

## A Clinical Profile of Patients Treated with Hydrocolloid Based Dressing Materials

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### Abstract

**Background and Objective:** In past few centuries, medicine is so much advanced in spite of that management of chronic wounds remains a tough challenge. To solve this, a lot of modalities of dressings and local applicants have been developed and a lot of studies are still going on. Continued research for good functional biological dressings resulted in the evolution of hydrocolloid based dressings for wounds. Hydrocolloid based dressings possess properties, which lend themselves to creating a wound environment favorable to the migration of cells from the epidermal margin across granulation tissue, encouraging wound closure. **Methodology:** A total of 60 cases clinically presenting as ulcer between June 2017 and July 2019 were taken for study. Each case was examined clinically in systematic manner as per the proforma. Hydrocolloid based dressing was used and outcome was measured by recording wound scores on days 3, 7 and 10. **Interpretation and conclusion:** In our study, hydrocolloid based dressing materials were found to enhance wound healing. These materials are promising new technology in the field of wound healing with multiple applications in a variety of wounds and can be used in both acute and chronic wounds.

**Key words :** Biological Dressings, Hydrocolloid, Wound closure

### Introduction:

In past few centuries, medicine is so much advanced in spite of that management of chronic wounds remains a tough challenge. To solve this, a lot of modalities of dressings and local applicants have been developed and a lot of studies are still going on. Wounds which are showing characters of delayed healing or non-healing is a problem which has given rise to various complications in addition to financial and psychological burden. All the surgeons during their practice will come across the problem of infection and ulcer. The nature of infection may differ, as does the types of surgery, but sepsis still threatens many patients.

Wide use of Antibiotic therapy in last decades has not decreased the overall incidence of surgical infection. Form their inception, antibiotics have been regarded

as safe drug of wide application; consequently they have been misused. As a result, the value of these agents has been undermined and due to this, they are not without negative impact like infection by opportunist organisms, emergence of resistant strains and also drug specific toxic effects.

To solve this lot of modalities of dressings and local applicants have been developed and lot of studies are still going on. Wounds which are showing characters of delayed healing or non healing is a problem which given rise to various complications in addition to financial and psychological burden. In order to find healing treatments, complementary methods have been developed.

### Hydrocolloid Based Dressings:

The hydrocolloids are interactive dressings, made up of an external layer of polyurethane and an internal layer of gelatine, pectin and carboxymethyl cellulose, which produce an ideal humid environment in the wound bed, control the exudate, facilitate the autolytic

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debridement, contribute to pain management and provide a barrier to external microorganisms.<sup>(1)</sup>

Hydrocolloids, first patented in 1967, were originally used in stoma care. Later on, hydrocolloids were also used in practice for both acute and chronic wounds.<sup>(2)</sup>

Hydrocolloids are moisture-retentive dressings. They absorb the wound fluid and as a result changes into a jelly-like mass. The outside of the dressing is covered with a polyurethane foam or film which enables the exchange of water vapor and protects the wound against contamination from the outside.<sup>(3)</sup>

Hydrocolloids are said to aid the healing by creating a moist environment and through an intensification of the autolysis process, advance debridement. They are supposed to be comfortable and time- and money-saving because dressing changes are less frequently required. In addition to this sheet form, hydrocolloids are also available as a paste or granules which are used to fill up the deep wounds.<sup>(4)</sup>

The more recently developed amorphous hydrocolloids are based on water-insoluble, water-swallowable cross-linked cellulose derivatives, an alginate and distilled water. These amorphous hydrocolloids contain between 3.3 and 4.8 wt% of cross-linked carboxy-methylcellulose, between 0.3 and 0.53 wt% of alginate and the rest distilled water.<sup>(5)</sup>

Added to this, the hydrocolloids maintain an acid pH in the wound bed, which impedes bacterial growth, as well as sustaining an ideal local temperature. They promote angiogenesis, increase the number of fibroblasts of the dermis, encourage the production of granulation tissue and increase the quantity of synthesized collagen, all of which are essential in the healing process.<sup>(6)</sup>

Hydrocolloids are frequently used in the treatment of pressure ulcers. For this application, hydrocolloids are more effective than gauze dressings with regard to the number of healed wounds, the reduction of the pressure ulcer dimensions, the time needed for dressing changes, the absorption capacity, the pain during dressing changes and the side-effects.

