

Association between Frequency of Prosthesis Cleaning and the Discharge Characteristics and the Tear Film in Subjects with Anophthalmic Socket after Evisceration with Dermis Fat Graft

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Abstract

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AIM: To analyze the associations between frequency of prosthesis cleaning with the discharge characteristics and the tear film in subjects with anophthalmic socket post evisceration with dermis fat graft.

SUBJECTS AND METHODS: This study is an analytic observational with cross sectional design study with control. The subjects of the study were unilateral acquired anophthalmic socket after evisceration with dermis fat graft at University of Sumatera Utara General Hospital which amounts to 30 subjects or 60 eyes (30 unilateral anophthalmic sockets, 30 contralateral eyes). Data was obtained from April 2018 to May 2018.

RESULT: There is significant association between frequency of prosthesis cleaning and the frequency of discharge ($P = 0.001$) and tear film quantity ($P = 0.024$). There is also significant association between the tear film quantity and the frequency of discharge ($P = 0.024$).

CONCLUSION: There was a significant association between frequency of prosthesis cleaning with the frequency of discharge and the tear film in subjects with Acquired Unilateral anophthalmic socket post-evisceration with dermis fat graft.

Introduction

After enucleation or evisceration is done, the main goal is to rehabilitate the patient to look normal and live a stress-free life. An ideal ocular prosthesis can be placed 4 to 8 weeks after evisceration or enucleation so that the patient feels comfortable and satisfied cosmetically [1], [2], [3], [4].

Discharge is the second problem after normal eye health, affecting 93% of patients with anophthalmic sockets and having various discharge characteristics. Dry eyes are also a problem in anophthalmic socket patients associated with prosthesis intolerance [5], [6].

Each patient individually has different intervals to remove and clean the prosthesis. Recommendations from the ophthalmologist for the frequency of cleaning of ocular prosthesis also vary.

The American Society of Ocularists recommends the removal and cleaning of the prosthesis once a month, but must be inserting immediately after socket irrigation [1], [4].

Subjects and Methods

This is an analytic observational study with cross sectional design with control. The study subjects were all patients who admitted to the Oculoplasty Oncology and Reconstruction Division of University of Sumatera Utara General Hospital Medan who was diagnosed with unilateral acquired anophthalmic socket post-evisceration with dermis fat graft from April to May 2018. The sample size was 30 people with age over 18 years. First, the patient identity record that

meets the sample selection criteria and then checks the anterior segment with slit lamp. Followed by schirmer I test were performed for both eyes, the anophthalmic socket side and normal eye. Patients were asked to complete the questionnaire, that was a modification of Pine and associates questionnaire (under the supervision of the researcher). All results are recorded and analyzed.

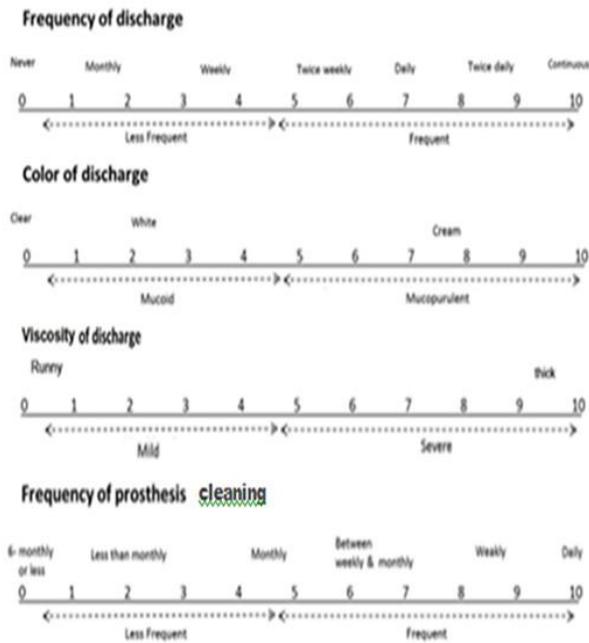


Figure 1: Questionnaire with visual analog scale (10 is the most severe) for self-reporting of the discharge characteristics (frequency, color, and volume) and frequency of prosthesis removal in subjects

Results

There were 30 consecutively recruited subjects with acquired unilateral anophthalmic socket post-evisceration with dermis fat graft, which they were drawn although with a higher ratio of men. The median age of participants was 46, and the youngest participant was 18.

