

ANTIMICROBIAL EFFECT OF AMNIOTIC MEMBRANE (A study of 100 cases)

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Abstract

In this study most of the infected wounds dressed with amniotic membrane showed marked reduction in bacterial counts within 25 days (96%) as compared to control group of patients whose wound required 36 days or more for similar result. However more work should be done on this subject for further evolution.

Introduction

An antimicrobial effect of biological dressing was recorded by Eade¹ in 1953 in human autograft experiments and it was demonstrated with non viable skin as well. The effect depends atleast partly on the host activity. Antimicrobial effects in animal experiments were seen by Morris, Bonadae and Burke² (1966) and Burleson and Eise-man³ (1971). The former could also confirm his finding in some of his patients.

Amniotic membrane was first used by Tassengaard Hosen⁴ (1950) as the temporary biological dressing in the laboratory animals and patients with injury.

In the present study, role of amniotic membrane as a biological dressing and its antimicrobial effect is reported. The study was carried out on 100 patients admitted

in the Department of Plastic Surgery, S.M.S. Medical College Hospital, Jaipur.

Material and Methods

100 cases of infected wounds were selected. The patients who had no systemic disease which affect healing in the age group between 20-40 years were studied.

80 cases had post burn infected raw area while 20 cases had post traumatic wound. The cases were divided into two groups.

Group (A) was of control group, all the patients were given systemic antibiotics, dressing of wounds was done by traditional methods e.g. Eusol and Saline dressings were done every alternate day.

Group (B) The patients were dressed with human amniotic membrane on every alternate day under all aseptic precautions. Amniotic Membrane was taken from freshly delivered placenta in which premature rupture of membrane and cervicitis was absent. The amniotic membrane was washed with savlon, saline, and preserved in vaseline gauze at 4° C. It was used upto 14 days. Culture of Bacteria from the wound was done on every 3rd dressing. Colonies count more than 200 indicate significant infection. Bacterial counts of more than

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1,00,000 is significant. Each group was of 50 cases without discrimination. Every alternate case admitted was put in another group as in this clinical study it is not possible to event all similar conditions in control group and amniotic membrane group. Results were compared.

Observation and Results

Table I

Type of Organism isolated	
Streptococcus	— 80
Staphylococcus	— 70
E.Coli	— 30
Pseudomonas, Pyocynaeous	— 20
Klebshiella	— 10

Seventy patients showed mixed infection of more than one organism. Duration for converting the infected wound into clean wound ready for grafting in control and Amniotic Membrane is shown in Table II

Discussion

In the present series reduction was noticed both in gram negative as well as in Gram positive bacteria. Antimicrobial effect was bactericidal in nature, because of the marked reduction in the number of bacteria Weekly culture showed progressive decline in the bacterial counts. No systemic antibiotics were given in group B. Biological dressing

Table II

Time and Day	Group A		Group B	
Less than 6 days	—			
7-12 days	1	2%	2	4%
13-18 days	3	6%	13	26%
19-24 days	10	20%	15	30%
25-30 days	16	32%	18	26%
31-36 days	15	30%	2	4%
More than 36 days	5	10%	—	

In group B 96% of wounds were ready for grafting in 25-30 days.

In group A only 60% of wounds were ready for grafting in 25-30 days.

Table III shows that 96% wounds in group B (Amniotic membrane treated patients) became clean on 25th day whereas in Group A (Control) only 90% became clean at 31st day.

Table III

Showing time bound culture characteristics of wounds

Time	Control A (Control patients)			Group B Amniotic Membrane Treated		
	Insignificant	Significant	250000 heavily infected	Insignificant	significant	Heavily infected 250000
First Day	—	35	15	—	36	14
7th Day	1	35	14	2	40	8
13th Day	4	38	8	15	35	—
19th Day	14	36	—	30	20	—
25th Day	30	20	—	48	2	—
31st Day	45	5	—	50	0	—

(Amniotic membrane) used had an antibacterial effect. It was bactericidal and bacteriostatic.

The control group 'A' required more dressing and time to get rid of the infection, while the cases dressed with amniotic membrane in group 'B' showed much better results. 96% of cases were ready for the grafting by the end of 25th day. Similar observations were obtained by Barandberg⁵ et al. (1977). In their cases biological dressing was used. They found it effective in reducing the degree of Bacterial growth and

found it superior to saline dressing. Martin et al. (1973) also found similar antibacterial effect with human skin homografts and amniotic membrane.

Martin et al. (1973) had reported that 50% of experimental animals dressed with amniotic membrane had reduction in bacterial counts. While in their control group showed only 10%. Breakthrough phenomenon was not seen in present study. It means there was no rise in bacterial count at particular time. It may be due to better technique of dressing.



Fig. 1. (Case No. 1) Shows infected wound post traumatic.

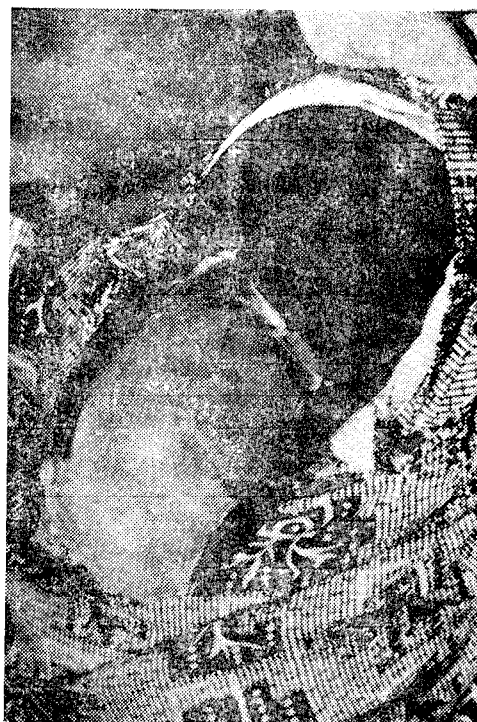


Fig. 2. (Case No. 1) Shows wound dressed with amniotic membrane.



Fig. 3. (Case No. 1) Shows healed wound after autograft.



Fig. 4. (Case No. 2) Shows infected wound post burn.



Fig. 5. (Case No. 2) Shows wound dressed with amniotic membrane.



Fig. 6. (Case No. 2) Shows healing of wound from all side after dressing with amniotic membrane and ready for grafting on 25th day.

References

1. Eade, G. G. : The relationship between granulation tissue, bacteria and skin grafts in the burned patients. *Plastic Recons. Surg.* 22 : 42, 1958.
2. Burke, J. F., Morris, P. J., Bondoc, C. : The use of frequently changed allografts to promote healing in the non-healing infected ulcer. *Surg.* 60 : 13, 1966.
3. Eiseman, B. Burleson, R. : Mechanism of antibacterial effect of biological dressing. *Ann. Surg.* 177 : 181, 1973.
4. Troensegaard-Hansen, E. : Amniotic Grafts in Chronic skin ulceration. *Lancet.* 1 : 859, 1950.
5. Brandberg, A., Elgefors, B., Bartholson, L. : Antibacterial effect and use of biological dressing in the treatment of infected wounds. *Scandinavian Journal of Plastic Surgery* Vol. 10 : 91-97, 1976 and Vol. 11 : 33, 1977.
6. Martin, C.; Robson, M. Tomas; J. : The effect of human amniotic membranes on the on the bacterial population of infected rat burns. *Ann. Surg.* 144-149, 177, 1973.