



A COMPARISON BETWEEN PAPAIN AND UREA DERIVATIVE AND EUSOL IN THE OUTCOME OF WOUND HEALING IN DIABETIC TROPHIC ULCERS

Mohammed Nadeem Nazim

PG student, Yenepoya Medical College, Derelakatte, Mangalore, Karnataka, India.

Natasha Mathias*

Assistant Professor, Yenepoya Medical College, Derelakatte, Mangalore, Karnataka, India. *Corresponding Author

ABSTRACT **INTRODUCTION:** Diabetic foot ulcer is a major disabling complication of diabetes which often precedes amputation of the limb. The DFU requires a long healing time and a multidisciplinary therapy, such as control of blood sugar levels, daily treatment of wounds, proper antibiotic therapy, and surgical revascularization.

METHODOLOGY: Study was conducted in 80 patients who were diabetics with foot ulcers. Diabetics with foot ulcers along with peripheral vascular disease/ underlying osteomyelitis and gangrene were excluded from the study. Papain and urea derivative (Debridase) and EUSOL are used to create a moist and clean wound environment to promote granulation, autolytic processes, angiogenesis and more rapid migration of cells across the wound.

RESULT: Debridase was found to be a better agent in wound healing for diabetic foot infections in comparison to EUSOL as seen in accordance to PUSH scoring. Cost is comparatively more with Debridase dressings. Individuals having a good nutritional status had a better improvement in their wound healing when compared to individuals having poor nutritional status.

CONCLUSION: There is no co-relation between duration of ulcer and rate of healing of ulcer. Wound dressing with Papain and Urea derivative (Debridase) was found to reduce the load of slough quicker when compared to EUSOL.

KEYWORDS : EUSOL, Debridase, Diabetic foot ulcer

INTRODUCTION:

Diabetes and its complications pose a major threat to the public health throughout the world. India is a country with the largest number of diabetic patients in the world. Diabetic foot ulcer is a major disabling complication of diabetes which often precedes amputation of the limb. According to the Global Lower Extremity Amputation Study Group, 25-90% of all amputations were associated with diabetes. Considering the large population and high prevalence of diabetes in India, the burden of its complication would become enormous. Diabetic foot ulcer is one of the common causes of hospital admissions among diabetics in India. This could be attributed to the lack of awareness, inadequate diabetic care at primary health care level, poor socioeconomic status and even barefoot walking.

The DFU requires a long healing time and a multidisciplinary therapy, such as control of blood sugar levels, daily treatment of wounds, proper antibiotic therapy, and surgical revascularization.

Papain and urea derivative (Debridase) and Edinburgh University Solution of Lime (EUSOL) are used to create a moist and clean wound environment to promote granulation, autolytic processes, angiogenesis and more rapid migration of cells across the wound.

MATERIALS AND METHODS:

An observational Study was conducted in patients who were diabetics with foot ulcers in the Department of General Surgery, Yenepoya Medical College from October 2016 to October 2017.

Papain and urea derivative (Debridase) and EUSOL are used to create a moist and clean wound environment to promote granulation, autolytic processes, angiogenesis and more rapid migration of cells across the wound. A prospective study of 80 Adult patients with diabetes suffering from single or multiple trophic ulcers. Among 80 patients, 40 underwent dressing with Debridase and 40 underwent dressing with EUSOL for a period of 30 days.

PUSH TOOL 3.0

- The Pressure Ulcer Scale for Healing (PUSH Tool) was developed by the National Pressure Ulcer Advisory Panel (NPUAP) as a quick, reliable tool to monitor the change in pressure ulcer status

over time.

- In this Study, Push tool 3.0 was used to study ulcer healing in diabetic ulcers.
- To use the PUSH Tool, the pressure ulcer is assessed and scored on the three elements in the tool:
 - Length x Width → scored from 0 to 10
 - Exudate Amount → scored from 0 (none) to 3 (heavy)
 - Tissue Type → scored from 0 (closed) to 4 (necrotic tissue)
- In order to insure consistency in applying the tool to monitor wound healing, definitions for each element are supplied at the bottom of the tool.
- Step 1:** Using the definition for length x width, a centimetre ruler measurement is made of the greatest head to toe diameter. A second measurement is made of the greatest width (left to right). Multiple these two measurements to get square centimetres and then select the corresponding category for size on the scale and record the score.
- Step 2:** Estimate the amount of exudate after removal of the dressing and before applying any topical agents. Select the corresponding category for amount and record the score.
- Step 3:** Identify the type of tissue. Note: if there is ANY necrotic tissue, it is scored a 4. Or, if there is ANY slough, it is scored a 3, even though most of the wound is covered with granulation tissue.
- Step 4:** Sum the scores on the three elements of the tool to derive a total PUSH Score.
- Step 5:** Transfer the total score to the Pressure Ulcer Healing Graph. Changes in the score over time provide an indication of the changing status of the ulcer. If the score goes down, the wound is healing. If it gets larger, the wound is deteriorating.

