

HUMAN AMNIOTIC MEMBRANE—A BIOLOGICAL DRESSING

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Undoubtedly the best method to manage any raw surface is to provide skin cover.

In surgical practice it is not possible always to provide skin coverage because of manifold causes (Singh, 1981).

When immediate skin coverage is not possible, then some alternative has to be used. Use of amniotic membrane is one of them. This has been found satisfactory in clinical and experimental studies (Colocho et al 1974 ; Walker et al 1977). The amnion is a thin, translucent membrane, foetal surface of which is smooth and glistening. It has five distinct layers (Bourne 1977).

AIMS AND OBJECTIVES

Present study endeavours towards following aims and objectives :

1. To study efficacy, status and suitability of human amniotic membrane as a biological dressing.
2. To establish the role of human amniotic membrane as barrier for prevention of infection in open wounds.
3. To assess clinically the desirable properties of an ideal biological dressing material, as applied to human amniotic membrane.

MATERIAL AND METHODS

Placentae from elective and emergency caesarean section of Seronegative (Syphilis

and Hepatitis B surface antigen) mothers were collected using absolute aseptic technique.

Table-I

S.No.	Group	Cause	No. of causes	Total
1.	I A	Superficial Burn	9	
		B Deep Burn	14	
2.	II	Traumatic	18	52
3.	III A	Donar Area	4	
		B Flap	3	
4.	IV	Miscellaneous	4	

After keeping placenta in sterile howl, amniotic membrane was separated with forceps and rinsed th roughly several times in sterile physiological saline. after a surface culture had been taken for initial bacteriological monitoring, the membrane was transferred to a sterile container filled with physiological saline and stored in a refrigerator at 4°C. The membranes were used subsequently after acquiring sterile culture report.

APPLICATION OF THE MEMBRANE OF RAW AREA

Using absolute aseptic techniques the membrane was spread over the raw area and applied with slight overlapping at margins. The assistant's help was significant while application and cutting the excess of the

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membrane. All air and fluid blebs were smoothed out to ensure total contact. Then it was allowed to dry by exposure. Patient was advised strict bed rest for 6 hours to prevent dislodgement of the membrane.

OBSERVATIONS

The 52 cases included in this study were grouped (Table I) for analysis.

GROUP IA—SUPERFICIAL BURNS : 9 cases

The membrane remained white, translucent and showed wrinkling by 72-96 hours. Adherence was 95% in seven cases. These patient had remarkable good overall improvement in general condition. The membrane starting peeling off from the edges by 7-8 day and come off completely by the end of 10th day and wounds healed without any complication. Culture remained sterile.

In remaining two cases, the membrane got elevated within 48 hours. There was lot of discharge and irritation. Culture showed mixed infected. Repeated fresh application of amniotic membrane was done. Gradually wounds healed by the end of 3 weeks without any complication.

GROUP IB—DEEP BURNS : 14 cases

Membrane remained white translucent, dry without any breach in nine case. Adherence was 100%. Patients had overall feeling of well being after 12-14 hours. It behaved continuously well till 7-10 days. It showed wrinkles and became dull greyish in colour. There was healthy granulation tissue at the edge alongwith blood mixed serous discharge at the base,

In 3 cases, membrane was dull greyish to start with and wound coverage was 40 to 60% only. There was seropurulent discharge and soddening present. Elevated blebs were excised and fresh patching was done repeatedly.

In two cases, the process was abandoned due to severe infection and conventional dressings was used.

All cases in this group had skin grafting done subsequently.

GROUP II—TRAUMATIC RAW AREA : 18 cases

After an interval of 24-48 hours, membrane remained translucent, dry, intact in 8 cases whereas it was found to be wet, soddened liquified in 7 cases. In 3 cases, wound coverage was only 20 percent. Haemolyticus and *E. coli* were the predominant organismal growth in 3 cases. Eusol dressing was used subsequently. The membrane behaved well in eight cases. Patient had reduced amount of pain, their haemoglobin improved at the end of 10-13 days. Wounds were ready for grafting.

