



A COMPARATIVE STUDY OF COLOSTRUM DRESSING VERSUS CONVENTIONAL DRESSING IN DEEP WOUNDS

General Surgery

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ABSTRACT

Introduction: Colostrum contains many immune factors, making them suitable for topical use within the wounds. Due to its anti-inflammatory, anti-viral and anti-bacterial properties, it's suitable for oral/ topical applications. There are different growth promoters identified in colostrum involved in growth and repair of body cells. Colostrum decreases the quantity of discharge from wound and fastened the healing process. **Aims And Objectives:** The aim of this study is to test the role of colostrum based dressing in the management of deep wounds by comparing it with conventional method of dressing. **Materials And Methods:** By systemic random sampling it is divided in two groups A and B. Group A done dressing in conventional manner and colostrum applied topically over the ulcer surface. Group B done dressing in conventional manner. All patients are thoroughly assessed. Observations are made and results tabulated. **Results:** In colostrum based dressing, 24% of patients stayed for 14 days while 22% for 17 days, 20% for 16 days, 16% for 15 days, 8% for 18 days, 6% for 13 days and 4% for 19 days. In conventional dressing, 44% of patients stayed for 16-17 days while 32% for 14-15 days, 12% for 18 days, 6% for 19 days, 2% for 20 days. Mean wound size in colostrum based dressing on day 4, 7 & 10 were 24.84mm, 19.50 mm and 15.68 mm respectively. Mean wound size in conventional dressing on day 4, 7 & 10 were 29.52mm, 27.86mm and 25.60 mm respectively. **Conclusion:** Colostrum based dressings significantly improve the wound healing compared to the conventional dressing alone. The mean duration of hospital stay in Colostrum based dressing group is less compared to conventional dressing group and is statistically significant.

KEYWORDS

Colostrum, Diabetic Ulcer, Venous Ulcer, Burns, Traumatic ulcer

INTRODUCTION

Deep wounds are commonly encountered in general surgical practice and managing them is a great challenge to a general surgeon.

Clinically we can classify deep wounds broadly into diabetic and non-diabetic ulcers. The later includes varicose ulcers, traumatic ulcers, arterial ulcers and Pressure sores. Day by day new ways of wound management is improving in general surgical practice. This study was done to test the efficacy of colostrum role in wound healing and to compare it with conventional methods. By doing so we can come to a conclusion on whether its use is significant or not in the wound management.

Colostrum contains many immune factors, making them suitable for topical use within the wounds. Due to its anti-inflammatory, anti-viral and anti-bacterial properties, it's suitable for oral/ topical applications. There are different growth promoters identified in colostrum involved in growth and repair of body cells.

Epidermal growth factor, Nucleotides, transforming growth factors, Insulin-like growth factor and 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 disease.

The Egyptians records on treating burns describe dressings prepared with milk from mothers of babies¹.

Sushruta in his surgical treatise Sushruta Samhita postulated the mixture of ghee (ghrita) and honey (madhu) for better wound healing².

Colostrum decreases the quantity of discharge from wound and fastened the healing process. It contains various growth and repair factors like as follows.

- -Proline-Rich Polypeptides (Colostrinine)
- -Lactoferrin
- -Immune Factors
- -Growth Factors
- -General Information
- -Anti-Inflammatory Properties

A proline-rich polypeptide (PRP), now named colostrinine, relative molecular mass 18,000, was isolated from ovine colostrum and characterized by Janusz, Lisowski et al. The nonapeptide which is a lively fragment of PRP was obtained by chemical synthesis. In mice,

PRP has many regulatory effects on the humoral and cellular immune reaction. PRP was found to induce interferon (IFN) and tumor necrosis factor (TNF) in human peripheral blood leukocytes and in blood cultures. The effects were dose related. The identified till now cytokines induced by PRP were IFN-gamma and TNF-alpha but many other cytokines could also be stimulated also. Colostrinine: a proline-rich polypeptide from ovine colostrum is a modest cytokine inducer in human leukocytes³.

Lactoferrin is an iron-binding glycoprotein found in exocrine secretions of mammals and released from neutrophilic granules during inflammation. This review describes the biological roles of lactoferrin in host defense. Secreted lactoferrin exerts antimicrobial action either by chelation of iron or by destabilization of bacterial membranes. Furthermore, lactoferrin modulates the inflammatory process, mainly by preventing the discharge of cytokines from monocytes and by regulating the proliferation and differentiation of immune cells. Some of these activities are associated with the power of lactoferrin to bind lipopolysaccharides (LPS) with high affinity. Indeed, recent in vitro studies indicate that lactoferrin is able to compete with the LPS-binding protein for LPS binding and therefore to prevent the transfer of LPS to CD14 present at the surface of monocytes. Lactoferrin: a multifunctional glycoprotein involved within the modulation of the inflammatory process⁴.

