Ear Lobe Crease: A Marker of Coronary Heart Disease

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Abstract

Aim and Objective- The clinical study was undertaken to evaluate the diagonal ear lobe crease (Frank sign) as an indicator of Chronic heart disease (CHD). However, there are certain studies have not found any correlation between Frank sign and CHD.

Material and Method -Total of 10 patients aged >40years were enrolled in this study with prior medical history of heart disease. Patient with anatomical obliteration of ear excluded from the study. All the selected patient was initially screened and findings were recorded in patient Performa. Date were recorded, tabulated and analysed by using descriptive analysis for responses to each question.

Result- DELC is observed in 80% of subjects with heart disease. The most frequently bilateral DELC is observe in 70% of subjects and without DELC in 20% of subjects. The mean age is within the range of 30-70 years. Unilateral and bilateral DELC was more among subject less than 50 years.

Conclusion- DELC is uncommon and has a prevalence of correlation with CHD as indicated in the present study. It is suggested that DELC examination be recommended for detecting underlying heart disease.

Keywords: *Coronary heart disease, Diagonal ear lobe crease, artheroscelerosis.*

Introduction

Chronic heart disease causes 30% death occurred worldwide. According to WHO in India prevalence of chronic heart disease is between 7% -13% in urban areas and 27% in rural areas.[1,2] Case control studies reported that risk factors of chronic heart disease in India include smoking, diabetes, hypertension, obesity, stress and physical inactivity.[3] In this modern era clinical evaluation and examination is most reliable tool to diagnose sub clinical stage and for further investigation play an important role to diagnose the underlying disease.

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Dr. Sanders T. Frank in 1973 proposes a term "Frank Sign". It is a wrinkle or furrow in theskin which is extending from the tragus to rear edge of the ear lobe at 45degree in varying depth, also known as diagonal earlobe crease.[4] Several studies concluded that earlobe creases are silent indicators of CHD. Dermatological signs considered as definitive functioning system that communicates with the internal environment. In many cases dentist may be the first health care provider to diagnose the underlying disease in early stages through dermatological or oral signs.

There is limited information about pathophysiology explaining link between frank sign and CHD, some authors concluded thar diseases of microvascular arteries result in loss of elastin and elastic fibers which cause diagonal ear lobe crease.In an autopsy-based report, it was suggested that progression of atherosclerosis is related with collagen metabolism which occurs in the skin.[3,9] The presence of earlobe crease can be easily

conducted and patient can undergo early diagnostic procedures to detect the risk of CHD and preventive therapies van be detected early. These findings have opened new venues for dentist to identify individual with high risk of developing CHD. Due to unclear etiology, and several studies concluded that earlobe crease may associated with the weakening of elastic fibers with age.

So, this study is planned to assess the link between chronic heart disease and diagonalear lobe crease as it provides diagnostic information which is important in clinical management of various dental treatment procedures.

Materials and Methods

A cross- sectional study conducted in oral medicine and radiology department. This study comprises of 10 patients who came in outpatient department for various dental treatment above the age of 40 years with proven heart disease. Informed consent was taken and study protocol was approved by the ethical committee of the Teerthankar Mahaveer Dental College and Research Centre. Complete history was taken and photograph was taken from every participant. Patient with distorted anatomy of ear, ear piercing and incomplete ear lobe crease were excluded from the study. Clinical examination was carried out and history of each subject were taken thoroughly. A deep diagonal crease extending obliquely from the tragus of the ear to the outer border of the earlobe was recorded as DELC. Unilateral and bilateral crease both considered as DELC positive. Data was recorded, tabulated and analysed.

Statistic Alanalysis

Statistical analyses were done by using SPSS (statistical package for social sciences) version 25.0 and MedCalc software. Descriptive statistics was performed by calculating mean and standard deviation for the continuous variables. Categorical variables are presented as absolute numbers and percentage.

Result

In the assessment of subject included in this study with heart disease age of the participants ranged from 32 to 70 years mean age of the study population was 53.80 years with standard deviation ±11.39 years. Mean age of patients with bilateral DELC was more than 50years in33% and unilateral DELC was common in less than50 years of subjects 25% and Bilateral DELC was observed in 70% of subjects and subjects with unilateral 10%. There were CHD patients (20%) without earlobe crease. There was no significant difference in the distribution of the diagonal ear lobe crease between less than 50 and more than 50 years age groups. Unilateral and bilateral ear lobe crease was more among subjects lesser than 50 years of age with heart disease.

Table1- Distribution of diagonal ear lobe creas

	Number	Percentage
Bilateral Diagonal Ear Lobe Crease	7	70.00%
Unilateral Diagonal Ear Lobe Crease	1	10.00%
Without Diagonal Ear Lobe Crease	2	20.00%

Table 2- Age-wise distribution of DELC

	Minimum	Maximum	Mean	SD
Age	32.00	70.00	53.80	11.39

Table 3- Association of DELC with age

Ear Lobe Crease	< 50 years	> 50 years	Total
No	0	2	2
	0.00%	33.30%	20.00%
Unilateral Diagonal Ear Lobe Crease	1	0	1
	25.00%	0.00%	10.00%
Bilateral Diagonal Ear Lobe Crease	3	4	7
	75.00%	66.70%	70.00%
p-value = 0.20			

Discussion

DELC is an anatomical landmark to detect the underlying heart disease. The presence of unilateral or bilateral DELC is important in diagnosis to avoid the adverse consequences in various dental procedure. Advantage of knowing DELC in patients include (1) it can help to predict the risk of coronary artery disease. (2) It can help in evaluating the treatment during/after treatment. DELC provide a valuable contribution to the dentist to assess the patients with risk of any heart disease in dental office.

Friedlander AH et al concluded in their study that whether it is not confirm its association and more research is required in this area, they advise to dentist to that DELC used as a clinical marker for risk assessment and medical evaluation. They observe relation between DELC and CAD. DELC may be said to be the external presentation of atherosclerosis.[5]

Y, Higuchi et al concluded in their study association of DELC with shortening of telomere. Shorten telomere indicate the progressing biological age and reported it as a useful marker of biological aging of cardiovascular system.[6]

Kadam YR et al. also reported prevalence of Bilateral DELC was 2.7% and its positive association with Cardiovascular disease, diabetes mellitus and hypertension.[10] The registrar General of India reported 17% of total death occurs yearly due to CHD. Hence proper preventive strategies and early diagnosis help to eradicate this epidemic.[11-12] In our study we observe DELC is associated with coronary artery disease. The statistical analyses show higher incidence of Coronary Artery Disease in patients with bilateral DELC.[11] There was significant relation with the advancement of age with DELC. This study comprises of a smaller number of subjects within the limitation this study the findings may not be generalizable. Therefore, further investigations are needed. In order to make a diagnosis of CHD it is essential to know the physical sign (DELC) for that particular population so further studies with larger sample size are necessary to affirm the results.

Conclusion

This study has shown that DELC has high prevalence in patients with heart disease. Result of this study also suggest that bilateral DELC might be common in with patients with Coronary heart disease. The incidence of DELC were significantly higher in individuals above the age 50years it may be due atherosclerosis. Atherosclerosis

could be due to hypertension, hyperlipidaemia, diabetes or obesity.

Conflict of Interest: -Nill

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