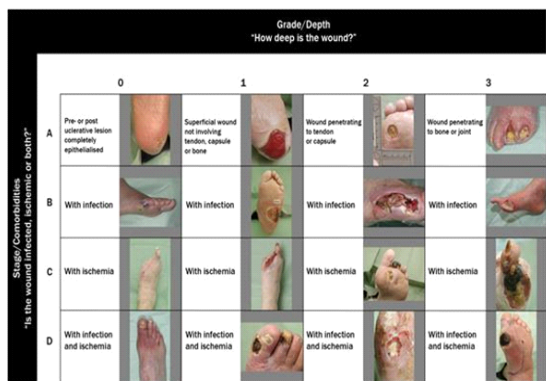
TREATMENT PROTOCOLS:

- Strict control of Hyperglycemia
- Off-loading the Wound
- Systemic Antibiotic as Indicated (based on culture or empirical)

EXCLUSION CRITERIA:

- Peripheral vascular disease
- Gangrene
- Osteomyelitis

The University of Texas Classification System for Diabetic Foot Wounds



NATIONAL PRESSURE ULCER ADVISORY BOARD

Pressure Ulcer Scale for Healing (PUSH) PUSH Tool 3.0

Patient Name: _____ Patient ID#: _____
 Ulcer Location: _____ Date: _____

Directions: Observe and measure the pressure ulcer. Categorize the ulcer with respect to surface area, exudate, and type of wound tissue. Record a sub-score for each of these ulcer characteristics. Add the sub-scores to obtain the total score. A comparison of total scores measured over time provides an indication of the improvement or deterioration in pressure ulcer healing.

	0	1	2	3	4	5	Sub-score
LENGTH x WIDTH (in cm²)	0	< 0.3	0.3 - 0.6	0.7 - 1.0	1.1 - 2.0	2.1 - 3.0	
	0	3.1 - 4.0	4.1 - 8.0	8.1 - 12.0	12.1 - 24.0	> 24.0	
EXUDATE AMOUNT	0	1	2	3	4	5	Sub-score
	None	Light	Moderate	Heavy			
TISSUE TYPE	0	1	2	3	4		Sub-score
	Closed	Epithelial Tissue	Granulation Tissue	Slough	Necrotic Tissue		
							TOTAL SCORE

Length x Width: Measure the greatest length (head to toe) and the greatest width (side to side) using a centimeter ruler. Multiply these two measurements (length x width) to obtain an estimate of surface area in square centimeters (cm²). **Caveat:** Do not guess! Always use a centimeter ruler and always use the same method each time the ulcer is measured.

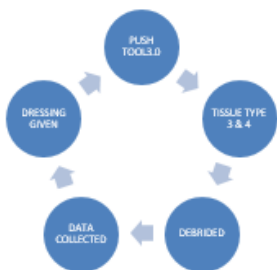
Exudate Amount: Estimate the amount of exudate (drainage) present after removal of the dressing and before applying any topical agent to the ulcer. Estimate the exudate (drainage) as none, light, moderate, or heavy.

Tissue Type: This refers to the types of tissue that are present in the wound (ulcer) bed. Score as a "0" if there is any necrotic tissue present. Score as a "1" if there is any amount of slough present and necrotic tissue is absent. Score as a "2" if the wound is clean and contains granulation tissue. A superficial wound that is reepithelializing is scored as a "1". When the wound is closed, score as a "0".