GROUP III—B FLAP NECROSIS : Raw area- 3 cases

The membrane liquified after 72 hours and foul swelling discharge (*E. Coli*, *Proteus*) was present. Adherence of the membrane was doubtful. In two cases, later conventional dressing were used and wounds were grafted after 10-12 days.

GROUP IV—MISCELLANEOUS GROUP : 4 cases

These cases had raw areas because of various infective causes and behaved on expectant lines.

DISCUSSION :

Out of several authors who used human amniotic membrane none has given figures of adequate take or failure. On the whole, all have described successful adherence, take and utility of the human amniotic membrane in burns, traumatic and operative wounds (Robson et al 1973 ; Colucho et al 1974, Unger et al 1976 ; Gruss and Jirsch, 1978 ; Bose, 1979, Ramakrishnan, 1981 ; Sheth, 1981 and Rao, 1981).

Davis (1910) used amniotic membrane on granulating wounds. Since then it has been used extensively (Sebella, 1913 ; Kubai, 1948 ; Douglas 1952 ; Pigeon, 1960).

Amnion has been selected for the present project because of its easy availability and no cost. Author (1981) has used collagen sheet with same aims and objectives.

Robson et al (1973) reported usefulness of amniotic membrane as a temporary wound dressing in 50 patients of partial and full thickness skin loss.

Various Indian workers have also used it (Bapat and Kothary, 1974 ; Bose, 1979 ; Yadav, 1981 ; Ramakrishnan, 1981 ; Rao, 1981).

Bapat and Kothary (1974) reported acceleration of wound healing after application of human amniotic membrane and also commencement of repair process i.e. migration of fibro-blasts and development of collagen during first 6-8 days of healing.

Unger et al (1979) used lympholized human amniotic membrane to dress partial thickness skin graft donor sites in seven patients but summarily mentioned no appreciable advan-

tage over conventional methods, although quality of healing was none the less inferior to that with conventional methods.

Bose (1979) used Human Amniotic membrane as a biological dressing in 15 cases of burn with uniformly satisfactory and hopeful results.

Recently, at the skin substitutes session in first Afro-Asian Conference on burns at Bombay in January, 1981, applicability, utility and indications for the use of human amniotic membrane in burn wounds dressing was discussed in papers presented by many authors (Ramakrishnan ; 1981 and Sheth, 1981).

Rao (1981) considered dry amnion as a superior biological dressing in burns as compared to wet one.

The effectiveness of Amniotic membrane to control infection can be due to various factors i.e. allantoin lysozymes and other bacteriostatic factors (Galask and Synder, 1970 ; Colucho et al, 1974 ; Singh, 1981 ; Larson, 1966 ; Sayman, 1973 ; Ninman and Shremaker, 1975).

Various reports are available in the literature regarding exposed Vs covered amniotic dressing (Bose, 1979 ; Gruss and Jirsch, 1978 ; Colucho et al 1974 ; Unger et al, 1974, Walker, 1977), fresh versus preserved membrane (Bose, 1979 ; Dino et al 1965 ; Walkar, 1977). Regarding adherence of the membrane to wound many authors have commented too (Graham, 1973 ; Tavis, 1978 ; walker, 1977).

However there can be various limitations in this type of study because of non-coopera-

tive patients time factor in application of the membrane and other numerous factors.

SUMMARY

52 cases have been treated with amniotic membrane. It seems to satisfy certain criteria for an ideal biological dressing.

As regards assessment of ideal characteristics of Human amniotic membrane as biological dressing, it possesses good degree

of adherence, antibacterial barrier function, prevents fluid and protein loss. It is elastic and pliable. It is enough to be applied easily. It is non-antigenic and fairly durable. It also offers some haemostatic effect to prevent capillary oozing.

It is supposed to be analogous to the skin, in relation to some of the histological, embryological and functional characteristics.

