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Original Research Article

Latent coronary artery disease among smokers and smokeless tobacco users: a cross-sectional study

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ABSTRACT

Background: Tobacco related mortality and morbidity and increase in developing country like India. WHO projected till 2020 India will accounts 15% of tobacco related mortality especially preventable causes of death e.g. cardiovascular disease. Active tobacco smoking is undoubtedly major risk factor for cardiovascular disease, but subjects use smokeless tobacco in dependence pattern is not extensively evaluated for cardiovascular risk factor. In India smokeless tobacco especially Khaini is major form of tobacco consumption. Scarcity of data on effects of smokeless tobacco in cardiovascular disease especially coronary artery disease major limiting factor for undermine the detailed evaluation of cardiovascular effects in smokeless tobacco dependence subjects. The aim of the study was to study the risk of coronary artery disease among smokeless tobacco dependence in comparison to tobacco dependence smokers.
Methods: Cross-sectional assessments were done on 36 adults (>18 years), treatment-seeking patients with a ICD 10 diagnosis of Mental and behavioral disorders due to use of tobacco. Data was collected on socio-demographic characteristics, and after detailed clinical evaluation treadmill exercise test was done.
Results: Mean age of tobacco dependence smokers 51.5±9.6 years vs 53.6±7.5 years. There were male predominant in study subjects and 38% subjects was treadmill test positive. Smokeless tobacco users had 35% positive treadmill test, and among Smokers 42% subjects was positive for treadmill test.
Conclusions: Risk for latent coronary artery disease was similarly higher in smokers and smokeless tobacco dependence subjects.

Keywords: Exercise stress test, Smokeless tobacco, Tobacco smoking, Tobacco dependence, Treadmill test

INTRODUCTION

Tobacco was first discovered by the native people of Mesoamerica and South America and later introduced to Europe and the rest of the world.[1] Earlier time tobacco used as the medicinal plant then later used as addictive substances.[2] Mid-20th century evidence of the harmful use of tobacco emerges and various kind of sanction and prohibition enforced to prevent the use of tobacco.[3] Tobacco consumption a risk factor for mortality in modern era.[4] Epidemiological data shows that 930 million smokers in worlds with 182 million in India.[5,6] Up to 2020 in India projected death related to tobacco consumption around 13%.[7] The pattern of tobacco consumptions is variables according to the region and socio-cultural context. In India recent Global adult tobacco survey 2016-2017 (GATS-2) shows that 19% men, 2 women, 10.7% of all adults currently smoke tobacco, 29.6% of men,12.8% women, 21.4% of all adults currently use smokeless tobacco.[8] Khaini was the most commonly used form of smokeless tobacco in India. Low cost, easy availability, and social and cultural

acceptance of Khaini consumptions are the important reason behind high prevalence of Khaini consumption.[9] The epidemiological study confirmed that active major risk factor for cardiovascular disease (CVD) and risk of death from coronary heart disease is two-fold higher among smokers compared with non-smokers.[10,11] Death due to tobacco smoking is the leading cause of preventable death.[12,13]

Sudden cardiac deaths due to acute coronary thrombosis occur in cigarette smokers, and smoking are associated with a ~50% increase in the risk of stroke.[14-16] The cardiovascular risk from smoking was extensively studied, but there was paucity of smokeless tobacco effects on cardiovascular disease. Recent study data show India has the higher prevalence of smokeless tobacco consumption especially Khaini.[8]

As coronary artery is the major cause of premature death among smokers. The exercise stress test is one of the most important and valuable noninvasive diagnostic tests in the clinical evaluation and management of the patient with suspected or known cardiovascular disease particularly coronary artery disease. This study is intended to study latent coronary artery disease among smokeless tobacco consumers in comparison to smokers.

METHODS

Subject recruitment and study design

The study has been done on 36 subjects, recruited from Department of Psychiatry, S. S. Medical College Rewa, A largest tertiary care center in the eastern part state of Madhya Pradesh. Subjects were recruited from Outpatient and Inpatient section of the department, fulfilling the criteria for Mental and behavioral disorders due to use of tobacco according to ICD 10, DCR, giving written informed consent, were not having severe medical illnesses (Who are incapable for the interview, need intensive care, in delirium). Subject taking other substance along with tobacco had the history of both chewing and smoking was excluded from the study. Information for substance history based on personal testimony and available records. Subjects were grouped in smokeless tobacco consumption and tobacco smoking, clinical evaluation, and Treadmill test was performed.

Clinical assessment and evaluation

All participants underwent a clinical and neuropsychiatric assessment at Department of Psychiatry, Sanjay Gandhi Memorial Hospital Rewa. A clinical assessment was performed, determine the age at onset of tobacco use, amount, route of consumption, withdrawal symptoms if any, comorbid substance abuse, current medication status, medical history, Blood pressure, and pulse were recorded for all participants and a more detailed physical examination was also performed if indicated by the history.

Treadmill exercise test

The treadmill exercise test is also very useful tool as a screening procedure for evaluation of latent coronary artery tool and healthy individuals who are considered to be at possible risk for coronary artery disease. Latent coronary artery diseases evaluated with Treadmill exercise test, based on promise, that exercise increase myocardial oxygen demand, which although adequate at rest, may be inadequate during exercise. The exercise can then result in relative myocardial ischemia. Consequently, E.C.G. manifestation which is normal or equivocal at rest may become abnormal and diagnostically significant with exercise. The E.C.G. recorder at rest and in response to exercise constitute the most important noninvasive, objective method for diagnosis of coronary artery disease.