Allen and Rankin, observed that Fibroblast protein (FGF), Insulin like protein (IGF-1) and reworking protein (TGF-b), when administered together these factors induce growth, proliferation and regeneration of satellite cells. After sometimes these cells will fuse with each other or the adjacent muscle cell thereby increasing myonuclei numbers for growth and repair. All three Factors are found in Bovine Colostrum⁵.

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 healing⁶.

Noda et al., discovered that TGF A & B present in bovine colostrum were helpful in embryonic development, cell proliferation and tissue repair like cellular activities⁷.

Dr. Bhora et al., found that for promoting wound healing growth factors present in colostrum had certain important part⁸.

A study of Purup et al., stated that Bovine colostrum has muscular-skeletal repair and growth capabilities and can promote growth in the intestinal tissue. Colostrum is the only natural source of transforming growth factors alpha and beta (TGF- α and TGF- β), and insulin like growth factors 1 and 2 (IGF-I and IGF-II). These major growth factors have significant muscle and cartilage repair characteristics and promote wound healing⁹

Uruakpa *et al.*, study described that Colostrum also contains additional growth factors, all with multiple regenerative effects on body cells. Such effects are highly beneficial and practical for trauma and surgical patients¹⁰

A study conducted by Krylov, et al., at the Institute of General Pathology and Pathophysiology in Moscow concluded that Colostrum Peptides Promote Wound-Healing and Block Allergic Response¹¹

Bagwe *et al.*, study on glycemic control found that Type 1 diabetes and insulin diabetes are likely based on an autoimmune disorder, and bovine colostrum contains various bioactive factors thought to potentially control and inhibit such autoimmune disorders and other similar allergies¹².

Patil SU et al., observed that Colostrum led to increase in tensile strength, collagen content of wound, acceleration of epithelialization as well as improvement in Histopathological scoring¹³

AIMAND OBJECTIVES

The aim of this study is to test the role of colostrum based dressing in the management of deep wounds by comparing it with conventional method of dressing.

MATERIALSAND METHODS

Study Setting:

A total of 100 patients admitted in Department of General Surgery, Navodaya Medical College Hospital and Research Centre.

Period Of Study: 1 year

Sample Size: The sample size is 100.

By systemic random sampling it is divided in two groups A and B.

- Group A done dressing in conventional manner and colostrum applied topically over the ulcer surface.
- Group B done dressing in conventional manner.

Inclusion Criteria:

- Patients with chronic ulcers including diabetic ulcer, venous ulcer and burns
- Patients who are willing to give informed consent.
- Patients aged 18yrs and above.

Exclusion Criteria:

- Patient with allergy to colostrum dressing.
- Patient who are critically ill.
- Ulcers due to peripheral arterial insufficiency.
- Patient with any evidence of underlying bone osteomyelitis.
- Malignant ulcers.

Procedure;

In group A patients wound cleaning done with debridement, saline wash, betadine wash, (hydrogen peroxide application if needed) along with the application of colostrum granules.

Capsules containing colostrum granules are applied over wound bed.

In group B patients, wound cleaning done with debridement, and wash with normal saline, betadine, hydrogen peroxide (if necessary) and dressings done.

In both groups, dressings was done daily and the outcome assessed by comparing wound size on day 4, 7 and 10th day.

All patients are thoroughly assessed and appropriate treatment given like adequate nutrition, anaemia correction antibiotics: initially empirical therapy done using combination of the third generation cephalosporins along with aminoglycosides after checking the renal function, then the antibiotics changed according to the culture and sensitivity.

Other measure like limb elevation, crepe bandage application for the venous ulcers, among pressure sores patients avoiding weight bearing and mobilizing or positional change advised and finally thorough wound debridement to remove the dead tissues, slough, any dirt, foreign body regular wound care done.

Outcome Variables:

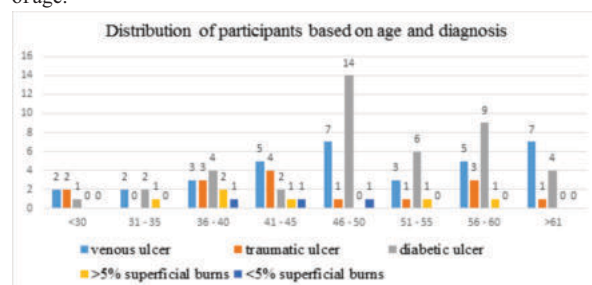
- Wound score comparison
- Duration of hospital stay
- Materials used.

