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Original Article

Surgery Section

A Comparative Study of Colostrum Dressing Versus Conventional Dressing in Deep Wounds

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ABSTRACT

Introduction: Deep wounds are extending deeper, across deep fascia into muscles or deeper structures. Understanding of nutrition, immunology, psychological issues, the physiology and the metabolic interactions require for optimal treatment of deep wounds. Wound dressing plays one of the important roles in wound healing. Newer type of wound dressings - Biological dressings like colostrum powder, collagen granules create the physiological interface between the wound surface and environment which is impermeable to bacteria.

Aim: To compare the efficacy and safety of colostrum dressing and conventional dressing in deep wounds.

Materials and Methods: Data was collected from all patients with deep wounds (stage II-IV), admitted during the period of April 2013 to March 2014, considering the inclusion and exclusion criteria.

Results: Less number of dressings, short healing time, rapid healing and decrease pain seen in colostrum dressing group compared to conventional dressing group.

Conclusion: Colostrum powder dressings are safe, promoter of wound healing, more patient compliance in terms of less pain, less number of dressing required. This treatment though found to be more expensive than conventional dressings; results indicate that colostrum powder dressings may be used as an adjunct in management of deep wound.

Keywords: Discharge, Healing time, Pain

INTRODUCTION

Deep wounds extend deeper, across deep fascia into muscles or deeper structures. Understanding of nutrition, immunology, psychological issues, the physiology and the metabolic interactions are required for optimal treatment of deep wounds. These deep wounds can cause various morbidities in the form of prolonged hospital stay, multiple surgeries, permanent disability and deformity, prolonged rehabilitation and enormous economical problems. Therefore, to tackle these issues, wound dressing plays one of the important roles. It is therefore appropriate that the process and problems of wound healing should be vigorously addressed by all practitioners and investigators involved in the treatment of deep wound patients and in the development and use of new wound repair material [1].

The properties of ideal dressing used in the wound management are that, it should be economical, easy to apply, readily available, a dressing or method or coverage that will provide good pain relief, protect wound from infection, promote healing, maintain moisture, be elastic, and non - antigenic and adhere well to the wound and untill spontaneous epithelisation occurs and healthy granulation tissue is formed [2]. In 150 A.D the Greek surgeon, Galen of Pergamum had first addressed the fact that the wound should be kept moist to ensure adequate healing [3]. Among newer type of wound dressings - Biological dressings like colostrums powder, collagen create the most physiological interface between the wound surface, environment and impermeable to bacteria [4].

Colostrum powder contains many cells, repair and growth factors which are responsible for healthy cell growth and repair of tissues like the skin, muscle, cartilage and bone. Colostrum powder dressing has certain advantages over conventional dressing, like healthy granulation tissue formation, greater reduction in inflammatory cells, decreased days of healing and decreased pain.

This study is conducted to compare the efficacy of colostrum powder dressing with that of conventional dressing in the management of deep wounds.

AIM

To compare the efficacy and safety of colostrum dressing and conventional dressing in deep wounds in terms of reduced pain, healing time, number of dressings healing quality and complications.

MATERIALS AND METHODS

Source of data

Data was collected from all patients with deep wounds (stage II-IV), who were admitted during the period of April 2013 to March 2014, for study considering the inclusion and exclusion criteria. In this study experimental research method was used to assess role of colostrums powder dressing on wound healing. The Colostrum powder was commercially procured in the form of colostrums capsules from bovine colostrums (Immurich). Information was collected through a predesigned pretested proforma prepared by investigators for each patient.

All patients were interviewed as per the proforma and a complete clinical examination was done. Cases were randomly selected and allocated into test group and control group, Cases allocated in test group treated with colostrums powder dressing and Cases allocated in control group treated with conventional dressings. Conventional dressings were done with betadine and hydrogen peroxide. In this study, effect of colostrums powder dressing was studied by evaluating and comparing the dependent variables within experimental and control group. The dependent variables were process of wound healing in the form of size of wound, soakage of wound, amount and colour of exudates, pain experienced by patient and decrease in stages of wound during the days of application of colostrums powder on wound for 15 d.