- 4 - **Necrotic Tissue (Eschar):** black, brown, or tan tissue that adheres firmly to the wound bed or ulcer edges and may be either firmer or softer than surrounding skin.
- 3 - **Slough:** yellow or white tissue that adheres to the ulcer bed in strings or thick clumps, or is mucinous.
- 2 - **Granulation Tissue:** pink or fleshy red tissue with a shiny, moist, granular appearance.
- 1 - **Epithelial Tissue:** for superficial ulcers, new pink or shiny tissue (skin) that grows in from the edges or its islands on the ulcer surface.
- 0 - **Closed/Resurfaced:** the wound is completely covered with epithelium (new skin).

www.pgsap.org | PUSH Tool Version 3.0 9/15/08 | ©National Pressure Ulcer Advisory Panel

DAILY PROGRESS:



RESULT:

TABLE 1: GENDER CHARACTERISTICS

	NUMBER	PERCENT
FEMALE	19	23.75
MALE	61	76.25
TOTAL	80	100

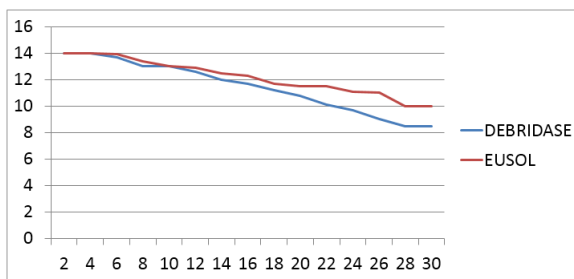
In this study, a total of 61 males (76.25%) and 19 females (25%) were studied. Male to female ratio of 3:1.

TABLE 2: TYPES OF ULCERS

	UT GRADE	PERCENT
SUPERFICIAL	28	35
INVOLVING TENDON	30	40
INVOLVING BONE	20	25
TOTAL	80	100

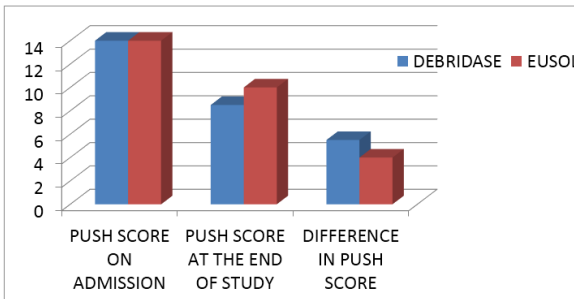
In concordance with University of Texas classification, in the present study, there was 35% of superficial wounds, 40% of wounds involving tendons and 25% of wounds involving bones.

GRAPH 1: PUSH SCORE VS DAYS



X-axis: Days; Y-axis: Push Score

GRAPH 2: PUSH SCORES AT THE START AND END OF THE STUDY



DISCUSSION:

Debridase was found to be a better agent in wound healing for diabetic foot infections in comparison to EUSOL.

Cost is comparatively more with Debridase dressings. Individuals having a good nutritional status had a better improvement in their wound healing when compared to individuals having poor nutritional status.

By the time of the end of the study, many of the patients undergoing Debridase dressing were ready for split skin grafting and a few were planned for discharge.

CONCLUSION:

There is no co-relation between duration of ulcer and rate of healing of ulcer

Wound dressing with Papain and Urea derivative (Debridase) was found to

- Reduces the load of slough quicker
- Which therefore,
- Promotes granulation
- Promotes angiogenesis,
- Promotes epithelialisation,

But however,
 Costs more,
 When compared to EUSOL in dressing diabetic foot ulcers.

REFERENCES:

- Prevention. Age-adjusted hospital discharge rates for non-traumatic lower extremity amputation per 1,000 diabetic population, by level of amputation. CDC, 2010. Available at: <http://www.cdc.gov/diabetes/statistics/lealevel/fig8.htm>.
- Vamos EP, Bottle A, Majeed A, Millett C. Trends in lower extremity amputations in people with and without diabetes in England, 1996-2005. *Diabetes Res Clin Pract* 2010; 87:275-82.
- Hellingman AA, Smeets HJ. Efficacy and efficiency of a streamlined multidisciplinary foot ulcer service. *J Wound Care* 2008; 17:541-4.
- Rerkasem K, Kosachunhanun N, Tongprasert S, et al. Reducing lower extremity amputations due to diabetes: the application of diabetic-foot protocol in Chiang Mai University Hospital. *Int J low Extrem Wounds* 2008; 7:88-92.
- George RK, Verma AK, Agarwal A, Agarwal G, Mishra SK. An audit of foot infections in patients with diabetes mellitus following renal transplantation. *Int J low Extrem Wounds* 2004; 3:157-60.
- Hill MN, Feldman HI, Hilton SC, Holechek MJ, Ylitalo M, Benedict GW. Risk of foot complications in long-term diabetic patients with and without ESRD: a preliminary study. *ANNA J* 1996; 23:381-6; discussion 87-8.
- Jayasinghe SA, Atukorala I, Gunethilleke B, Siriwardena V, Herath SC, De Abrew K. Is walking barefoot a risk factor for diabetic foot disease in developing countries? *Rural Remote Health* 2007; 7:692.