BIBLIOGRAPHY

1. Bapat, C. V. and Kothary, P. M. : "Preliminary report on acceleration of wound healing by amniotic membrane graft" *Ind. J. Med. Res.* ; 62, 1342. (1974)
2. Bose, B. : "Burn wound dressing with human amniotic membrane"; *Annals Royal College of Surgeons* ; 61, 444. (1979)
3. Colucho, G. ; Graham, W. P. ; Green, A. E. ; Mateson, D. W. and Lynch, D. : "Human Amniotic Membrane as a physiological wound dressing"; *Arch. Surg.* ; 109, 370. (1974)
4. Davis, J. S. : "Skin transplantation with a review of 550 cases at the Johns Hopkins Hospital"; *John Hopkins Hospital. Rep* ; 15, 707. (1910)
5. Dino, B. R. ; Eufemio, G. G. and DeVilla, M. S. : "Human Amnion: The establishment of an Amnion bank and its practical application in Surgery"; *J. Phillip, Med. Asso.* ; 42, 357. (1966)
6. Dino, B. R., Eufemia, G. G., DeVilla, M.S. et al : The use of fetal membrane homografts in the local management of burns. *J. Phil. Med. Assoc.*, 41 (Supplement): 890-898, (1965).
7. Douglas, B. : "Homografts of foetal membrane as a covering for large wounds specially those from burns—experimental and clinical study—A preliminary report", *J. Tenn. Med. Assoc.* ; 45, 230. (1952)
8. Galask, R. P. and Synder, I. S. : "Antimicrobial factors in amniotic fluid"; *Am. J. Obstet. Gyne.* 106, 59. (1970)
9. Graham, W. C. : Cited by Robson et al (1973).
10. Gruss, J. S. and Jirsch, D. W. : "Human Amniotic Membrane—A versatile wound dressing"; *Can. Med. Asso. J.* ; 118, 1237. (1978)
11. Krishnan, R. : "Role of collagen sheet as a temporary cover for raw areas: A clinico—experimental study"; Thesis for M. S. (Surgery) Lucknow Univ. (1980).

12. Kubani, A. (1948): cited by Bose (1979).
13. Larson (1966): cited by Gruss and Jirsch (1978).
14. Ninman, C.; and Shoemaker, P. (1975): cited by Bose (1979).
15. Pigeon, J. : "Treatment of second degree burn with Amniotic membrane"; *Can. Med. Asso. Jour.*; 83; 844. (1960)
16. Ramakrishnan, M. : "Placental membrane as a temporary biological dressing in complicated burns"; Presented at I Afro—Asian Conference on Burns; (Jan. 1981).
17. Rao, T. V. : "Dry Amnion as a biological dressing in burns"; Presented I Afro-Asian Conference on Burns, (Jan. 1981).
18. Robson, M. C. and Krizek, T. J. : "The effect of human amniotic membrane on the bacterial population of infected rat burns"; *Ann. Surg.*; 177, 114. (1973)
19. Sabella, N. : "Use of foetal membrane in skin grafting"; *Med. Rec. N. Y.*: 83, 478. (1913)
20. Saymeu, D. G., Nathan, P., Holder, I. A. et al. : "Control of surface wound infection: skin versus synthetic grafts"; *Appl. Microbiol.*, 25, 921. (1973)
21. Sheth, R. D. : "Role of Amniotic membrane cover as a biological dressing in extensive post burn raw surface as compared with routine method of dressing"; Presented at I Afro-Asian Conference on burns at Bombay, (Jan. 1981).
22. Singh, S. K. : "Human Amniotic Membrane A Biological Dressing" thesis for M.Ch Plastic Surgery, Lucknow University, Lucknow. (1981)
23. Tavis, M. J.: Thornton, J.; Danot, R. and Bartlett, R. H. : "Current status of skin substitutes"; *Surg. Clin. North. Am.*; 58, 1233. (1978)
24. Unger, M. G. and Robert's M. ; "Lyophilized amniotic membrane on graft donar sites"; *Brit. J. Plast. Surg.*, 29, 102. (1976)
25. Walker, A. B., Cooney, D. A. and Allen, J. E. : Use of fresh amnion as a burn dressing. *J. Paediat. Surg.* 12 : 391-395, (1977).

