DISCUSSION

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Since the introduction of the "Biological Dressings" by Brown (1953) in the treatment of burn wounds, a number of investigators (Song 1966, Shuck 1969, Rappaport 1970) have emphasized the effectiveness of homografts and xenografts in controlling infection and minimizing the loss of protein and fluids from the burnt surface. Silverstein (1971) and his colleagues have reported xenografts to be inferior to allografts in decreasing bacterial count. They have related this failure to poorer adherence to the wound with xenografts. Rappaport and his co-workers (1970) have reported that xenografts left in place for more than 24 hours will not control the growth of bacteria. Collagen sheets are expensive and not available at every centre. A number of investigators have demonstrated the clinical feasibility of treating burn wounds with foetal membranes. Foetal membranes are easily available and are of no cost to the patient. They adhere well and obtain a biologically closed wound. Pigeon (1960) have stated that since the amniotic membrane is formed from the ectoderm of the foetus, it is like an extension of the skin of the body.

The present work is the study of the effectiveness of amnion and full thickness foetal membrane (amnion and chorion). Their results as regard the relief of pain, control of oozing and infection and rate of healing are also compared. This study was done on the patients of burns involving less than 50% of body surface area, without considering their age, sex, occupation, socio-economic status, mode and cause of injury and contamination of wound.
either sex. Out of 31 cases studied, male sufferers were 13 and female were 18. 30 cases were below 30 years of age. This signifies that incidence is much higher in younger age group. This may be possible that younger persons are more engaged in daily activity, therefore they are more prone to sustain burn injury. Thermal injury appeared to be the main cause of burn. 21 cases sustained burns while cooking food, 3 cases by lamp while studying in lantern light, and 5 cases had burns due to scalding.

Total 31 cases were studied. 18 cases were treated with amnion alone, 8 cases with full thickness membrane, and in 5 cases both amnion and full thickness membrane were applied. Thus total 36 wounds were considered.

Dino (1966) has reported the testing of many agents to sterilize the membranes and found the Normal saline with 10 lac unit of crystalline penicillin and 1 gm of streptomycin sulphate to be the best. In the present study membranes were collected from labour room and obstetrical operation theatre, and were used either fresh or were preserved in normal saline treated with 10 lac units of crystalline penicillin and 1 gm of streptomycin sulphate, at 4°C as suggested by Dino. They were used at different intervals after procurement and no difference was found in either membranes regarding their effectiveness. They retained all their biologic properties as does a fresh membrane. This suggests that both the foetal membranes can be easily collected and stored for use without changing their biologic properties. Robson et al(1973) suggested that any substance chosen to sterilize the membrane should not in itself be so chemically powerful as to change biologic effectiveness of the membrane.
The use of chorion or intact amnion and chorion was suggested for deep burns as (i) it eliminates the need to separate the membranes at the time of preparation (ii) thicker intact membrane appears not to desiccate on the wound as quickly as does the amnion alone. Idem(1973) reported that bacterial growth is decreased most effectively when the biologic membrane achieve an initial 'take' onto a granulating surface. The drawback with xenograft is related to its mobility and lack in this initial 'take up'.

Amnion, chorion and combined amniotic membrane have been used by various investigators as a substitute for skin in the past. Most investigators have had a preference for one or the other of the membranes. Jenner studied amnion and chorion side by side in the same wound and found no demonstrable difference the two. Similarly Lino(1965) experimented with various layers of foetal membranes and found the end results practically the same. In the present study 23 wounds were treated with amnion alone and 13 wounds with intact Amnion and Chorion, and the results were consistent with above studies.

It was remarkable to note that pain and discomfort disappeared immediately after application of membrane. Only one out of 23 amnion treated wounds and one out of 13 full thickness membrane treated wounds required analgesics and sedatives for relief of pain proving thereby that both the membranes are helpful in decreasing pain and discomfort of the patient which is the most common symptom in a burn patient. This relief in pain is probably due to coverage of exposed nerve endings which are irritated when left exposed. Lino(1965) stated that the disappearance of pain is due to the soothing effect of the soft mucoid surface of the membrane, protecting the nerve endings
from the irritant factors which may be the only surrounding air. He further commented that since the relief is immediate it is not a chemical process like local anaesthesia which takes some time to take effect. In other words, the process could be one of mechanical barrier as afforded by the epidermis.

No allergic reaction was noted in any case, proving thereby that foetal membranes do not cause any allergic reaction when used as dressings. This is in accordance with other reports published from time to time.