Table 1: Characteristics of Subjects with Acquired Unilateral Anophthalmic Socket Post-Evisceration with Dermis Fat Graft

Characteristic	Study participants, n =30 (100%)
Gender	
Male	21 (70%)
Female	9 (30%)
Median age	
Male	46 years (range 22 - 75) (70%)
Female	50 years (range 18 - 60) (30%)
Median age at eye loss	
Male	34 years (range 10 - 65) (70%)
Female	26 years (range 5 - 57) (30%)
Anophthalmic side	
Left	17 (56.7%)
Right	13 (43.3%)
Reason for eye loss	
Accident	16 (53.3%)
Medical	14 (46.7%)
Median time since prosthesis fitted	12 years (range 1 - 35) (100%)

All the subjects scored 1 or more for all the

items in the questionnaire with regard to the discharge characteristics (frequency, color, volume) and frequency of prosthesis cleaning (Table 2). Table 2 shows that of 30 subjects with acquired unilateral anophthalmic socket post-evisceration with dermis fat graft, most frequency of discharge were frequent in 18 people (60%), the color of discharge was mucopurulent in 21 people (70%), and the viscosity of discharge was thicker in 19 people (63.3%).

Table 2: Discharge Characteristics and Frequency of Prosthesis Cleaning Among 30 Subjects with Acquired Unilateral Anophthalmic Socket Post-Evisceration with Dermis Fat Graft

Discharge	Frequency (n) (%)
Frequency	
Less frequent	12 (40%)
Frequent	18 (60%)
Color	
Mucoid	9 (30%)
Mucopurulent	21 (70%)
Viscosity	
Runny	11 (36.7%)
Thick	19 (63.3%)
Frequency of prosthesis cleaning	
Less frequent	12 (40%)
Frequent	18 (60%)

The anophthalmic socket side, as compared to the normal side, showed a significantly lower Schirmer value, it can be concluded that there is a significant difference in the quantity of tear film between anophthalmic socket side and normal side (Table 3).

Table 3: Comparing the Results of Schirmer I Test Between Anophthalmic Socket and Normal Eye of 30 Subjects With Acquired Unilateral Anophthalmic Socket Post-Evisceration with Dermis Fat Graft

	Anophthalmic Socket (30)	Normal (30)	P value
Mean (SD)[range] Schirmer I Test, mm	8 (2,31) [5-12]	15 (3,64) [10-25]	0.001

There was a significant associations between frequency of prosthesis cleaning with discharge and the frequency of discharge in the subjects with acquired unilateral anophthalmic socket post-evisceration with dermis fat graft, $P = 0.001$ ($P < 0.05$), where the frequency of discharge was frequent in subjects who more frequently cleaning the prosthesis (Table 4).

Table 4: Associations Between Frequency of Prosthesis Cleaning with Discharge Characteristics Among 30 Subjects with Acquired Unilateral Anophthalmic Socket Post-Evisceration with Dermis Fat Graft

Discharge Characteristics	Frequency of Prosthesis Cleaning				Total		P value
	Less frequent		Frequent		n	%	
Frequency							
Less frequent	12	40	0	0	12	100.0	0.001*
Frequent	0	0	18	60	18	100.0	
Color							
Mucoid	6	66.7	3	33.3	9	100.0	0.062
Mucopurulent	6	28.6	15	71.4	21	100.0	
Viscosity							
Runny	6	54.5	5	45.5	11	100.0	0.197
Thick	6	31.6	13	68.4	19	100.0	

There was a significant associations $P =$

0.024 ($P < 0.05$) between the frequency of prosthesis cleaning and the quantity of tear film in the the subjects with acquired unilateral anophthalmic socket post-enucleation with dermis fat graft (Table 5).

The 30 subjects with acquired unilateral anophthalmic socket post-enucleation with dermis fat graft, showed a significantly lower Schirmer value in the subject with frequent prosthesis cleaning than subject with less frequent prosthesis cleaning (Table 5).