Sample size

In this study samples were the patients admitted in the hospital during study period having ulcers and pressure sores ranging from

stage II-IV. Two hundred patients were selected randomly after meeting inclusion and exclusion criteria. Which were further divided into two groups. One group with Colostrum dressing (n=100) and other with conventional dressing (n=100).

Inclusion criteria

Patients of age 20-60 y with deep wounds of stage two to four and willing to participate in study were included in the study.

Exclusion criteria

Patients of age below 20 y with ulcer in stage one and patients who were suffering from arterial disease and not willing to participate in the study were excluded from the study. In the pre-intervention period the measurement of dependent variable was carried out for all patients of both the groups. The measured dependent variables were size of wound, soakage of wound, amount and colour of exudates, pain, sepsis, type and stage of wound by using structured observation.

After initial assessment, the manipulation of independent variable i.e. intervention of treatment of colostrums powder on wound carried out for the samples of experimental groups. For the samples of experimental group the observations (O) and application of colostrum powder was done twice in a day 7am and 7pm (stage 3 and 4) the observation was done on every 3rd day. i.e. 3rd, 6th, 9th,12th and 15th day of application.

RESULTS

For the patients of conventional dressing group, the series and timing of observation was same as that of experimental group [Table/Fig-1]. Observation checklist to assess rate and process of wound healing for 15 d areas included were size of wound, temperature, soakage of wound, amount and colour of exudates, sepsis, pain, margins of ulcer etc.

While analysing the scores of wound healing following scoring key was used [5]:

Sr.no.	Percentage	Grade
1	Below 25%	Excellent
2	26-50%	Good
3	51-75%	Satisfactory
4	76 & above	Poor

Data from observation related to wound healing before and after was analysed in frequency and percentage.

DISCUSSION

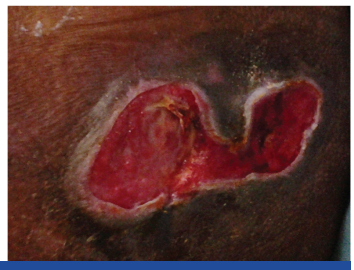
Deep wounds that are difficult to treat, includes diabetic ulcers, venous ulcers, trophic ulcers, pressure sores and necrotizing fasciitis. Colostrum contains many immune factors which make them suitable for topical use in the wounds. Due to its anti-viral, anti-bacterial, and anti-inflammatory properties, it is suitable for oral and/or topical applications. There are seven different growth promoters identified in colostrum involved in growth and repair of body cells. Three of the seven factors identified are involved in the healing of wounds. Nucleotides, EgF (Epidermal growth factor), TgF (Transforming growth factors), FgF (Fibroblast growth factors) and IgF-I (Insulin-like growth factor) stimulate skin growth, cellular growth and repair by direct action on DNA and RNA. These growth factors facilitate the healing of tissues of damaged by ulcers, trauma, burns, surgery or inflammatory disease.

In our study most commonly affected age group is 41 to 50 y of age and males are more affected compared to females [Table/Fig-12-14]. In colostrum dressing group 20% patient stayed for 3-4 wk while in conventional dressing group 40% patient stayed 3-4 wk. Which is almost double than the colostrum dressing group [Table/Fig-15]. Colostrum contains many cells and repair factors, which are important for healthy cell growth. So, in colostrum group there is fast healing and short stay at hospital.

