

Comparative study of surgical debridement and autolytic debridement methods at a tertiary care hospital, India

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Abstract

Background: Wound debridement is very crucial step for wound healing and prevention of infections complications. Traditionally, several types of wound debridement techniques have been used in clinical practice such as autolytic, enzymatic, biodebridement, mechanical, conservative sharp and surgical.

Aim & objective: Compared the surgical debridement and autolytic debridement methods for wound.

Results: This study involves selecting fifty patients suffering from acute or chronic wounds, randomly distributing them to the following groups irrespective of age, sex and etiology of wounds and then treating them with different methods of debridement as denoted by the group's name Group I Surgical debridement group, Group II Autolytic debridement group. Male patients were predominant than female, mainly 41-60 years age groups. Discomfort reduction more in surgical group whereas pain and discharge reduction more in autolytic group.

Discussion: The choice of the debridement technique depends on type of ulcer/wound patient's age, economic status, state of wound edges and skin, exudate and resources of the caregiver. Surgical debridement is low cost, highly sensitive and rapid acting but it can cause pain and invasive. Autolytic debridement is a painless, less invasive, less chance of infection and safe technique, but with slow action, so with high costs, because dressing are usually changed once a day.

Conclusion: Surgical debridement is the fastest way to remove the source of infection, promotes healing and helps accurate assessment of wound. Pain and discomfort are less in autolytic debridement.

Keywords: Wound, surgical debridement, autolytic debridement

Introduction

Debridement is the removal of dead (necrotic) foreign material or infected tissue from the wound to promote and expedite wound healing. Wound debridement can help for growing of

healthy tissue, minimize scarring and reduce complications of infections ^[1]. Debridement is required for old or chronic wounds that aren't healing properly and also necessary for severe wound infection whom developing risk for infection.

Many types of traditional debridement methods are available such as autolytic, enzymatic, bio debridement, mechanical, conservative sharp and surgical debridement ^[2-3]. Surgical debridement removes unhealthy tissue by cutting it off by using surgical instruments. Surgical sharp debridement used for large, deep, or very painful infected wounds. Autolytic debridement uses your body's enzymes and natural fluids to soften bad tissue. This is done with a moisture-retaining dressing that's typically changed once a day. Autolytic debridement is best for non-infected wounds and pressure sores.

The choice of debridement methods depends on patient age, wound condition; overall health and risk for complications, generally combination of the following methods are the best option ^[4] In recent decades, many new types of debridement were invented such as Versajet-kinds of fluid jet technology, ultrasound debridement therapy, hydrosurgery debridement and Monofilament polyester fiber pad debridement ^[5-6]. Surgical debridement is the fastest and safest way to remove dead necrotic tissue. Autolytic debridement is the natural and highly selective process by which endogenous Proteolytic enzyme break the necrotic tissue. A comparative study of different methods of debridement is essential to define the protocols for choice of most suitable method of debridement to shorter the wound healing period and reduce morbidity.

Aim and Objective: Aim of our study to compared the surgical debridement and autolytic debridement methods and their impact on wound healing.

Materials and Methods

This prospective study was conducted at department of Surgery in G.R.M.C. Gwalior from October 2013 to September 2014. A total of 50 patients with indications of wound debridement admitted in surgery department were enrolled in our study.

Inclusion criteria

Acute as well as chronic non healing ulcers, Diabetic foot ulcer, post traumatic and post-burn wounds, venous ulcers, decubitus ulcers, skin & soft tissue infections.

Exclusion criteria

Malignant ulcer, pregnant women, pediatric and mentally unstable persons, multiple ulcers and Ischemic ulcer.

Wound was examine thoroughly and recorded the grade of wound, swab culture sensitivity and presence of systemic infection was made at the outset.

We have randomly divided patients into two groups each matched for age, sex and other co morbid condition.

Group I: We allotted 25 patients who were suffering from wounds of various etiologies in this group and they were subjected to surgical debridement. These wounds were managed with surgical debridement under total intravenous anesthesia, regional or local blocks depending on severity of infection, site and co-morbidity status. This was followed by routine conventional betadine-normal saline.

