

Evaluation Of Epithelialization When Amniotic Membrane Use As A Biologic Dressing In Oral Cavity

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Abstract:

Abstract:

Background: Skin act as a protective barrier to prevent the contamination from environment and dehydration of tissue. After any surgery to the oral cavity, wound closure or reconstruction is mandatory which is done by skin graft and skin substitute like amniotic membrane by the process of epithelialization and tissue regeneration. Amniotic membrane is use as skin substitute in burn, eye and oral cavity as biologic wound dressing.

Objective: To evaluate the epithelialization after use of amniotic membrane in mucosal defect of oral cavity as a biologic dressing.

Methods: This was a prospective study which included 26 with premalignant lesion in buccal mucosa who under went excision of the lesion from intraoral buccal mucosa between January 14-june 15 and post operative follow up for 4-6 month after the surgical procedure. We used amniotic membrane(am) for dressing of the defects in buccal mucosa of oral cavity under local anesthesia. Efficacy of this procedure was assessed by granulation tissue formation with surface epithelialization on the graft site.

Results: The epithelialization evaluated in postoperative period. According to sex 40 males 70% and 30 females age 22-72 years with means age 45.0 ± 10.5 years. After excision of lesion from buccal mucosa amniotic membrane was grafted on the defect. Complete adherence of amniotic membrane in most of the cases. Wound covered by epithelialization was entire wound coverage in 85% and Nearly entire wound coverage in 15% when use amniotic membrane use as a biologic dressing in oral cavity. No allergic reaction occurs in any patients.

Conclusion: Amniotic membrane can be use as a skin substitute in buccal mucosa of the oral cavity.

Keywords: Amniotic membrane, Epithelialization, precancerous lesion, oral cavity.

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Introduction:

In 1978 the World Health Organization (WHO) defined leukoplakia as "a white patch or plaque that cannot be characterized clinically or pathologically as any other disease"¹. The current definition is that of "a white plaque of questionable risk having excluded (other) known diseases or disorders that carry no increased risk for cancer"². It is considered as one of the most common premalignant lesion or Potentially Malignant Disorder.³

It is a clinicopathological diagnosis that can only be made after histological examination of the tissue. It represents the most common premalignant disease of the oral mucosa. The prevalence varies geographically but also reflects differences in study design and populations studies⁴. The presence of dysplasia in leukoplakia is believed to be associated with a higher probability to transform into oral cancer which increases with the grade⁵⁻⁶

The gold standard for the diagnosis and management remains histopathologic assessment from a suspicious lesion. This depends on the quality of the biopsy, patient clinical information, interpretation of biopsy by a pathologist and the correct action by the clinician. The pathologist can only confirm that no other pathology is present and comment on the presence and degree of dysplasia or infiltration⁴.

It is usually treated by surgical excision with a healthy margin. In case of a large mucosal defect after excision of any benign or malignant soft tissue lesion, reconstruction is mandatory. A number of surgical procedures have been advocated for the reconstruction of oral cavity defects after surgery, including primary closure, buccal mucosal graft, split thickness skin graft, buccal pad of fat, allogeneic graft, regional rotational flap and distant flap⁷.

An epithelial defect not responding favorably to routine modalities of dressings instigated the search of an ideal dressing material, which is biologic and satisfies certain desirable properties. The ideal dressings should provide relief from pain, protect wound from secondary infection, maintain a moist environment, prevent loss of fluids, promote healing, be elastic and non-antigenic, adhere well to wound, be easy to apply, easily available and economical.⁸

The search for such a material led researchers to human amniotic membrane, which augurs well with expectations. Human amniotic membrane is a biolog-

ic dressing that is non immunogenic because of its unique characteristic of not expressing major histocompatibility antigens. Hence it does not evoke an immune response from the host. In addition to that, the membrane produces various growth factors including basic fibroblast growth factor, transforming growth factors, angiogenic growth factors, all contributing to better re-epithelialization⁹⁻¹⁰.

Human amniotic (AM) has been used as a biomaterial for surgical reconstruction for nearly 100 years. In 1910, Davis was the first scientist to use amniotic membrane in the skin transplantation¹¹. Subsequently, it has been widely used as a surgical dressing in management of burn¹²⁻¹³ surgical reconstruction of the bladder¹⁴ and vagina¹⁵ and in prevention of surgical adhesions¹⁶. Amniotic membrane transplantation is also used in a wide variety of ocular disease as a temporary graft in order to promote ocular surface healing by suppressing inflammation, fibrosis and neovascularization¹⁷⁻¹⁸

The aim of this study was to evaluate epithelialization after use of amniotic membrane as a biologic wound dressing material surgical defects of buccal mucosa of oral cavity.



Figure-1 Preoperative picture to postoperative epithelialization.



Figure-2 Preoperative picture to postoperative epithelialization.

Method:

This was a prospective study that included 20 with premalignant lesion in buccal mucosa who underwent excision of the lesion from intraoral buccal mucosa between January 14 and June 15 in Department of Oral and Maxillofacial surgery, BSMMU. The study approved by the Ethical Committee of Bangabandhu Sheikh Mujib Medical University. Location of the lesion was buccal mucosa and Patients with clinically and histo pathologically diagnosed premalignant lesion undergoing surgical management. The amniotic membrane was fixed by Suturing (vicryle 4/0 round) to the underlying mucosal membrane. The patients were followed up for 4-6 months.

