



Surgery

COMPARATIVE STUDY BETWEEN EUSOL AND NORMAL SALINE IN WOUND HEALING

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ABSTRACT We encountered many patients with cellulitis and necrotising fasciitis in the emergency ward regularly. Patients required regular dressing. Eusol or normal saline may be used during dressing of the wound. Here we made a comparative study between the two agents. Eusol has an overall better result-granulation tissue developed early, wound swab became free from slough and bacterial growth earlier. Eusol is not harmful for surface wounds when used in diluted form.

KEYWORDS : EUSOL, normal saline, wound healing

1. INTRODUCTION

EUSOL (Edinburgh University Solution of lime) is a commonly used solution in Surgical ward that helps the patient in faster wound healing. It is found most effective in Pseudomonas organism. But it will harm the patients too bad as burns if it is used in surgical application without proper dilution with normal saline or with distilled water. It is used in burn patients, surgical dressing and treating abscess and abscess. It acts as an excellent desloughing agent by forming nascent chlorine. It inhibits bacterial growth by inhibiting bacterial cell wall formation. However this chlorine containing compound is considered biologically incompatible as it produces more harm[1]. However EUSOL is preferred by plastic surgeons in many situations.[4] Normal saline is an excellent wound desiccation property which helps in healing. Moreover it is biologically compatible. Here we studied a comparative study between EUSOL and normal saline in wound dressing following debridement of necrotic devitalised tissue on the body surface in 83 patients who were admitted in the emergency ward.

2. MATERIALS AND METHODS

Aim of the Study: To compare EUSOL and normal saline in wound healing following debridement in patients with cellulitis, necrotising fasciitis and gangrene of skin and subcutaneous tissue in emergency ward. 83 cases were included in the study with prior informed consent. Study Duration: January 2016 to July 2017.

Patient selection: All patients admitted in the emergency ward with cellulitis, necrotising fasciitis and gangrene. Debridement of the devitalised tissue were performed. Dressing were done with normal saline in one group and EUSOL in the other group.

3. OBSERVATION AND RESULTS

This comparative study was done over a period of 18 months from January 2016 to July 2017 in our hospital. 83 cases were studied and were randomly divided in two groups:

Group A-Dressing done with EUSOL

Group B-Dressing done with Normal Saline.

Maximum number of patients were between 21 to 40 years (45.80%) (Table 1). Maximum number of patients were male (68.67%)(Table 2). All the persons underwent debridement in different areas. Dressing with EUSOL and Normal Saline(NS) done subsequently. Maximum number of areas affected were in the legs(31.33%)(Table 3).

Granulation tissue development depends on the material used for regular dressing. 43.37% developed granulation tissue on 1st week, 13.25% on 2nd week with EUSOL whereas 14.46% developed granulation tissue on 2nd week, 28.92% on 3rd week with NS.(Table 4)

During the period of dressing, 26.51% developed wound free from slough on 1st when dressed with EUSOL whereas 26.51% developed it on 4th week when dressed with NS.(Table 5)

Majority of the patients(28.92%) who were dressed with EUSOL found free from growth on 3rd week, whereas majority(21.69%) of patients who were dressed with NS found free from growth on 5th

week.(Table 6)

Table 1. Age Distribution

Age(years)	EUSOL(n =47)		Normal Saline(n=36)		Total=83	
	n	%	n	%	n	%
<20	7	14.89	5	13.89	12	14.46
21-30	10	21.28	9	25.00	19	22.90
31-40	11	23.40	8	22.22	19	22.90
41-50	9	19.15	6	16.67	15	18.07
>50	10	21.28	8	22.22	18	21.69

Table 2. Sex Distribution

Sex	n	%
male	57	68.67
female	26	31.33

Table 3. Areas of the body affected

	EUSOL	NS	Total	%
Thigh	12	9	21	25.30
Leg	14	12	26	31.33
Foot	7	6	13	15.66
Forearm	7	4	11	13.25
Scrotum	4	2	6	7.23
Hand	3	3	6	7.23
Total	47	36	83	

Table 4. Period of development of granulation tissue

EUSOL	Period of Granulation tissue development		
	1 week	2 weeks	3 weeks
thigh	9	3	0
leg	12	2	0
foot	5	2	0
forearm	6	1	0
scrotum	3	1	0
hand	1	2	0
Total	36	11	0
%(n=83)	43.37	13.25	0.00
NS	1 week	2 weeks	3 weeks
thigh	0	4	5
leg	0	2	10
foot	0	2	4
forearm	0	2	2
scrotum	0	1	1
hand	0	1	2
Total	0	12	24
%(n=83)	0.00	14.46	28.92

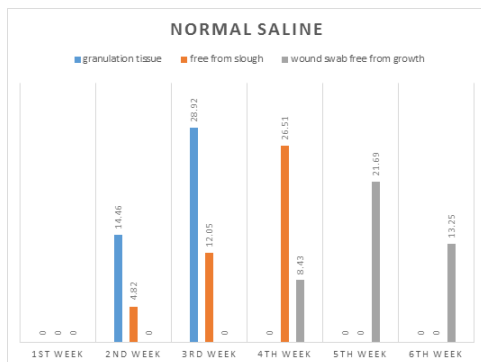
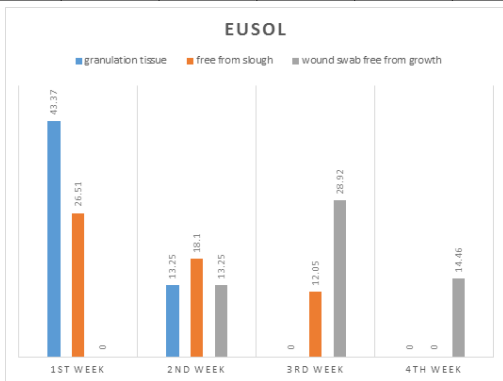
Table 5. Period of development of wound free from slough

