

The effectiveness of amniotic membrane as a biological dressing on the donor site of the split thickness skin graft

Saadallah M. Al-Zacko, Falah G. Sharif

Burn and plastic unit – Al-Jumhoori teaching hospital, Mosul, Iraq.

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ABSTRACT

Objective: To evaluate the effectiveness of amniotic membrane as a biological dressing in the healing, relieving of pain, decreasing the possibility of infection and decreasing the discoloration and hypertrophic scars of split-thickness skin graft (SSG) donor sites.

Design: Case-control prospective study.

Setting: Burns and plastic unit (BPU), Al-Jumhoori teaching hospital, during the period from Sept. 2002 to April 2004.

Participants: Sixty donor sites in 40 patients, in whom we used the thigh as a donor site for SSG, were studied.

Results: The study revealed that the time required for complete healing is less in amniotic membrane-treated group (group 1) than in traditionally-treated group (group 2). There was also less pain, less infection and more color match in group 1 than in group 2.

Conclusion: Amniotic membrane is a good and beneficial biological dressing. It hastens wound healing, protects donor sites from infection and reduces its pain.

Key words: Amniotic membrane, donor sites, split-thickness skin graft.

الخلاصة

أهداف البحث: تقييم فعالية الغشاء السلوي كغشاء حيوي في إشفاء وتخفيف الألم وتقليل احتمالية العدوى وتقليل اختلاف اللون والندب التنخنية للمنطقة الواهبة للترقيع الجلدي الجزئي السمك.

التصميم: دراسة الحالات المقارنة

إجراء البحث والإطار الزمني له: شعبة الجراحة التجميلية والحروق – مستشفى الجمهوري التعليمي للفترة من أيلول 2002 لغاية نيسان 2004.

الطرق المتبعة: تم دراسة المنطقة الواهبة للترقيع الجلدي الجزئي السمك لـ 40 مريض (60) منطقة فخذ.

النتائج: أظهرت الدراسة ان الوقت اللازم للالتئام كان أقل في حالات استعمال الغشاء السلوي (مجموعة 1) مقارنة بحالات المضمدة بالضماد التقليدي. (مجموعة 2) وكذلك أقل الماء، أقل عدوى وأقل اختلافاً للون وتنخن الجلد في مجموعة 1.

الاستنتاج: الغشاء السلوي هو ضماد حيوي ممتاز حيث يسرع في الالتئام ويقلل الألم والعدوى.

The amniotic membrane is the innermost fetal membrane, being contiguous with the amniotic fluid. It is effective in promoting healing as the rough chorion side helps to stimulate granulation tissue, and the smooth amnion side promotes epithelialization⁽¹⁾. It was first applied to cover leg ulcer (Davis, 1910) in

order to gain epithelial continuity⁽²⁾. It has angiogenic properties, contains lysozymes and bacteriolytic protein that causes reduction in bacterial count^(3,4). The membrane applied to the donor site of SSG is allowed to remain in place, as it adheres to the wound, until it separates spontaneously as re-epithelialization

occurs. This study aims at comparing the outcome of amniotic membrane with traditional dressing of SSG donor sites.

Patients and methods

Between Sept. 2002 and April 2004, 40 patients were selected randomly for this study, where 60 thighs were used as donor areas for SSG where we dressed their upper halves by amniotic membrane (group 1) and their lower halves by traditional dressing as sofratulle (group 2).

The amniotic membrane obtained from placentae of healthy (sero-negative for hepatitis and HIV) mothers at time of normal delivery or from elective caesarian section. The membrane was separated from chorion, washed with isotonic saline, and put in a container with gentamicin or ampicillin, to decrease the possibility of bacterial colonization, and kept at 4°C where it can be used within 4 days.

The membrane over the wound was covered by saline-impregnated gauze and cottowool. After 1 week, the wound was examined daily until it separates spontaneously with complete re-epithelialization.

The 60 sites in each group were evaluated for the following points: time required for healing, wound infection, severity of pain and scar hypertrophy and discoloration.

Results

The male to female ratio was 3:2, with the age ranged between 2 to 60 years. In our 40 patients (60 thighs of donor areas), we found that the time required for complete healing was shorter in amniotic membrane-dressed sites (group 1) than in traditionally-dressed sites (group 2) (table 1) (fig. 1).

Nine cases of group 2 and 2 cases of group 1 showed clinical signs of infection of donor sites.

The presence of pain was assessed in 24 patients who were above 10 years of age. Pain was found in one case in group 1 as compared to 12 cases in group 2.

Scar hypertrophy and discoloration: 10 patients (16 thighs) were followed up for 1.5 years. Good color match was noticed in 12 cases in group 1 and 8 cases in group 2. Hypertrophic scars were noticed in 3 cases in group 2 but in none of group 1 (fig. 2).

(Table 1): The average time for healing of donor areas.

Age (years)	No. of sites	Healing time (days)		
		Group1 mean±SD	Group2 mean±SD	P-value
1-9	26	8.00±1.06	10.42±1.96	0.000*
10-19	17	8.24±0.97	10.47±1.77	0.000*
20-29	6	8.83±1.47	11.17±1.17	0.012*
30-39	2	8.00±1.41	10.00±1.41	0.293
40-49	7	10.43±1.40	12.57±0.98	0.006*
≥ 50	2	11.00±1.41	14.00±1.44	0.168
Total	60			

*Means a significant difference
T-Test of two means was used



Figure (1): Shows the upper part (amnion – dressed) donor site wound heals faster than the lower part (traditionally – dressed) wound.



Figure (2): Shows the upper part (amniotic – dressed) donor site wound with better color match and scar hypertrophy than the lower part (traditionally– dressed) wound.

Discussion

Most patients were children and teenagers because these are more prone to burns and trauma. Males are more prone to burns than females. This result was similar to other studies^(1,5).

It was clear that amniotic membrane-covered group healed faster than the control group. This is because the moist surface of the membrane promotes healing⁽⁶⁻⁹⁾, the presence of epithelial stimulating factors and antibacterial factors which prevent infection and, later on, hasten healing^(3,10,11). This result is similar to other studies^(2,12).

It was obvious that amniotic membrane-covered group sustained infection less commonly than the traditionally dressed group. This is due to the antibacterial effect of the membrane, good adherence of the membrane to the donor bed, prevention of fluid collection and presence of immunological factors in the membrane^(11,13).

Pain in the amniotic membrane-dressed areas was less severe than in those traditionally-dressed areas. This is due to the moist smooth surface of the amniotic membrane that covered the sensory nerve endings, the rapid healing and lower possibility of infection in their areas^(11,13-15).

The hypertrophic scars and discoloration were very clear in the traditionally dressed group on comparison with the amniotic membrane- dressed group. This is due to rapid healing, less possibility of infection and increased tissue moisture which decrease capillary activity and reduce hyperemia and collagen deposition in the

latter group⁽¹⁶⁻¹⁸⁾.

Conclusion: Amniotic membrane is a good and beneficial type of dressing because it is easily available, free of cost, fulfills all the functions of ideal biological dressings. It hastens wound healing and epithelialization, protects donor sites from infection and reduces pain in the donor areas.

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