Table 5: Associations between Frequency of Prosthesis Cleaning with Tear Film Among 30 Subjects with Acquired Unilateral Anophthalmic Socket Post-Enucleation with Dermis Fat Graft

Characteristic	Frequency of Prosthesis Cleaning				Total		P value
	Less frequent		Frequent		n	%	
	mean	n	mean	n			
Schirmer I Test, mm	9.08	12	7.17	18	30	100.0	0.024*

A significant association ($P = 0.024$) between the quantity of tear film with the frequent of discharge, which the tear film quantity is lower than less frequency of discharge (Table 6).

Table 6: Associations between Tear Film with Discharge Characteristics Among 30 Subjects with Acquired Unilateral Anophthalmic Socket Post-Enucleation with Dermis Fat Graft

Discharge Characteristics	Schirmer I Test		P value
	mean	mm	
Frequency			
Less frequent	9.08	12	0.024*
Frequent	7.17	18	
Color			
Mucoid	9	9	0.100
Mucopurulent	7.48	21	
Viscosity			
Runny	8.27	11	0.551
Thick	7.74	19	

Discussion

The anophthalmic socket varies between individuals and their condition and shape are affected by loss of eyes, surgical techniques, types of implants that have accommodated a prosthetic eye and age. This problem will certainly affect the quality of life of patients. This problem will certainly affect the quality of life of patients. Problems that can be encountered in the patients anophthalmic socket are the presence of discharge, dry eye and poor prosthesis cosmetics such as not symmetrical with the other eye, the size of the prosthesis is too large or small can cause changes in the eyelid position (pseudoptosis or eyelid retraction), decreased motility prosthesis, discomfort and pain in the anophthalmic socket. Patients with anophthalmia sockets need rehabilitation to look normal and live a stress-free life [1], [2], [5].

Table 1 shows that the most from 30 subjects with acquired unilateral anophthalmic socket post-

enucleation with dermis fat graft in males is 21 people (70%), while in women is 9 people (30%). The mean age of the study in males is 46 years and women are 50 years old. The mean age at eye loss in males is 34 years and women are 26 years old. The anophthalmic sides in the right eye as 17 people (56.7%) and left eye is 13 persons (43.3%). The most reason for eye loss in the study is accident in 16 people (53.3%), while the medical reason in 14 people (46.7%). The median time since prosthesis fitted is 12 years.

Discharge a common complaint of an anophthalmic socket patient that affects the quality of his life and there may be many underlying causes. Discharge is the glandular product of the bulbi conjunctiva released by goblet cells. The most common cause is giant papillary conjunctivitis. The pathogenesis is a combination of the immunological response to the mechanical trauma of the prosthesis [6], [7].

Using a visual analog scale for doing self-reporting of discharge characteristics (frequency, rare or frequent), color (mucoid or mucopurulent), and viscosity (runny or thick) [7], [8].

Table 2 shows subject with frequent discharge is 18 people (60%), while less frequent discharge is 12 people (40%). The most color of discharge is mucopurulent in 21 people (70%), while mucoid in 9 people (30%). The most viscosity of discharge is thick in 19 people (63.3%), while the runny in 11 people (36.7%). Subject with frequent prosthesis cleaning is 18 people (60%) have a higher frequency of discharge than subjects with less frequent prosthesis cleaning is 12 people (40%).

Losing of eyeball is accompanied by a rearrangement of the conjunctiva and lacrimal apparatus. Furthermore, following the fitting of an ocular prosthesis, cytological features of the conjunctiva undergo a change, as does the nature of tears. After enucleation or enucleation, the loose conjunctival lining of the newly formed socket adjusts as it heals and there is an inevitable loss of conjunctiva area [1], [2].

The provision of a prosthetic eye restores the fornices, which may have temporarily fore shortened, and returns the eyelids to their original positions where they resume their normal function. The presence of a prosthesis is necessary for basic tear distribution and drainage to resume although it may not operate as efficiently as previously. Lacrimal system efficacy in the anophthalmic socket (with structures intact) greatly depends upon the fit of the prosthesis. The prosthesis entering the anophthalmic socket will be contact with the conjunctiva, the eyelid will moisten the prosthesis with ocular fluid and rest on the surface of the sediment with ocular fluid and collecting precipitate on its surface. Protesa intolerance, tear delivery impeded by conjunctival scarring or lack of sensory reflex impulse to the

lacrimal gland of the ocular surface is often associated as a cause of dry eye in the anophthalmic socket patient [8], [9], [10], [11], [12].