Processing and Preservation of Fresh Frozen (-800C) Amniotic Membrane Allograft:

Human placenta was collected from healthy and seronegative donor during elective caesarean or vaginal deliveries. Under a laminar flow cabinet amnion membrane was separated from chorion and cleaned blood clots & other debris from amnion membrane. Then the membrane washed ¾ times (30 minutes per cycle) using Balanced Salt Solution (BSS) containing antibiotics mixture (penicillin 50 µg/ml, Streptomycin 50 µg/ml, gentamycin 25 µg/ml and amphotericin B 2.5 µg/ml). After washing the amnion membrane was then flattened onto a nitrocellulose paper with a size of 0.22/0.45 µ with the epithelium/basement membrane surface up. The membrane with nitrocellulose paper was then cut into 5x5cm² pieces and kept into a sterile vial containing the DMEM (Dublecco’s Eagle Modified Medium) and glycerol at the ratio of 1:1 (V/V). Then the vials

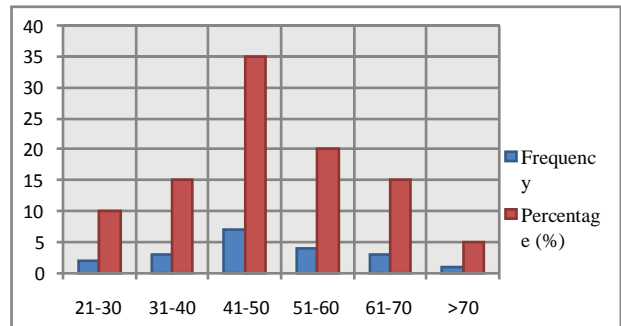
containing amnion membrane was stored in -800C deep freezer¹⁹. Before clinical applications in tissue banking and biomaterial research unit of Bangladesh atomic energy commission and they supply us before operation. We used amniotic membrane(am) for dressing of the defects in buccal mucosa of oral cavity under local anesthesia and post-operative follow up for 4-6 month after the surgical procedure.. Efficacy of this procedure was assessed by granulation tissue formation with surface epithelialization on the graft site.

Data analysis:

The data was analyzed with the help of software programmed SPSS version 20 for windows. The comparison between means was done by Independent sample’t’ test for continuous variable. The result was considered significant if p value was ≤0.05.

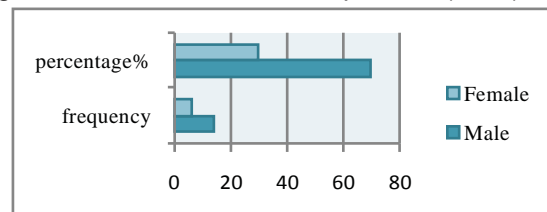
Results:

The study was conducted in the department of Oral and Maxillofacial Surgery, BSMMU, Dhaka. The study was intended to evaluate the epithelialization after excision of oral pre malignant lesion. The table, bar diagram and pie chart was formed as necessary. Figure 1: Age distribution of the patients (n=20)



The column diagram showing age frequency actual and percentage. most common age group is 41-50 years 35%. Maximum age 72 years and Minimum age 22 Years. Mean±SD age of patient is 45.0±10.5 years.

Figure 2: Sex distribution of the patients (n=20)



The bar diagram showing the sex distribution of the patients. The diagram shows male 70% and female 30%.

Table: 1 Assessment of wound coverage after one month clinically (n=20)

Wound coverage	When amniotic membrane used as a biologic dressing in oral cavity (n=20)		p value
	Total	Percentage %	
Entire wound coverage	17	85%	0.86 ^{ns}
Nearly entire wound coverage	3	15%	

P value measured by Chi-square test, ns = not significant n= Number of patient

This table: 1 shows wound coverage in which entire wound coverage in 85% and Nearly entire wound coverage in 15% when use amniotic membrane as a biologic dressing in oral cavity. The p value is 0.86, which is not significant.

Table: 2 Assessment of Adherence of amniotic membrane to the defect.

Adherence of amniotic membrane	Total	Percentage%
Complete adherence	16	80%
Partial adherence	3	15%
Not adherence	1	5%

This table: 2 shows adherence of amniotic membrane to the defect in which Complete adherence 80%, Partial adherence 15% and Not adherence 5% of patients.

No allergic reaction occurs in any patients. The epithelialization was very well in all patients.

Discussion:

Amniotic membranes have already been used extensively as biologic dressings in ophthalmic, abdominal, and plastic surgery. The laminin structure of amnion tissue is nearly identical to that of native human tissue such as oral mucosa. Reconstruction of a buccal mucosal defect after excision of speckled leukoplakia using HAM has been reported with a promising result²⁰. Uncovered wounds are susceptible to infection and prone to scarring and contraction. The moist environment with saliva contamination interferes with

healing process.^{21,22} Autologous regional and distant flap and/or skin graft are routinely used. Allograft donor is not suitable because of rejection after a short period of reconstruction.²³

Collagen membrane was used as graft material to repair defects of mucous membrane in the oral cavity. They recommended that Collagen was an excellent material for graft wound healing.²⁴

In our study we used amniotic membrane as a biological dressing for surgical defect in buccal mucosa of the oral cavity. No special technique followed in our study. Its application was very simple and easy in buccal mucosa defect. In clinical study wound coverage was fine with no recurrence.

In a recent study which was performed by Shojaku, et al. usefulness of human AM patches as a dressing substitute for temporalis fascia graft was investigated in canal wall down tympanoplasty. Complete epithelialization of the mastoid cavity took place in all patients, as well as complete epithelialization of the AM graft was significantly faster than the facial graft.²⁵ Now a days amniotic membrane enhance wound healing and re epithelialization.²⁶

Its antimicrobial and anti viral properties^{27,28}, low immunogenicity²⁹ reduce scarring and inflammation³⁰, no rejection of graft^{31,32}.

Conclusion:

So in conclusion we can say that amniotic membrane can be used as a skin substitute in buccal mucosa of the oral cavity.

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