Dental caries among a group of boys with β-thalassemia major (10-12 years old) in relation to salivary Mutans streptococci

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ABSTRACT

Background: Beta thalassemia major is an inherited disorder that may affect general and oral health.The purpose of this study was toassess the severity of dental caries in relation to oral cleanliness, mutans streptococciamong a group of boys with beta thalassemia majorin comparison with a control group.

Materials and Methods: The study involved 30 boys with BTM aged 10-12 years compared to 30 healthy boys with the same age group. d_{1-4}mfs and D_{1-4} MFS indices were applied (Muhlemann, 1976), the viable counts of mutans streptococci in stimulated saliva were also determined.

Results: The entire thalassemic group was caries-active. For both dentitions, a higher dmfs/DMFS values were recorded for study compared to control group, difference was statistically not significantconcerning dmfs, while it was statistically significant concerning DMFS ($P<0.05$). Salivary bacterial counts of mutans streptococci were found to be higher in the study compared to control group and the difference was statistically highly significant ($P<0.01$).All correlations between bacterial counts and dmfs/DMFS indices in study group were statistically not significant.

Conclusion: Patients with Beta thalasemic major had more caries severity compared to normal subjects.

Key words: β-thalassemia, mutans streptococci. (J Bagh Coll Dentistry 2014; 26(2): 157-159).

الخلاصة

المقدمة: يعتبرفقر دم البحر الأبيض المتوسط النوع الكبير أحد أنواع الاضطرابات الوراثية التي قد تؤدي الى انخفاض في انتاج كريات الدم الحمراء كما يعمل على زيادة تحطيمها. يعاني المصابون بهذا المرض من عدة تغيرات جرثومية التي قد تصيب الفم واللعاب مما قد يزيد من احتمالية الاصابة بتسوّس الأسنان.

أهداف الدراسة: تهدف هذه الدراسة الى حساب حدّة تسوّس الأسنان, نظافة الفم, المكوّرات المسبحية عند مجموعة من الأطفال الذكور المصابين بمرض فقر دم البحر الأبيض المتوسط النوع الكبيربالمقارنة مع مجموعة ضابطة.

المواد وطرق العمل: شملت الدراسة 30 مريض تتراوح أعمارهم مابين (10-12) سنة بالمقارنة مع 30 من الأطفال الأصحّاء ومن نفس الفئة العمرية. تم قياس حدّة تسوّس الأسنان حسب مقياس (تسوّس, قلع, حشوة) (d_{1-4}mfs وD_{1-4}MFS) حسب طريقة موهلمان (1976). تم جمع عيّنات اللعاب المحفّز بالاضافة احتساب الاعداد الحيّة للمكوّرات المسبحيّة في اللعاب.

النتائج: أظهرت النتائج اصابة جميع الاطفال بتسوّس الأسنان. فيما يتعلق بالأسنان اللبنية, أظهرت النتائج وجود قيم عالية للتسوّس حسب مقياس (تسوّس, قلع, حشوة) (dmfs) لدى المرضى مقارنة بالأطفال الأصحّاء مع عدم وجود فروقات معنوية. فيما يتعلق بالأسنان الدائمية, وجدت قيم عالية للتسوّس حسب مقياس (تسوّس, قلع, حشوة) (DMFS) لدى المرضى مقارنة بالأطفال الأصحّاء مع وجود فروقات معنوية($P<0.05$). النتائج بيّنت أن أعداد المكوّرات المسبحية أعلى عند الأطفال المصابين بالمرض مقارنة مع المجموعة الضابطة مع وجود فرق معنوي عالٍ ($P<0.01$).كل العلاقات بين أعداد المكورات المسبحية في اللعاب مع تسوّس الأسنان للأطفال المصابين بالمرض كانت بدون فروقات معنوية.

الأستنتاج: وجد أن تسوّس الأسنان في الأطفال المرضى أعلى من أقرانهم من الأطفال الأصحّاء, مما يعني ضرورة توفير برنامج وقائي فعّال لهؤلاء الأطفال المرضى.

كلمات مفتاحية: فقر دم البحر المتوسط النوع الكبير, المكوّرات المسبحية الميوتانز.

INTRODUCTION

Beta thalassemias are a group of inherited blood disorders caused by reduced or absent synthesis of the beta chains of hemoglobin [(1, 2)]. From the few studies regarding dental caries among patients with BTM it was concluded that the prevalence and severity of this disease were higher in those patient than in normal subjects [(3, 4)].

There are a limited number of studies concerning counts of mutans streptococci in relation to dental caries in BTM [(5)]. This study was designed to correlate dental caries severity to salivary mutans streptococci among of β-thalassemia major patients.

MATERIALS AND METHODS

The study group included 30 boys, with an age range of 10-12 years according to the last birth day [(6)]; they were already diagnosed with β-thalassemia major, attending the thalassemic center in Ibn Al-Baladi Hospital for their regular checkup and blood transfusion. The control group included 30 boys matching in age and genders with the study group; they were examined in their primary school nearby the hospital. Prior to clinical examination, collection of stimulated salivary samples from both study and control groups was done [(7)].