In Table 3 showed that the results of the Independent t-Test can be concluded that there is a significant difference in the quantity of the tear film between the anophthalmic socket with the normal eye, where the quantity of the tear film in the anophthalmic socket is lower than the eye in the normal eye. It is in line with study by Allen et al who reported that the tear volume of the anophthalmic socket is not the same as the normal eye, as the tear volume on the anophthalmia socket have been less than in the normal eye. However, unlike previous study by Kim et al., showed that no statistically significant difference in Schirmer test results between anophthalmic socket with normal eye [12].

Recommendations for the cleaning of ocular prosthesis are no more than 1 month and no less than six months. A monthly cleaning of the prosthesis to remove the precipitate from the prosthesis surface and the ability of the conjunctiva to increase lubricating fluid on the socket reduces mechanical irritation resulting from friction of the prosthesis with conjunctiva and reduces the production of secretions. Mechanical irritation may be caused by the removal of the prosthesis, exposure to foreign materials or bacteria during the cleaning of the prosthesis so that it enters the socket. The presence of sediment is associated with fewer conjunctival inflammations and discharge, and that the sediment is not due to conjunctival inflammation in patients who do not frequently clear the prosthesis. All patients should clean their prosthesis at least six months, since the amount of sediment accumulated during this time may be sufficient before the occurrence of conditions required for GPC or for deposits begin to disrupt the interpalpebral zone where the precipitate dries and physically disrupts the conjunctiva when it flashes [1], [9].

It is assumed that there is an irritating or disruptive effect on the conjunctival anophthalmic socket associated with the removal and reinsertion of the prosthesis during cleaning of the prosthesis. Little is known about the severity of this effect or how long it lasts, it takes further research to determine the severity of conjunctival inflammation to measure inflammation before and after remove and reinsert the prosthesis [7]. Rodiah and Monica, the using contact lens may cause conjunctival inflammation and caused dry eye syndrome [13]. The Chi-Square test shows subjects with frequent prosthesis cleaning had a significantly higher frequency of discharge than subjects with less frequent prosthesis cleaning, ($P = 0.001$), whereas color ($P = 0.062$) and viscosity of discharge ($P = 0.197$) were not significantly different between these 2 groups.

The previous study by Kashkouli MB et al., also found that frequent prosthesis removal had a

significantly higher frequency of discharge than subjects with less frequent prosthesis removal, whereas color and volume of discharge were not significantly different between these 2 groups. It is in line with study by Pine KR et al., who reported that associations were found between discharge frequency and cleaning regimes with more frequent cleaning accompanying more frequent discharge. No associations were found between color of discharge and cleaning regimes, but viscosity was associated with cleaning regimes and years of wearing with more frequent cleaning accompanying more viscous discharge. Different with previous research by Kim et al., and Chang WJ et al., compared inflammatory conjunctival of anophthalmic socket with contralateral eyes, showed no association between conjunctival inflammation and aspects of prosthesis use, including the frequency cleaning of the prosthesis [7]. Many studies have been explained the etiology of discharge most common and disturbing patient anophthalmic socket. There are two theories about the etiology of discharge: 1) growth of bacterial, specific of the infection process; and 2) reduced tear production [9].

In Table 5 with the Independent t-Test showed significant association ($P = 0.024$) between the frequency of cleaning prosthesis with the quantity of tear film in subject with anophthalmic socket, where the tear film quantity is lower in the subject with frequent prosthesis cleaning than subject with less frequent prosthesis cleaning. It is in line with study by Kim et al, specimens from patients who cleaned their prosthesis once a day showed significantly less goblet cell density and greater nucleus to cytoplasm ratios at the superior tarsal conjunctiva than those who cleaned less often. The results of Kim et al., did not agree with the earlier results of an investigation by Chang et al., which found no statistical difference in goblet cell density or epithelial cell morphology in 12 anophthalmic patients with giant papillary conjunctivitis.

In Table 6, shows the results of Independent t-Test is a significant association ($P = 0.024$) between the quantity of tear film with the frequent of discharge, which the tear film quantity is lower than less frequency of discharge, whereas color ($P = 0.100$) and viscosity of discharge ($P = 0.551$) were not significantly different between these 2 groups. Allen et al., or Fett et al., directly linked low basic tear production or the use of prosthetic lubrication with the discharge problem.

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