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Deep Wounds: Colostrum Dressing Versus Conventional Dressing

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Abstract

Wound dressing plays an important role in wound healing. Newer type of wound dressings includes Biological dressings like collagen granules, colostrum powder, etc. that creates the physiological interface between the wound surface and environment which is impermeable to bacteria. This study was conducted to compare the efficacy of colostrum powder dressing with that of conventional dressing in the management of deep wounds. Hundred consecutive patients with deep wounds (stage II-IV), admitted during the study period were taken for study after considering inclusion and exclusion criteria. Patients were randomly divided into two groups: Colostrum dressing (Group A: n-50) and Conventional dressing (Group B: n-50). The efficacy of both the dressings was compared using following indicators: Reduction in ulcer surface area, rate of granulation, decrease in pain score, percentage wound healing and hospital stay. It was found that the rate of granulation and reduction in ulcer area was significantly more with colostrums dressing ($p< 0.05$). Excellent results with wound healing were observed in 76% patients with colostrums dressing compared to 48% with conventional dressing ($p< 0.05$). Hospital stay for more than 3 weeks was required in 40% patients with conventional dressing compared to 18% with colostrums dressing ($p< 0.05$). Significant reduction in pain was observed in patients with colostrums dressing over subsequent follow ups ($p<0.05$).It was concluded that colostrum powder dressings are safe, promote faster wound healing, and have more patient compliance due to lesser pain. Results indicate that colostrum powder dressings can be used as an adjunct in management of deep wound.

Keywords: Colostrum Dressing, Conventional Dressing, Deep Wounds, Hospital stay, Wound healing

Introduction

Deep wounds are the ones extending deeper, across deep fascia into muscles or deeper structures.[1] Deep wounds are extremely complex and optimal treatment requires an understanding of nutrition, immunology, psychological issues, the physiology and the metabolic interactions among all the major organ systems. Deep wounds that are difficult to treat include diabetic ulcers, venous ulcers, trophic ulcers, pressure sores and necrotizing fasciaitis.[2] These wounds can cause painful lengthy hospital stay, multiple stages of surgeries, permanent disability, prolonged rehabilitation, loss of income and enormous financial burden. 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.[3]

An ideal dressing used in the wound management should be economical, easy to apply, readily available dressing or method or coverage that will provide good pain relief, protect wound from infection, promote healing, keep moisture, be elastic, and non - antigenic and adhere well to the wound and waiting for spontaneous epithilisation and healthy granulation tissue.[4]

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.[5] 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.[6] This study was conducted to compare the efficacy of colostrum powder dressing with that of conventional dressing in the management of deep wounds.

Materials and Methods

Data was collected from all patients with deep wounds (stage II-IV), who were admitted during the study period after considering the inclusion and exclusion criteria. The Colostrum powder was procured in the form of colostrums capsules from bovine colostrums. Information was collected through a pre-designed, pre-tested proforma. All patients were interviewed as per the proforma and a complete clinical examination was done. Cases were randomly test group (colostrums dressing) and control group (conventional dressing). Conventional dressing was done with betadine and hydrogen peroxide. The efficacy of both the dressings was compared using following indicators: Reduction in ulcer surface area, rate of granulation, decrease in pain score, percentage wound healing and hospital stay. While analysing the wound healing following scoring key was used [6]:

Below 25%: Poor

Between 26-50%: Satisfactory

Between 51-75%: Good

76% & above: Excellent

Sample size

Hundred consecutive patients were randomly divided into two groups: Colostrum dressing (Group A: n-50) and Conventional dressing (Group B: n-50).

Inclusion criteria

- Patients age 20-60 years
- Deep wounds (Stage II-IV)

Exclusion criteria

- Patients who were suffering from arterial disease
- Patients not willing to participate

In the pre-intervention period the measurement of following variable was carried out for all patients: size of wound, ulcer surface area and pain score and stage of wound by using structured observation. After initial assessment, dressing of colostrums powder and betadine/ hydrogen peroxide was carried out for patients of group A and B respectively. Application of colostrum powder was done twice in a day and the observation was done on 3rd, 7th, and 14th day of application.