Compared with other bioactive dressings, such as alginate dressings or biosynthetic dressings, hydrocolloids are significantly less effective.<sup>(6)</sup>

### **Methodology:**

#### **Source of Data:**

Patients presented with ulcers, admitted under general surgery department at LG General Hospital, Maninagar, Ahmedabad between June 2017 to September 2019 were enrolled with this study with their consents.

**Type of Study:** Prospective Study

#### **Sample Size:**

Total 60 patients were included in this study. All patients were managed using Hydrocolloid based dressing (Hydroheal Ointment).

#### **Inclusion Criteria:**

- Patients presenting with ulcers
- Patients more than 12 years of age

#### **Exclusion Criteria:**

- Patients less than 12 years of age
- Patients who were managed on outpatient basis
- Patients not giving consents of newer modality of dressing
- Patients having Untreated Osteomyelitis, Malignancy in the wound, Entero-cutaneous fistula

Clinical examination of each case was done systematically as per the proforma drafted for the study. The outcome was measured using parameters like wound surface area, colour and consistency of granulation tissue, depth of the wound, pain score and duration of hospital stay.

Method of Collection of Data: Wound bed was prepared thoroughly. Culture swab was sent for microbiology. Surgical debridement was done if

deemed necessary and adequate haemostasis was achieved. Hydroheal ointment (Manufactured by Dr. Reddy's Laboratory, India) was applied on the wound. The Wound was closed using occlusive dressing and re-opened after 3 days. Wound surface area was examined on day 3, 7 and 10.

**Figure 1: Application of hydrocolloid dressing**



**Results:**

Most of the patients presenting with wounds were in the 5<sup>th</sup> decade of life 20 (33.3%), followed by the 6<sup>th</sup> decade 18 (30%).

**Table 1: Age distribution of patient**

Age Group	No. of Patients
< 30 years	3 (5%)
30-40 years	11 (18.3%)
40-50 years	20 (33.3%)
50-60 years	18 (30%)
> 60 years	8 (13.3%)
Total	60

Wounds were more common in males (48 cases - 80%) than in females (12 cases - 24%) with male to female ratio being 4: 1.

**Table 2: Gender distribution of patient**

Gender	No. of Patients
Male	48 (80%)
Female	12 (20%)
Total	60

Wound were most commonly located on leg (31 cases - 51.7%), followed by foot (20 cases - 33.3%)

**Table 3: Location of wound**

Location of Wound	No. of Cases
Forearm	2 (3.3%)
Abdomen	4 (6.7%)
Buttocks	1 (1.7%)
Leg	31 (51.7%)
Foot	20 (33.3%)
Sole	2 (3.3%)
Total	60

Based on aetiology of wounds, which were determined by history and clinical examination, wounds were divided into different groups. A major portion of 24 cases (40%) fell into diabetic foot ulcer.

**Table 4: Aetiology of wound**

Aetiology of Wound	No. of Cases
Mechanical Trauma	14 (23.3%)
Thermal Burns	4 (6.7%)
Decubitus Ulcers	6 (10%)
Venous Ulcers	8 (13.3%)
Diabetic Foot Ulcers	24 (40%)
Neuro-trophic Ulcers	3 (5%)
Others	1 (1.7%)
Total	60