Treadmill exercise test was performed following Bruce protocol. A 12-lead ECG was used and continuously monitored during the test, and blood pressure was recorded at rest and every 2 minutes during exercise and recovery. The Treadmill exercise test was considered positive when a horizontal or down sloping ST-segment with a depression ≥1mm occurred 0.08 seconds after the J point. The test was considered equivocal when an ST segment depression <1mm was observed, or when a left bundle branch block or premature ventricular beats >6beats/min were seen. The test was considered inconclusive if the patient failed to reach 85% of the predicted maximal heart rate for his or her age.

Statistical analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) 21.0 for Windows. The quantitative and qualitative variables were described as means, standard deviation and p value. The student t-test for parametric data and the w2 -test for nonparametric data was employed. All statistical tests were two-sided and the level for statistical significance was 0.05.

RESULTS

Data collected from 36 subjects, fulfilling inclusion and exclusion criteria of study and underwent clinical evaluation and treadmill exercise test. four subjects were unable to performed treadmill exercise test and treadmill exercise test result was nondiagnostic in three subjects.

Socio-demographic profile

As seen in Table 1 mean age of smoker vs smokeless 51.5±9.6 years vs 53.6±7.5 years. mean education year up to the level of high school. prevalence of smokeless tobacco was 35.3% in females. no female smoker was reported in the study sample. 41% subjects were separated or widow among smokeless tobacco users. two third of study subjects reside in urban area community.

Table 1: Socio-demographic characteristics.

Variable	Tobacco chewers (N=17)	Tobacco smokers (N=12)	X2/T
Age, Yrs [Mean (SD)]	53.6±7.5	51.5±9.6	0.73
Education, Yrs [Mean (SD)]	8.6±3.8	10.4±2.6	0.15
Sex [N (%)] Male	11 (64.7%)	12 (100%)	0.02
Female	6 (35.3%)	0	
Marital status [N (%)] Married	10 (58.8%)	10 (83.3)	0.16
Widowed/ separated	7 (41.2%)	2 (16.7)	
Religion [N (%)] Hindu	14 (82.4%)	12 (100)	0.12
Muslim	3 (17.6%)	0	
Family type Nuclear	8 (47.1%)	8 (66.7)	0.29
Extended/ joint	9 (52.9%)	4 (33.3)	
Residence [N (%)] urban	12 (70.6%)	8 (66.7)	0.82
Rural	5 (29.4%)	4 (33.3)	

Table 2: Clinical characteristics.

Variable	Tobacco chewers (n=17)	Tobacco smokers (n=12)	χ2/t
Duration of tobacco abuse, Yrs [Mean (SD)]	32.5±10.5	33.1±5.6	0.76
F/H/O Coronary artery disease Absent	14 (82.4%)	7 (58.3%)	0.15
Present	3 (17.6%)	5 (41.7%)	
H/O hypertension Absent	8 (47.0%)	5 (41.7%)	0.74
Present	9 (53.0%)	7 (58.3%)	
Resting ECG abnormality Absent	8 (43.0%)	7 (58.3%)	0.55
Present	9 (53.0%)	5 (41.7%)	
Medical symptoms Absent	8 (43.0%)	6 (50%)	0.88
Present	9 (53.0%)	6 (50%)	
Tread meal test Positive	6 (35.3%)	4 (33.3%)	0.73
Negative	11 (64.7%)	8 (66.7%)	

Clinical characteristics

Comparison of clinical characteristics (Table 2) reveals mean duration of tobacco use was 32.5±10.5 vs 33.1±5.6 smokeless tobacco users vs tobacco smokers, there was no statistically significant higher duration of smokeless tobacco users than smokers. 27.5% study subjects had the history of coronary artery disease, 55.2% subjects had essential hypertension, 50% subjects had resting E.C.G abnormality among them eight subjects had Sinus tachycardia, three had Ectopic beats, and 3subjects had Nonspecific ST-T Change. Treadmill exercise test was positive among 39.3% subjects and there was no statistically significant difference between smokers and smokeless tobacco users. Nearly 50% tobacco dependence subjects had medical complains, nine subjects reported atypical chest pain, eight reported breathlessness, four reported Peptic ulcer syndromes and nine subjects reported bowel disturbance.

DISCUSSION

The atherosclerosis being natural phenomenon involves the vascular system of the body with the advancement of the age, it is enhanced by various factors. Tobacco is thought to be atherogenic and its prolonged consumption in any form leads to early occlusion of the coronaries and may lead to myocardial damage. The treadmill test is presently the simplest, least expensive and sensitive, noninvasive screening test for the early detection of latent ischemic heart disease. The study sample consists of the chronic tobacco chewing and smokers. Khani and Guttka was the most common form of tobacco chewing and bidi was the most common form of tobacco smoking.

Atypical chest pain and bowel habit disturbance were most common physical symptoms among tobacco chewers and smokers both, peptic ulcer syndrome was other symptoms. The incidence of positive results of treadmill test was 35% in tobacco chewers vs 33% in smokers and there was no significant difference. In previous study 18% tobacco smokers show positive Treadmill test.[17] The duration of smoking and number of cigarettes/bidis smoked per day were directly proportional to the incidence of a positive stress test. In the previous study, the duration of tobacco chewing, or smoking was less in comparison to this study may be one of the important cause of high prevalence positive treadmill test. This was one of unique kind of study to compare the treadmill test in age and duration of the substance use matched case-control study. The result of this study indicated that among tobacco dependence subjects tobacco chewers had the significantly higher risk of latent coronary artery disease similar to tobacco smokers. Cardiac evaluation of tobacco dependence subjects is the warrant for early detection of latent coronary artery disease and mitigate cardiac mortality related to tobacco dependence subjects.

CONCLUSION

In conclusion screening test for coronary artery disease is the important tool for early detection of cardiac illness and significantly reduces cardiac morbidity and mortality in tobacco dependence subjects.

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