Statistical Analyses

Data from observation related to wound healing before and after dressing was analysed using SPSS 17.0 software (SPSS, Chicago, IL, USA). The mean values were compared using Student's -test. The frequency distributions were compared using chi-squared test. Statistical significance was assumed when the p value was <0.05.

Results

Baseline demographic variables were similar in both groups ($p>0.05$) (table 1). Rate of granulation and reduction in ulcer area was significantly more ($p< 0.05$) with colostrums dressing (table 2). Excellent results with wound healing were observed in 76% patients with colostrums dressing compared to 48% with conventional dressing ($p< 0.05$) (table 3). Hospital stay for more than 3 weeks was required in 40% patients with conventional dressing compared to 18% with

colostrums dressing ($p< 0.05$) (table 4). Significant reduction in pain ($p<0.05$) was observed in patients with colostrums dressing over subsequent follow ups (graph 1).

Discussion

Deep wounds that are difficult to treat, includes venous ulcers, diabetic ulcers, trophic ulcers, pressure sores and necrotizing fasciitis. Colostrum contains many immune factors, making them suitable for topical use in the wounds. Due to its anti-inflammatory, anti-viral and anti-bacterial properties, it is suitable for oral/ 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. EgF (Epidermal growth factor), Nucleotides, TgF (Transforming growth factors), IgF-I (Insulin-like growth factor) and FgF (Fibroblast growth factors) stimulate skin growth, cellular growth and repair by direct action on RNA and DNA. 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 31 to 50 y of age and males are more affected compared to females. In colostrum dressing group 18% patient stayed for 3-4 wk while in conventional dressing group 40% patient stayed 3-4 wk. Rate of granulation and reduction in ulcer area was also significantly more with colostrums dressing ($p< 0.05$). About 76% patients had healing of ulcer more than 75% and 24% had healing between 51-75% in colostrums group while 48% patients had healing of ulcer more than 75% and 46% had healing between 51-75% in conventional group. Colostrum contains many cells and repair factors, which are important for healthy cell growth. Colostrum also decreases the amount of discharge from wound and fastened the healing process. So, in colostrum group there is faster healing and shorter hospital stay. Barry M et al. found that Colostrum is a powerful agent when applied externally[7].

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 [8]. 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. Ashok YK et al. 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 [6].

A clinical research study by Dr. Bhora et al., found that for promoting wound healing growth factors present in colostrums had certain important part [9]. Noda et al., discovered that TGF A & B present in bovine colostrum were helpful in embryonic development, cell proliferation and tissue repair like cellular activities [10]. 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 [11]. 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 are found in Bovine Colostrum [12].

Based on the findings of present 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 and promotes faster wound healing. Patient's compliance is more as it causes less pain while the dressing is changed. The above results indicate that colostrum powder dressings may be used as an adjunct in management of deep wound.

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Tables and Figures

Table 1. Distribution based on Patient's Characteristics

Variable		**Group A (n-50)**	**Group B (n-50)**	**p- value**
Gender	**Male**	31	33	**0.83**
	Female	19	17	
Age (years)	**< 30**	6	7	**0.81**
	31- 50	29	26	
	> 50	15	17	
Type of Onset	**Trauma**	33	36	**0.77**
	Spontaneous	16	14	

Table 2. Distribution based on Rate of granulation and Reduction in Ulcer surface area

Variables	Group	N	Mean	SD	p- value
Rate of Granulation (cm2)	A	50	0.76	0.05	< 0.05
	B	50	0.50	0.07	
Reduction in Ulcer Area (cm2)	A	50	29.27	5.02	< 0.05
	B	50	25.13	8.88	

Table 3. Distribution based on assessment of wound healing

Wound Healing	Group A (n-50)	Group B (n-50)	p- value
Poor (< 25%)	0	0	< 0.05
Satisfactory (26-50%)	0	3	
Good (51-75%)	12	23	
Excellent (> 75%)	38	24	
Total	50	50	

Table 4. Distribution based on hospital stay

Hospital Stay (weeks)	Group A (n-50)	Group B (n-50)	p- value
1 - 2	17	10	< 0.05
2 - 3	24	20	
3 - 4	9	20	
Total	50	50	

Graph 1. Comparison of Mean Pain Score between the groups