Eighteen patients had percentage reduction of ulcer between 91-99%, 50 patient had percentage reduction between 81-90%. 4

[Table/Fig-1]: Preintervention Day-0

[Table/Fig-2]: Intervention Application of Colostrum powder



[Table/Fig-3]: Postintervention Day-3

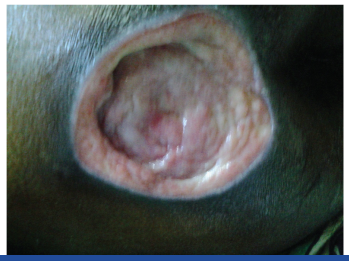
[Table/Fig-4]: Postintervention Day-6

[Table/Fig-5]: Conventional dressing group Day-0

[Table/Fig-6]: Post Intervention Observation (Day-15) Colostrum group

[Table/Fig-7]: Observation (Day-0) conventional dressing group

[Table/Fig-8]: Postintervention Day-15 15) conventional dressing group



[Table/Fig-9]: Conventional dressing group Day-6

[Table/Fig-10]: Postintervention Day-12

[Table/Fig-11]: Observation (Day-

Sr.no	Age (Years)	No. of patient	Percentage (%)
1	21-30	28	14
2	31-40	40	20
3	41-50	74	37
4	51-60	58	29
	Total	200	100

[Table/Fig-12]: Age distribution

Sr.no	Sex	No. of patient	Percentage (%)
1	Male	136	68
2	Female	64	32
	Total	200	100

[Table/Fig-13]: Sex distribution

Sr.no	Type of Onset	No. of patient	Percentage (%)
1	Traumatic	140	70
2	Spontaneous	60	30
	Total	200	100

[Table/Fig-14]: Onset of ulcer

Period of stay (weeks) (A)	No. of patients	Percentage (%)
1-2	35	35
2-3	45	45
3-4	20	20
Total	100	100

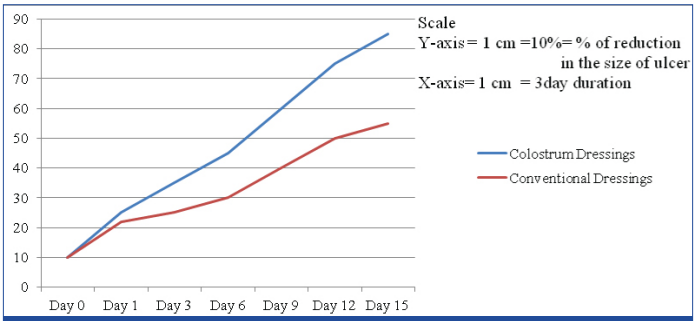
Period of stay (weeks) (B)	No. of patients	Percentage (%)
1-2	25	25
2-3	35	35
3-4	40	40
Total	100	100

[Table/Fig-15]: Average duration of hospital stay (a) colostrum powder dressings (b) conventional dressings

Reduction in size of ulcer (%) (a)	No. of patients
61-70	12
71-80	20
81-90	50
91-99	18
Total	100

Reduction in size of ulcer (%) (b)	No. of patients
61-70	24
71-80	48
81-90	24
91-99	04
Total	100

[Table/Fig-16]: Percentage of reduction of ulcer size (a) Colostrum dressings (b) Conventional dressings



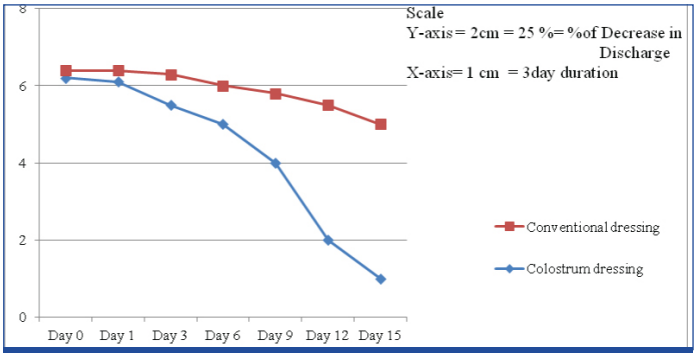
[Table/Fig-17]: Percentage of reduction in the size of ulcer

patients had percentage reduction of ulcer between 90-99% and 24 patients between 81-90% and 48 patients between 71-80% [Table/Fig-16,17].