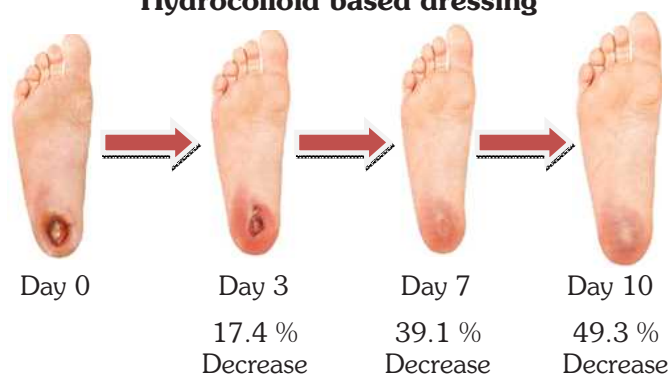
**Table 5: Comparison of Wound surface area during Hydrocolloid dressing**

Days after Hydrocolloid Application	Number of Cases		
	< 20 cm <sup>2</sup>	20-40 cm <sup>2</sup>	> 40 cm <sup>2</sup>
Day 0	3	7	10
Day 3	7	6	7
Day 7	13	4	3
Day 10	16	3	1

**Table 6: Comparison of colour of granulation tissue during hydrocolloid dressing**

Days of Hydrocolloid Application	Number of Cases		
	Pale	Pink	Bright Red
Day 0	17	3	0
Day 3	7	8	5
Day 5	2	9	9
Day 10	0	7	13

**Figure 2: Decrease in wound surface area after Hydrocolloid based dressing**



**Discussion:**

The use of Hydrocolloids for non-healing ulcers dates from about 50 years ago. An important original work was that of George Winter, who demonstrated the value of a moist wound environment in wound healing. Recent advances in wound management incorporate new technologies that interact with the wound at a cellular level rather than simply reducing moisture loss. The balance of moisture is critical to healing and this principle has been the driving force in the development of products that are currently available such as hydrogels, hydrocolloids, alginates, and foams and films.<sup>(2)</sup>

The benefits of this method in comparison with conventional methods include reduction of bacterial contamination, facilitation of patient movement, improvement in patient’s psychological condition, more convenience and less pain. Hydrocolloid adhesive dressings absorb water and low molecular weight components from ulcer secretions, so they swell to produce a jelly. This jelly protects the ulcer, and

new cells proliferate. Moreover, the jelly stimulates the immune system locally by activating granulocytes, monocytes and the complement system, decreasing the effects of bacterial colonization and ensuring auto-debridement of the ulcer.<sup>(7)</sup>

Bacterial colonization is likely under the Hydrocolloid layer. In fact, clinical trials of Hydrocolloids on more than 2000 ulcers have shown a much lower incidence of infection than in other treatment methods.<sup>(8)</sup>

In this study, the therapeutic effects of Hydrocolloids on different ulcers were studied. In view of the cost of ulcer management in hospitals and the associated psychological problems, it seems rational to shift to simpler methods that are more cost efficient and executable by the individual patient. Hydrocolloids treatment of ulcers is less expensive and more comfortable and is ultimately increase the patients’ compliance. These adhesives are available in different sizes and brands convenient for use in ulcers of different parts of body. In the most recent products, the appropriate time for changing the adhesive is indicated by a colour conversion. In addition, their transparency makes it easy to observe the ulcer’s status without removing the adhesive and dressing.<sup>(9,10)</sup>

**Conclusion:**

Chronic non-healing wound is the problem which has given rise to enormous psychosocial and financial burden. There are many novel dressing techniques available now-a-days with the advancement of modern medical science. This study includes 60 patients with acute or chronic wounds fulfilling inclusion and exclusion criteria. Hydrocolloid based dressing can be used for wounds over any part of body like foot, leg, abdomen, upper limb, back, buttocks, etc. It cause rapid wound healing, reduce the number of change of dressing and reduce the time of hospital stay before definitive surgery for covering wound can be planned. Also this method is associated with minimal complications like pain and bleeding or oozing from the newly formed granulation tissue.

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