Group II: We allotted 25 patients in this group who were suffering from wounds of various

etiologies and they were subjected to Autolytic debridement. We used commonly marketed honey (Dabur Honey) for application on wound surface. Gauze pads were impregnated with honey and used as wound cover. These were further covered with transparent occlusive dressings, which were changed when soaked.

A detailed history & clinical examination were done.

The wounds were observed every time the dressings were changed and findings recorded for sake of comparison at 0,3,7,14,21,28 and 35 days as per subjective and objective criterion as follows:

Subjective-Patient Factors (Scale of 1 -10)

- i) Discomfort
- ii) Pain

Objective-Wound exam criteria

- i) Exudate/discharge
- ii) Average time for wound healing

Written informed consent was taken from all the patients from their own.

Statistical analysis: ANOVA in SPS software was used for all the criteria and all the patients, the levels of significance were calculated for all days of observation where in $p < 0.05$ was allotted a confidence value of 95% and $p < 0.01$ was given a confidence level of 99%.

Results

This study involves selecting fifty patients admitted in Department of Surgery G.R. Medical College, Gwalior from October 2013 to September 2014, with acute or chronic wounds, randomly distributing them to the following groups irrespective of age, sex and etiology of wounds and then treating them with different methods of debridement as denoted by the group's name.

Group I: Surgical debridement group.

Group II: Autolytic debridement group.

In both the groups' male patients was 68% the predominant over the female 32%. Most of the patients (56%) belong to the 41-50 years age group.

Table 1: The etiology of wounds in the patients were as follows

Etiology	No. of patients	Percentage
NSTI including Fournier' s gangrene	9	18.0
Post traumatic wound	11	22.0
Post-cellulites	18	36.0
SSI	12	24.0
Total	50	100.0

Post-cellulites were the most common etiology responsible for maximum number (36%) of wounds.

For each of the subjective and objective criteria, the finding with respect to all the patients in

the group was compared.

Table 2: Comparison of both the groups for Discomfort Scale

	Day-1	Day-3	Day-7	Day-14	Day-21	Day-28	Day-35
Group-I (Mean \pm SD)	9.44 \pm 1.1	7.54 \pm 1.19	5.8 \pm 1.28	3.6 \pm 1.29	1.36 \pm 1.49	0.04 \pm 0.81	0
Group-II (Mean \pm SD)	9.68 \pm 0.74	7.6 \pm 1	5.76 \pm 1.33	3.68 \pm 1.49	1.76 \pm 0.87	0.48 \pm 1.04	0.08 \pm 0.4

It was evident that the reduction in discomfort levels in the surgical groups as compared to autolytic group; it is statistically significant on days 3, 7, 14, 21 and 28 with 95% confidence limits (p-value < 0.05). On day 35 the comparisons became based as end points had been achieved in most wounds

Table 3: Comparison of both the groups for pain Scale

	Day-1	Day-3	Day-7	Day-14	Day-21	Day-28	Day-35
Group-I (Mean \pm SD)	7.48 \pm 1.55	5.36 \pm 1.72	3.96 \pm 1.39	2.32 \pm 1.62	1.24 \pm 1.3	0.52 \pm 0.96	0.2 \pm 0.81
Group-II (Mean \pm SD)	8 \pm 1.04	5.8 \pm 0.76	3.76 \pm 1.23	2.16 \pm 1.24	1.04 \pm 0.97	0.12 \pm 0.33	0.04 \pm 0.2

It was observed that the reduction in pain levels in the autolytic group as compared to the surgical group but it was not significant statistically (p-value=0.07).

Table 4: Comparison of both the groups for discharge Scale

	Day-1	Day-3	Day-7	Day-14	Day-21	Day-28	Day-35
Group-I (Mean \pm SD)	4.6 \pm 0.57	2.56 \pm 0.71	2.08 \pm 0.90	1.44 \pm 0.91	0.68 \pm 0.9	0.24 \pm 0.59	0.08 \pm 0.4
Group-II (Mean \pm SD)	4.6 \pm 0.5	3.76 \pm 0.43	2.76 \pm 0.77	1.64 \pm 0.95	0.52 \pm 0.77	0.12 \pm 0.43	0