EUSOL	Period of development of wound to be free from slough			
	1 week	2 weeks	3 weeks	4 weeks
Thigh	6	3	3	0

Leg	10	3	1	0
Foot	3	2	2	0
Forearm	3	3	1	0
Scrotum	0	3	1	0
Hand	0	1	2	0
Total	22	15	10	0
%(N=83)	26.51	18.10	12.05	0.00
NS	1 week	2 weeks	3 weeks	4 weeks
Thigh	0	2	3	4
Leg	0	0	2	10
Foot	0	1	1	4
Forearm	0	1	2	1
Scrotum	0	0	1	1
Hand	0	0	1	2
Total	0	4	10	22
%(N=83)	0.00	4.82	12.05	26.51

Table 6. Period of development of wound free from growth

Period of development of Wound with no growth					
EUSOL	2 weeks	3 weeks	4 weeks	5 weeks	6 weeks
Thigh	3	5	4	0	0
Leg	3	9	2	0	0
Foot	2	3	2	0	0
Forearm	3	3	1	0	0
Scrotum	0	3	1	0	0
Hand	0	1	2	0	0
Total	11	24	12	0	0
%(n=83)	13.25	28.92	14.46	0	0
NS	2 weeks	3 weeks	4 weeks	5 weeks	6 weeks
Thigh	0	0	1	4	4
Leg	0	0	2	5	5
Foot	0	0	1	3	2
Forearm	0	0	1	3	0
Scrotum	0	0	1	1	0
Hand	0	0	1	2	0
Total	0	0	7	18	11
%(n=83)	0	0	8.43	21.69	13.25



DISCUSSION

Eusol (Edinburgh University Solution of lime) is made of 12.5 gm bleaching powder and 12.5 gm boric acid and distilled water to make 1 litre of the solution. The pH ranges from 7.5-8.5 (Lorrain Smith,1990)[1]. EUSOL is an antiseptic solution which is prepared

from chlorinated lime and boric acid, formerly used in treating wounds. It is used in to remove the slough or necrotic tissues from the wound during surgical dressing and thus it helps in effective healing.

Normal saline soaked sponges helps in wound healing, sponges remains essentially isotonic with time. As the water in the foam evaporates, the dressing becomes hypertonic and draws fluid from the wound by osmosis. The wound fluid then dilutes the dressing to reach a dynamic equilibrium, whereby the foam fluid assayed will approach isotonicity. This movement of wound fluid into the sponge may contribute to its effectiveness as a dressing.[2]

In early 1990s, evidence was found that Eusol solution could impair blood flow in the capillary circulation of granulation tissue in the rabbit ear chamber model and hence it delayed healing of wound(Brennan and Leaper, 1985) [3].

Many products are currently used for wound healing . Edinburgh University Solution of Lime (Eusol) received adverse publicity for its use in wound management.A survey was made among one hundred and twenty-four consultant plastic surgeons regarding their use of Eusol. Ninety-five doctors replied (77%); out of which 78 (82%) still use Eusol. While nine out of 17 who do not use EUSOL are prevented from using it as they are unable to obtain necessary supplies. In plastic surgery, Eusol is still being used by plastic surgeons in specific situations[4].

In our study granulation tissue development depends on the material used for regular dressing. 43.37% developed granulation tissue on 1st week, 13.25% on 2nd week with EUSOL whereas 14.46% developed granulation tissue on 2nd week, 28.92% on 3rd week with NS. During the period of dressing, 26.51% developed wound free from slough on 1st when dressed with EUSOL whereas 26.51% developed it on 4th week when dressed with NS. Majority of the patients(28.92%) who were dressed with EUSOL found free from growth on 3rd week, whereas majority(21.69%) of patients who were dressed with NS found free from growth on 5th week.

5. CONCLUSION

Patients who were dressed regularly with EUSOL developed granulation tissue, wound free from slough, wound swab free from growth earlier than that of normal saline. Overall Eusol is better than normal saline in wound healing in patients with necrotising fasciitis and cellulitis over body surface after debridement.

REFERENCES

- [1] P. Prakash and S.J. Kiruba Prasanna, Healing Drug Can Harm Patients Badly :Severe Burn Injury in the Wound with Eusol Dressing – A Rare Entity,International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS), 2014, Vol 1, No.5, 16-17.
- [2] J. K. Lim, L. Saliba, M. J. Smith, J. McTavish*, C. Raine* and P. Curtin,Normal saline wound dressing – is it really normal?,British Journal of Plastic Surgery (2000), 53, 42–45.
- [3] Brennan and Leaper, Effect of antiseptics on wound healing : a study using the rabbit ear chamber. British Journal of Surgery 72(10): 780-782 (1985).
- [4] Humzah MD1, Marshall J, Breach NM. Eusol: the plastic surgeon's choice?., J R Coll Surg Edinb. 1996 Aug;41(4):269-70.