Table 1: Distribution of participants according to age and diagnosis.

Age	Venous ulcer	Traumatic ulcer	Diabetic ulcer	>5% Superficial burns	<5% Superficial burns
<30	2	2	1	0	0
31 - 35	2	0	2	1	0
36 - 40	3	3	4	2	1
41 - 45	5	4	2	1	1
46 - 50	7	1	14	0	1
51 - 55	3	1	6	1	0
56 - 60	5	3	9	1	0
>61	7	1	4	0	0
Total	34	15	42	6	3

The above study shows etiology of study participants according to age. Diabetic ulcer was more common in patients aged 46-50 years, venous ulcer among patients aged 46-50 and >60 years of age.

Traumatic ulcer among 41-50 year of age and burns among 36-40 year of age.

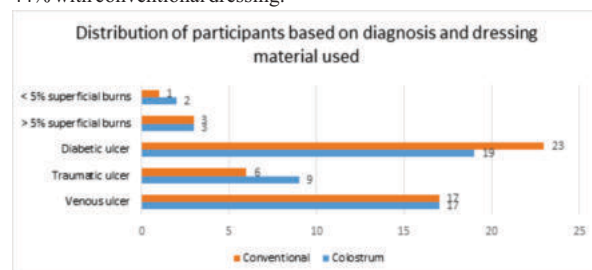


Graph 1: Distribution of participants according to age and diagnosis.

Table 2: Distribution of participants according to diagnosis and dressing material used.

Diagnosis	Dressing material	
	Colostrum	Conventional
Venous ulcer	17	17
Traumatic ulcer	9	6
Diabetic ulcer	19	23
>5% superficial burns	3	3
<5% superficial burns	2	1
Total	50	50

According to above table showing distribution of study groups based on diagnosis, Patients with diabetic ulcer, 54.7% received conventional dressing and rest 45.3% received colostrum based dressing. 50% of patients with venous ulcer received colostrum and conventional dressing. In patients with traumatic ulcer, 60% were treated with colostrum based dressing while 40% with conventional dressing. In burns patients, 56% with colostrum based dressing and 44% with conventional dressing.



Graph 2: Distribution of participants according to diagnosis and dressing material used.

Table 3: Distribution of participants according to dressing material used and duration of hospital stay.

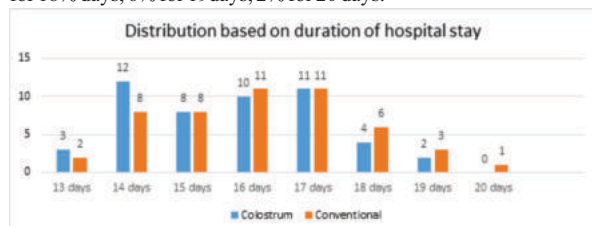
Duration of stay	Colostrum	Conventional	Total Number
13 days	3	2	5
14 days	12	8	20
15 days	8	8	16
16 days	10	11	21
17 days	11	11	22
18 days	4	6	10
19 days	2	3	5
20 days	0	1	1
Total	50	50	100

In Colostrum Based Dressing,

24% of patients stayed for 14 days while 22% for 17 days, 20% for 16 days, 16% for 15 days, 8% for 18 days, 6% for 13 days and 4% for 19 days.

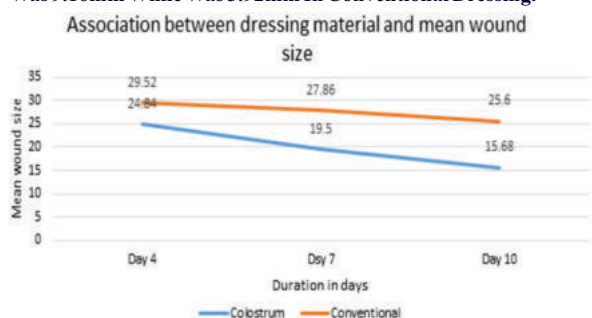
In Conventional Dressing,

44% of patients stayed for 16-17 days while 32% for 14-15 days, 12% for 18 days, 6% for 19 days, 2% for 20 days.

