2. Unhealthy granulation tissue, 3. Serous discharge present

Photo 2: Wound after 8 days
1. No discharge present, 2. Healthy granulation tissue present

Photo 3: Post -SSG-Day_7_Wound closed

Discussion

50 patients were included in the above study out of which 31 were males & 19 were females. In the study, patients between 12 years & 65 years of age were included. Children below 12 years of age were excluded considering their inability to interpret the reaction to ointment & relative inability to co-operate. People above 65 years have been excluded due to the possibility of associated illnesses.

The above study has covered a wide spectrum of wounds. Burn wounds were studied in range of 15% to 30% partial thickness bums all sorts of amputations stumps was studied. Various ulcers and even pressure sores were studied. The agent under study was found to be effective in all types of wounds.

In this study the area of the wounds ranged from 4cm^2 to 1250cm^2 and the maximum number of wounds i.e. 13 had wound area between 100 cm^2 to 196 cm^2.

6 patients of pressure sore showed wound contraction. In the beginning the average area covered by bed sore wound was 45 cm^2 which was reduced to 5cm^2 over 21 to 28 days. Thus, in these patients the end point was achieved by wound contraction.

Also in this study, no side effects have been noticed both during the trial as well as during regular follow up. The common side effects of itching, allergic reactions were also not detected in this study with this product thus making it a very acceptable product as local agent in management of wounds.

In above study, a wide spectrum of micro-biological flora was detected in wounds of 37 patients. Wounds of 13 patients did not grow any micro- organisms on the wound culture and remained sterile throughout the study, tilt the end point. 37 wounds which grew micro-organisms in the beginning but were sterile at the end point. This observation suggests that the agent under study has anti-bacterial action. In 40 patients, systemic antibiotics were used due to presence of systemic infection, in conjunction with this product that was applied locally over wounds. The desired end point was observed with a mode of 14 days in these 40 patients.

In the above study, the wound closure was achieved by various ways which are as follows:

- Split thickness skin grafting (SSG).
- Secondary closure of wound.
- Wound contraction.
- Closure of amputation stump.
- Epithelization.

Wound healing was achieved by SSG in 37 patients and proved aneffective way of early wound closure. Rapid control of wound slough and stimulation of development ofhealthy wound bed led to early wound closure and helped to decreases the hospital stay of patient.

In this study, only one patient could not complete the trial follow-up as she expired. The wound of the patient responded very dramatically to application of this product and end point was reached as far as wound wasconcerned but the patient expired due to respiratory failure in postoperative period following closure of fecal fistula. 49 patients completed the trial.

Scar is the visible residual mark of the wound. This parameter is particularly important in burns patients and indicates a process of healthy wound healing. In this study the patients of bums responded well to this product and produced healthy scar without any hypertrophic scars and keloid formation upto to 3 months of follow up. This needs further study to detect the possible effect of this product on the process of wound healing and scar maturation when used as a local application.

The process of scar maturation starts after epithelization and is complete by 6 months to 2 years or more varying from person to person and a close monitoring is required. No local or systemic adverse reactions were detected in 49 patients in this trial. Only 1 patient experienced mild itching for 2 days in the beginningbut it disappeared without any treatment from 3'^{d} day onwards. Thus, this product was observed to be free from local and / or systemic adverse reactions when applied locally over wounds. Regular follow up of all the patients was carried out. The duration of follow up ranges from 1 month to 6 months. In all patients the scar quality was seen to be good and maturation was observed to progress satisfactorily without any evidence of hypertrophic scar even in post bum scars.

Conclusion

This indigenous product is efficient as local agent in achieving beneficial effects on wound healing. The product was highly effective against large spectrum ofmicrobiological flora of wounds and also effective in achieving good scar quality.

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