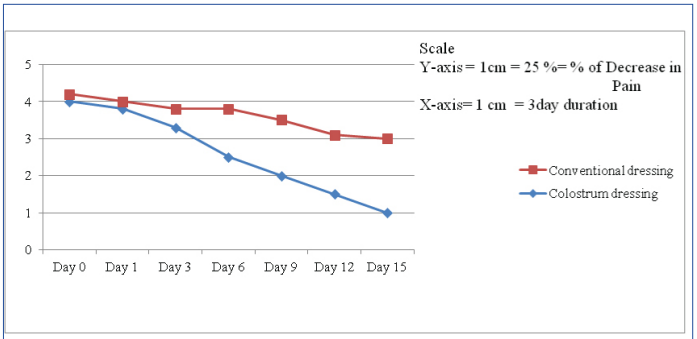
No. of dressings (A)	No. of patients	Percentage (%)
1-5	00	00
6-10	35	35
11-15	31	31
16-20	19	19
21-25	15	15
26-30	00	00
Total	100	100

No. of dressings (B)	No. of patients	Percentage (%)
1-5	00	00
6-10	00	00
11-15	02	02
16-20	34	34
21-25	45	45
26-30	19	19
Total	100	100

[Table/Fig-18]: No. of dressings required (a) Colostrum dressings (b) Conventional dressings



[Table/Fig-19]: Decrease in discharge after colostrum application



[Table/Fig-20]: Decrease in pain after colostrum application

Thirty five patients required colostrum dressing between 6-10, while only 15 patients required between 21-25. 45 patients required conventional dressing between 21-25, which is almost triple time than colostrum dressing. Maximum number of conventional dressing required is 30 [Table/Fig-18]. So, conventional dressings required much more. This is because colostrum decrease the amount of discharge from wound and also fastened the healing leads to decrease in number of dressings [Table/Fig-19]. Barry M, had find that Colostrum proves to be a powerful agent when applied externally [6] [Table/Fig-20]. A colostrum powder dressing has another advantage over conventional dressing in terms of non-immunogenic, non-pyrogenic, being natural, easy application, hypo allergic and pain free [3].

A study by Dr. Sporn et al., reported in Science stated that "Polypeptide Transforming Growth Factors (TGF A & B) and Epithelial Growth Factor Isolated from Bovine Colostrum Used for Wound Healing" because growth factors in bovine colostrum were found to be very effective in promoting wound healing. Our study have shown that colostrum is most effective at promoting healing

of injuries when it is both taken internally and applied topically to the affected area [7]. A clinical research study by Dr. Bhora et al., found that for promoting wound healing growth factors present in colostrums had certain important part [8].

Noda et al., discovered that Transforming growth Factors A and B (TGF A & B) present in bovine colostrum were helpful in embryonic development, cell proliferation, and tissue repair like cellular activities. They also reported it promoted the synthesis and repair of DNA -the master code of the cell [9]. Skottner, Arrhenius-Nyberg, Kanje and Fryklund observed that IGF-1 had role in significant body weight gain and significant bone growth. After Topical application to wounds, It resulted in more effective healing [10].

Allen and Rankin, observed that Fibroblast growth factor (FGF), Insulin like Growth Factor (IGF-1) and Transforming Growth Factor (TGF-b), when administered in combination these factors induce growth, proliferation and regeneration of satellite cells. After sometimes these cells will fuse with one another or the adjacent muscle fiber thereby increasing myonuclei numbers for growth and repair. All three Factors found in Bovine Colostrum [11].

Based on the findings of this study, it can be concluded that colostrum dressing can decrease the hospital stay, promote ulcer healing and decrease pain in cases of deep ulcers. Though at present many different types of dressings like honey dressings, vacuum assisted dressings, hyperbaric oxygen therapy, collagen sheet application and herbal medication like turmeric powder has been tried. Colostrum dressing is cheap, easily available, non immunogenic, easy to apply, provide good pain relief, protect wound from infection and promote healing. So, in future it can be a useful measure for management of deep wounds.

CONCLUSION

Colostrum powder dressing is non-allergic, safe, promotes wound healing. Patient compliance is more as it causes less pain while the dressing is changed, also in terms of less number of dressing required. This treatment however is found to be more expensive than conventional dressings. The above results indicate that colostrum powder dressings may be used as an adjunct in management of deep wound.

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