**Graph 3:** Distribution of participants according to dressing material used and duration of hospital stay.**Table 4: Association between dressing material and mean wound size:**

Mean wound size	Colostrum	Conventional
day 4	24.84	29.52
day 7	19.5	27.86
day 10	15.68	25.6
t value: -2.64905	df: 2	p value: 0.028519

The above table shows change in wound size among study groups. Mean wound size in colostrum based dressing on day 4, 7 & 10 were 24.84mm, 19.50 mm and 15.68 mm respectively. Mean wound size in conventional dressing on day 4, 7 & 10 were 29.52mm, 27.86mm and 25.60 mm respectively.

Decrease In Wound Size By Day 10 In Colostrum Based Dressing Was 9.16mm While Was 3.92mm In Conventional Dressing.**Graph 4:** Association between dressing material and mean wound size:**Table 5: Mean duration of hospital stay of participants according to dressing material used.**

Dressing material	Mean duration of hospital stay (days)	Standard deviation
Colostrum	15.68	1.58
Conventional	16.12	1.6616

The above table shows mean duration of hospital stay among study group.

Mean duration of stay in colostrum based dressing group was 15.67 days and 16.12 days in conventional dressing group.

DISCUSSION

The number of patients studied was 100 and were randomly divided into group A (50) and group B (50).

Age Distribution:

- Most ulcers are reported in age group between 30 to 60 years.
- 41 to 50 years contributes about 36%, 31 to 40 contributes 18%, 51 to 60 contributes 29%

Gender Distribution:

The ulcers are most common in males contributes about 60% of the cases and females 40% of cases.

Etiology Of Ulcer Distribution:

- In etiology of the ulcer in this study the most common ulcer is diabetic ulcer (42%) followed by venous ulcers (34.0%), traumatic ulcer (15%) and burns (9%).
- Patients with diabetic ulcer relatively had large wound compared to other diseases. Reduction in wound size was better appreciated in patients with <5% superficial burns (by 16.67mm) than other ulcers.
- Patients with diabetic ulcer stayed for longer time in hospital compared to others.

End Of Treatment Analysis:

- Patient with colostrum based dressing had a good result throughout the course of the study. In day 10 the results are statistically significant (p value<0.05).
- There is reduction in the duration of hospital stay in colostrum based dressing patients comparative to conventional dressing alone (p value<0.05).
- In addition, there was no significant difference between the two groups with respect to baseline ulcer size and amount of slough.
- Group A has experienced less pain compared to that of group B because the need for the bed side surgical debridement is less.
- The duration of hospital stay was less in group A compared to group B.
- The patients treated with colostrum based dressings had faster reduction of slough / necrotic tissue and increased granulation tissue.
- This study demonstrated that colostrum based dressings along with bed side surgical debridement had cumulative effect in reduction of slough and increase granulation tissue.

CONCLUSION

The results concluded as follows

- Colostrum based dressings significantly improve the wound healing compared to the conventional dressing alone.
- The mean duration of hospital stay in Colostrum based dressing group is less compared to conventional dressing group and is statistically significant.



Figure 1a: day 0 of venous ulcer of right foot
Figure 1b: day 5 of colostrum granules over wound bed
Figure 1c: day 5 of colostrum based dressing
Figure 1d: day 20 of colostrum based dressing



Figure 2a: Pressure sore over sacral aspect
Figure 2b: day 10 of colostrum dressing

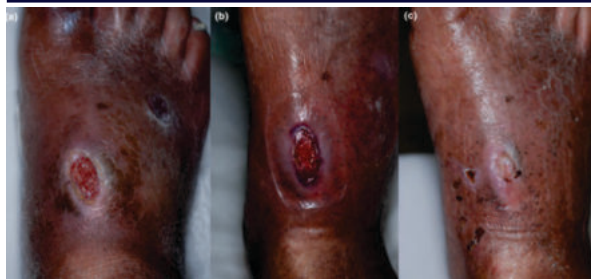


Figure 3: diabetic ulcer over right foot (a) day 0 (b) day 3 (c) day 8 of colostrum dressing

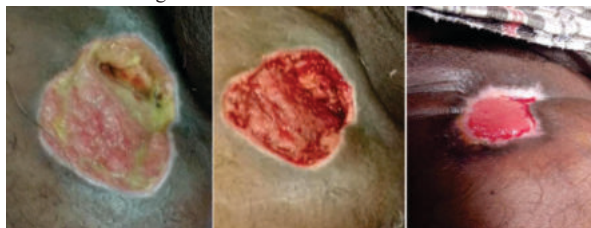


Figure 4a: Traumatic ulcer over Left thigh **Figure 4b:** day 5 with colostrum dressing **Figure 4c:** day 8 with colostrum dressing



Figure 5 Colostrum Capsules

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