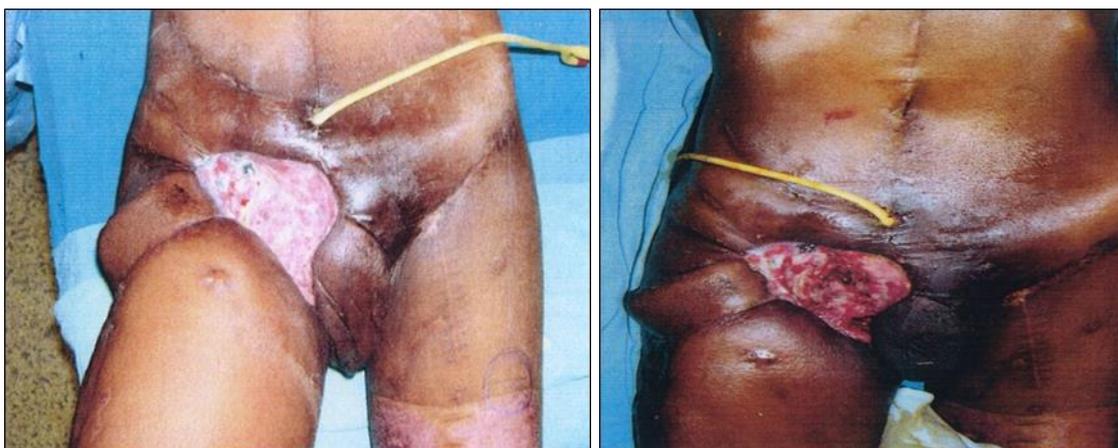
It was evident that the reduction in discharge levels in the autolytic was appreciably more than the surgical group; statistically significant on days 7,14,21 with 95% confidence limits (p value <0.05) but no significant on day 1,3,28 and 35.



Before debridement

After debridement

Fig 1: showing wound before and after surgical debridement

**Before debridement****After debridement****Fig 2:** showing wound before and after autolytic debridement

Discussion

Wound debridement is a critical component of the wound healing process that sets the stage for re-epithelialization. In chronic wounds, such as pressure ulcers, venous ulcers, and diabetic foot ulcers, proper and timely debridement can significantly improve the rate of healing.

The choice of the appropriate debridement technique depends on many parameters like: type of tissue, type of bio-burden that cover the wound bed, state of wound edges and skin, exudate and additionally, but not secondary, amount of pain from the procedure, patient's environment, age and choice, skill and resources of the caregiver, patient's quality of life, regulations and guidelines [7-8].

Autolytic debridement is a painless, less invasive, easy application, less chance of infection and safe technique, but with slow action, so with high costs, because dressing are usually changed once a day [9].

Many researchers evaluate and critically appraise that effect of hydro-surgery debridement system was 8.87 min faster compared to conventional sharp debridement and fewer debridement follow-up needed [10].

Consideration in various methods of debridement.

Lets us assign a score of importance to each consideration from 4+ to 0 as per its relevance while undertaking a debridement procedure.

- 4+ Extremely important.
- 3+ Very important.
- 2+ Important.
- 1+ Has no bearing/effect.
- 0 May be considered at all.

0	Surgical	Autolytic
General condition	4+	2+
Comorbidity	4+	1+
Consent	4+	1+
Anesthesia	4+	0
Pain relief	4+	2+
Technical skill	4+	1+
Anatomical knowledge	4+	1+
Bleeding	4+	1+
Complication	4+	0

Present study observed that significant reduction in discomfort levels in the surgical

debridement groups as compared to autolytic debridement group which was comparable with the Mosti *et al.* ^[11].

Our study found pain and discharge relative low in autolytic method, similar finding also observed by Schultz G.S. *et al.* ^[12] and Mancini S. *et al.* ^[13].

Conclusion

To promote healing, reduce risks of infection, and improve patients' outcomes, and an array of debridement methods should be included in the patient's wound management plan of care. Even though surgical debridement has been considered gold standard for getting rid of necrotic tissue, it may not be essential by the best. Surgical debridement needs consideration of multiple factors such as comorbidity, anesthesia, technical skill, set-up and complication. Pain and discharge reduction was more in Autolytic debridement whereas discomfort reduction was more in surgical debridement.

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