Each individual was asked to chew a piece of Arabic gum for one minute then to remove all saliva by expectoration, chewing was then continued for ten minutes with the same piece of gum and saliva collected in a sterile screw-capped bottles. After collection and disappearance of salivary foams, 0.1 ml of saliva wastransferred to 0.9 ml of sterile phosphate buffer saline (pH 7.0) for microbiological analysis.

Dental caries was diagnosed by clinical examination; using dental mirror and sharp dental

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explorer. Assessment and recording of caries experience was by the application of (d_{1-4}mfs/D_{1-4} MFS). The selective media for the cultivation of mutans streptococci was Mitis Salivarius Bacitracin Agar. Isolation and identification of bacteria were done according to Holbrook and Beighton[8]. Statistical Analyses were achievedby using SPSS version 20 (Statistical Package for Social Sciences). Descriptive measurement (mean and standard deviation) and interferential statistic involved (Student's t-test, Paired t-test, Person's correlation coefficient, and multiple liner regression) were applied. The level of confidence was 95%.

RESULTS

Clinical examination showed that all subjects were affected by dental caries. Decayed, missed and filled teeth surfaces of boys by fractions of d_{1-4}mfs/D_{1-4} MFS index are represented by their means and standard deviations (SD) in Tables (1) and (2).

Salivary bacterial counts of mutans streptococci were found to be higher in study group (3.63±1.650)CFU/ml×10^4 compared to control group (1.93±0.907)CFU/ml×10^4 and the difference was statistically highly significant (P<0.01). All correlations between bacterial counts and dmfs/DMFS were statistically not significant Table (3).

Tables (4) and (5) illustrate results of single linear regressions of dmfs and DMFS indices as a (dependent variable) in both study and control groups explained by mutans streptococci count (independent variables). The recorded correlation coefficient (r) between dmfs and bacterial count was 0.242 in study group and 0.320 in control group, the R^2 value was lower in the study compared to the control group. For DMFS, the correlation coefficient (r) with bacterial count was 0.041 in study group and 0.252 in control group; the R^2 value was also lower in the study compared to the control group.

Table 1: Caries-experience of primary teeth (dmfs) among study and control groups

Parameters	No.	Study		Control	
		Mean	±SD	Mean	±SD
ds	30	6.100	5.797	4.400	4.966
ms	30	0.330	1.269	0.630	2.684
fs	30	-	-	-	-
dmfs	30	6.430	6.185	5.030	5.468

Table 2: Caries-experience of permanent teeth (DMFS) in study and control groups

Parameters	No.	Study		Control		t-value	P-value
		Mean	±SD	Mean	±SD		
DS	30	6.500	4.297	4.230	2.029	2.613*	0.011
MS	30	-	-	-	-	-	-
FS	30	-	-	-	-	-	-
DMFS	30	6.500	4.297	4.230	2.029	2.613*	0.011

***significant at the level P<0.05,df=29**

Table 3: Correlation coefficients between mutans streptococci counts in saliva and caries-experience (primary and permanent teeth) in study and control groups

Caries-Experience	Study		Control	
	r	P	r	P
dmfs	0.242	0.198	0.320	0.084
DMFS	-0.041	0.831	0.252	0.179

Table 4: Single linear regression of caries-experience (dmfs) with mutans streptococci counts in study and control groups

Group	Coefficients		t-value	P-value
	B	S.E		
Study R^2=5.8%	1.168	0.886	1.318	0.198
Control R^2=10.3%	1.930	1.079	1.789	0.084

Table 5: Single linear regression of caries-experience (DMFS) with mutans streptococci counts in study and control Groups

Group	Coefficients		t-value	P-value
	B	S.E		
Study R^2=0.2%	-0.137	0.634	-0.216	0.831
Control R^2=6.4%	0.564	0.409	1.380	0.179

DISCUSSION

Data of the present study showed that all children in both study and control groups had dental caries, i.e. a 100% of occurrence of the disease; this may indicate that both groups may have the same susceptibility to dental caries. However, data revealed that there is a variation in the severity of caries-experience between the groups; this was true for primary and permanent teeth. For both dentitions, caries-experience as measured by dmfs/DMFS index was higher in the study group compared to the control and differences were statistically significant for DMFS and not significant for dmfs. This may indicate a higher severity of dental caries among study group compared to control; the same results were recorded by others [9, 10].

In thalassemic patient, the DMFS index was composed of decay surface only, as no case was seen with either missing or filling surfaces. This is an indication of the increased need for dental treatment. The increased severity of dental caries among thalassemic children may be attributed to poor oral cleanliness, related to certain oral structural changes that take place in thalassemic patient due to maxillary enlargement result in protrusion of anterior teeth, increase space between teeth, over-bite or open-bite and varying degrees of malocclusion, aid in more plaque accumulation [11]. Another explanation for the increase severity of dental caries in the study group is the higher counts of mutans streptococci in the thalassemic group; as found by this study with a statistically high significant difference, the same result was reported by other [5].The higher counts of salivary mutans streptococci may be related to the lower IgA level in saliva of thalassemic patients that may lead to increased microbial proliferation [12].

Results of multiple linear regressions revealed a more impact of mutans streptococci on dental caries of the control group compared to study group. Studying bacterial count in dental plaque may give more obvious picture regarding the correlation between count of this cariogenic bacteria and dental caries. The increased cariesseverity among thalassemic patients may indicate the increase need for special care and preventive programs for this special group.

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