ORIGINAL RESEARCH PAPER

General Surgery

A STUDY OF INSULIN DRESSING OVER 100 CASES OF DIABETIC FOOT ULCER

KEY WORDS:
Insulin dressing, Wound Healing, Ulcer

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INTRODUCTION:

Ulcer is a very common long lasting morbid condition. Its diagnosis mainly depends on Clinical Examination and supported by Investigation Management of ulcers require persistence of both the patient and the surgeon. Every surgeon almost always encounters chronic or callous ulcers refusing to heal and such ulcers are the ultimate test of the patience of both the surgeon and the 'victim' (patient).

Diabetic foot is a medical emergency and a major risk factor for subsequent extremity amputation. The prevention and treatment of lower extremity ulceration has been strongly correlated with reduced amputation rates , thus this is a highly preventable diabetes complication. Wound care is an important adjuvant measures in healing of a diabetic foot ulcer. In recent times, topical effect of insulin is discovered which shows better healing effect over ulcer.

AIMS AND OBJECTIVES:

To observe the effectiveness of the insulin dressing on the 100 diabetic ulcer cases over lower extremities.

- Duration of healing and dressing
- Timing of dressing
- Need for change of dressing
- Appearance of the granulation tissue
- Need of skin grafting
- Duration of hospital stay

MATERIALS & METHODS:

The study will be conducted among 100 indoor patients admitted to our SMIMER hospital.

Study duration: 1.5 year

METHODOLOGY

- All ulcer size is measured with measure tap.
- All ulcer will be debrided on day of admission.
- All patient received empirically received tab augmentin and then antibiotic will be change according to culture and sensitivity report which is send every 3rd day. If patient having planter foot-ulcer then offloading custom made foot wear should be given.

Method of insulin dressing:

- surrounding area cleaned with 3% povidone solution.
- Ulcer area is cleaned with normal saline.
- Slough and debris will be removed.
- Regular human insulin 4units in 1 ml of normal saline for each 10 cm2 of ulcer sprinkled over ulcer.
- Ulcer is covered with 'paraffin gauze'' then one layer of sterile gauze soaked with human insulin will be put. Another paraffin gauze will be put. Last layer, saline soaked dressing will be covered.
- Sterile dressing will be put.
- Patient dressing will be done twice a day.
- 10 min before and 1 hour after application of insulin, random blood glucose will be carried out.
- Every 7rd day ulcer (1) swab culture and sensitivity, (2) superficial culture and sensitivity, (3) deep tissue culture and sensitivity will be sent.
- Every 7rd day size of ulcer will be measured.
- Dressing will be carried out till 21days.

Inclusion Criteria

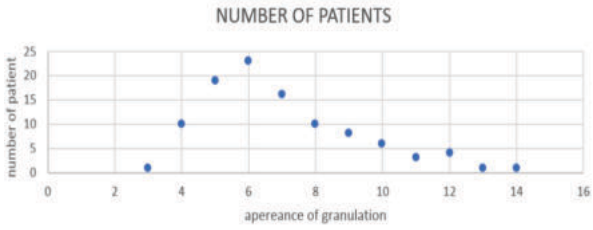
- AGE GROUP :18 -70 years
- SITE: lower extremities
- SIZE: ulcer size 5-10 cm2
- HBa1c criteria:>6.5
- Wegener's classification grade 1 and 2

Exclusion Criteria

- AGE:<18year and >70year
- SITE: site other than lower extremities
- SIZE: ulcer less than >10 cm2
- HBa1c criteria:<6.5
- Wegener's classification grade 3 and 4
- PLWH positive
- Pregnancy

RESULTS

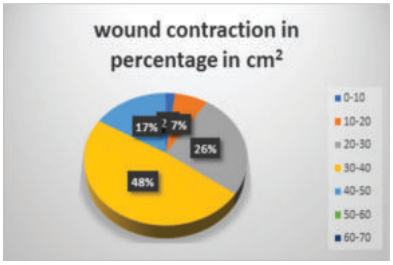
1. Appearance of healthy granulation tissue in relation to day



Graph1: Appearance of healthy granulation tissue in relation to day

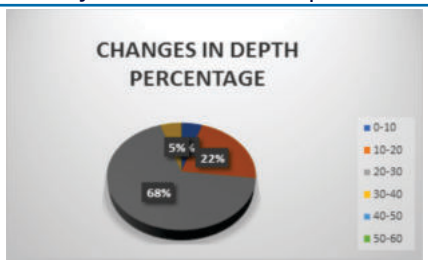
Comment : Chart shows 5 to 6 day had maximum number of patient whom had healthy granulation tissue.

2.Wound contraction



Graph 2: wound contraction in percentage in cm^2 using topical insulin

Comment Chart show that 48% of patient had wound contraction 30 to 40 percent due to topical effect of insulin in our study.



Graph 3: wound contraction in percentage in cm^2 using topical insulin

Comment Chart shows maximum patient had 80 to 90% reduction of depth in our study.

DISCUSSION:

Diabetes is the most common endocrine disease among adults in the developing countries. Diabetes is also one of the most common chronic disease in the adult population. The clinical importance of diabetes lies in the associated multitude of morbidity as well as high mortality rate. In our study, we have observed following effect of insulin on diabetic ulcer.

1. Rate of reduction of area of wounds
2. Rate of reduction in depth of wounds
3. Time taken for appearance of healthy granulation tissue

Application of topical insulin has been shown to accelerate the healing of both acute and chronic wounds, but the exact mechanisms are unknown.in our study , topical insulin shows rapid wound contraction as 49 cases shows 30% to 40% wound contraction compare to earlier size of ulcer. Earlier studies on use of topical insulin on wound healing have shown significant increase in the rate of wound healing29-32. In these studies, initial wound area correlated with wound healing rate i.e., larger wounds healed at a faster pace than smaller wounds. However, in the current study, the healing rate in the study group was higher than in the control group, regardless of initial wound size. Recently, data from different sources show that AKT activation is an important step for VEGF release in skin wounds through a post-transcriptional modification in the activity of keratinocytes32. This causes a faster contraction of the wound area. The increased expression of IGF-1 may be one mechanism by which topical insulin enhances the process of wound healing.

FIG :Gradual reduction in the area of the ulcer with the use of topical insulin (a, b, c, d)

The use of topical insulin accelerated the filling up of wounds.in our study, we observed that 68 cases had reduction of wound depth 80% to 90%. 22 cases has reduction of depth 70% to 80%. 5 cases showed reduction in ulcer depth 90% to 100%. Studies on the molecular signalling pathways involved in wound healing have shown that the expression of proteins involved in early steps of insulin action, i.e. IR/IRS-1,2/AKT, are increased in the healing tissue of wounds. These have the ability to phosphorylate proteins that regulate lipid synthesis, glycogen synthesis, cell survival and protein synthesis and thus cause a rapid filling up of the wounds. This could be one of the possible explanations for our observation.

Fig: Wound Contracture ;at Presentation, After 1 Week, After 4 Week

CONCLUSION

The use of topical insulin was found to be safe and effective in patients with diabetic ulcer. Topically applied insulin was found to accelerate the rate of wound healing as compared to conventional dressing methods.

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