Another observation was drying up of covered areas within 24-48 hours, thereby stopping oozing. The membranes adhered well to the wounds and obtained a biologically closed wound. Adherence has been proposed to be the most important property of biological membranes. According to Lino (1965) cessation of oozing is probably not due to mechanical occlusive pressure, but it is an augmentation of the co-agulum of plasma on the raw surface thereby sealing the pores. The coagulating fibrin then invades the meshes of the membrane and prevents the passage of fluid through it, at the same time making it adhere to the raw surface. The technique of applying the membrane over normal skin beyond the borders of the burn seals the periphery of the raw area.

Out of 36 wounds considered, 6 amniotic membrane treated and one full thickness membrane treated wounds developed infection. Out of these 7 wounds, 1 wound developed localized infection which was treated by splitting the membrane at that site and systemic antibiotics. In remaining 6 wounds membranes were rejected due to generalized pus collection and in all membranes were reapplied. In 2 amniotic membrane treated wounds
membranes were again rejected, probably due to failure to control infection. Culture of these infected wounds showed that staphylococcus and pseudo monas were the main organism. This difference in infection rate in 2 types of membrane treated wound is not significant because it is quite possible that (i) these wounds were not thoroughly cleaned so as to destroy the pathogens already present over the wound (ii) sterility of the membranes is not guaranteed as no culture of membranes was done after their preservation.

In the remaining 29 wounds there was no infection. This suggests that both membranes help to obtain biologically closed wound and prevent the access of bacteria from outside, thus preventing the infection. Several authors have suggested that foetal membranes have unique antibacterial action. Allantoin, a bactericidal product of purine metabolism, immunoglobulins, and lysozymes, a bacteriolytic protein are all present in amniotic membranes and have been proposed as antimicrobial factors (Rosen 1973). Morris et al (1966) credited observed decrease in bacterial count to intimate biological closure of the open wounds by the membranes. Dino (1965) explained the absence of infection at the grafted sites as a contribution of several factors (i) the cleaning of the burn areas pregrafting must have killed or removed whatever bacteria may be there; (ii) the antibiotic preservative may have killed the bacteria; (iii) the sealing effect of the dried adherant membrane may have prevented the proliferation of surviving aerobic pathogens by shutting off the atmospheric oxygen (iv) the dried membrane becomes a mechanical barrier preventing the access of bacteria in the environment into the raw burnt surface.
21 amniotic membrane treated wounds within healed within 25 days (3 wounds healed in 6-10 days, 10 wounds in 11-15 days, 4 wounds in 16-20 days and 3 wounds in 21-25 days). Similarly 12 full thickness membrane treated wounds healed within 25 days (7 wounds in 6-10 days, 1 wound in 11-15 days, 2 wounds in 16-20 days and 2 wounds in 21-25 days. One amniotic membrane treated wound healed in 26-30 days and one amniotic and one full thickness membrane treated wounds healed in 36-40 days. These latter 3 wounds were among those which developed infection, which could have delayed the healing process. These results show that both the membranes are equally good in promoting healing process. Early healing with membranes may be explained as a contribution of several factors (i) by covering the wounds, conversion of superficial burns to deep burns is prevented (ii) normal dermal cells which are left over the wound after injury, are prevented to destroy by covering them with membranes (iii) absence of infection is also an important factor in early and better healing. Lino (1965) observed that the crust formed under the membrane remained dry and free from infection until their peeling off from 9th to 20th days. They became corrugated, hard and tough thus affording a good protective covering for the underlying delicate healing skin.

The healed skin treated by two membranes showed no differences. 29 healed wounds were pink, smooth and had flat margins. Four healed wounds had pink and raised surface with flat margins and two wounds had red raised surface with flat margins. Both latter wounds developed Keloid. Two cases developed contracture both involving neck area and the cause of contracture was lack of patient's cooperation.

Hansen (1950) in his study noted that enclosing a wound in plaster of paris leads to thick and raised granulation
tissue over skin margin, but with amnion grafting, granulation
tissue never raises above the skin margin. Pigeon (1960)
reported that (i) the normal discolouration in most cases of
primary healing of burns was absent when wounds were examined
after several weeks in amniotic membrane treated cases (ii)
immediate protection of injured cells of dermis prevents the
destruction of underlying cells, which if occur would be
replace by fibrotic tissue leading to scar formation, chao et
al (1940) and Troensgaard- Hansen (1960) also have noted that
amniotic membrane seemed to possess some specific healing
power. They have reported a stimulation of both fibrous tissue
growth and more rapid epithelial repair.

Thus it can be concluded that both foetal membranes
fulfilled all the functions of an ideal biological dressings.
In terms of their large size and easy availability without
cost to the patient, they are actually superior to the
homograft and heterograft skin. They minimized protein and
fluid losses and resulted in marked relief of pain and
discomfort. They appeared to increase the rapidity of
epithelization. The nontoxic and non antigenic nature of the
membranes as well as their adherent qualities, make it an
excellent biological covering for the burn surface.