Palatal Mucosal Changes among Reverse Smokers in an Indian Village

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The smoking habits of 324 villagers of Uppada, East Godavari District, A.P., India, and their effect on the palatal mucosa leading to cancer, were studied. The frequency of reverse smoking (i.e., smoking with the lighted end inside the mouth) was 6.23 times higher in females than in males. The frequency of preleukoplakia was 2.26 times higher, that of leukoplakia was 13.84 times higher, and that of stomatitis nicotina was 7.13 times higher in reverse smokers than in regular smokers. These frequencies are lower compared to earlier studies done in the 60's and 70's in the districts of Visakhapatnam and Srikakulam.

Key words: Reverse smoking — Premalignant lesions — Epidemiology

Addapoga or reverse smoking of a locally made cigar (chutta) with the lighted end inside the mouth is a common habit among the rural people of north coastal Andhra Pradesh. The association of reverse smoking with carcinoma of the hard palate was first noted by Kini and Rao.¹⁾ Mehta *et al.*²⁾ commented that reverse smoking in India was found only in Andhra Pradesh. The reverse smoking of chutta produces changes in the mucosa of the hard palate due to pyrolytic products of tobacco, and heat acts as a co-carcinogen.³⁾ Precancerous and cancerous lesions of the hard palate due to reverse smoking were studied in the Visakhapatnam area⁴⁾ and in Srikakulam district.⁵⁾ The present study was undertaken in 1988 in the neighboring district of East Godavari, Andhra Pradesh, India.

The National Cancer Control Programme⁶⁾ of India envisages the primary prevention of tobacco-related cancers, and the present study is a part of our work aimed at designing a programme for prevention of carcinoma of the hard palate induced by reverse smoking of chutta.

MATERIALS AND METHODS

Uppada is a coastal village in East Godavari District, Andhra Pradesh, inhabited by fishermen and weavers. The survey team comprising of the researchers, volunteer doctors and non-medical volunteers, has set up a health camp in the fishermen's colony. All the 1,012 households in the village were informed and invited to visit the camp. Only 78 families attended the camp and no selection was made by the researchers. The families were examined and the details regarding identification, socio-economic status, smoking and drinking habits, usage of green-yellow vegetables in the diet and physical examination results were recorded on a printed proforma. Clinical photos were taken as necessary. Persons with malignant

lesions were referred to the cancer clinic of the Government General Hospital, Kakinada, and the remaining persons were treated at the camp.

Chutta Chutta (Telugu name) is a home-made cigar. Tobacco strands are rolled with sun-dried tobacco leaf as a cover into a cigar, which measures 10-14 cm in length and 1 cm in diameter. It is lighted at one end and after a few puffs to ensure that it is alight, it is reversed and the lighted end is kept in the mouth and held between the teeth. This practice of reverse smoking is called addapoga (Telugu).

Premalignant lesions of the hard palate The palatal mucosa was examined in daylight, using mirrors, and the pathological lesions were described using the following terms.

Preleukoplakia The early change in the palatal mucosa appears brownish or brownish white and the line of demarcation is diffused in preleukoplakia.⁷⁾

Stomatitis nicotina Stomatitis nicotina, first described by Thoma⁸⁾ in cigar smokers, is a mucosal lesion of the hard palate, where papular elevations have central umbilications with or without pigmentation. It is considered to be a precancerous lesion in reverse smokers of chutta.⁹⁾

Leukoplakia Leukoplakia is also observed in the mucosa of the hard palate due to reverse smoking of chutta. Any white patch, measuring 5 mm or more, which cannot be scraped off the mucosa is called leukoplakia.⁷⁾ Premalignant nature of the leukoplakia, as evidenced by a high frequency of epithelial atypia, was noted by Pindborg *et al.*^{5,7)}

Malignant lesions of the hard palate Carcinoma of the hard palate was first noticed to be associated with addapoga (reverse smoking) by Kini and Rao¹⁾ and subsequent work by Reddy *et al.*⁹⁾ established the epidemiological link between reverse smoking and occurrence of carcinoma of the hard palate. An ulcer or a growth in the hard palate with malignant features is noted as cancer.

Biopsy was not feasible in the field as consent was not readily forthcoming.

Statistical methods Chi-square analysis was performed to examine the significance of the relationships between reverse smoking and occurrence of precancerous and cancerous lesions.¹⁰⁾

RESULTS AND DISCUSSION

1. The relation of reverse smoking to carcinoma of the hard palate was reappraised with a view to designing a programme of primary prevention. 2. The survey was carried out in April, 1988 in East Godavari district. Previous surveys were carried out by Ramulu *et al.*⁴⁾ in 1972 in the Visakhapatnam district and by Pindborg *et al.* in 1971 in Srikakulam.⁵⁾ 3. The village of Uppada, inhabited by fishermen and weavers, has a population of 5,062 with 1,012 households. Out of 78 families studied, 9 families were non-smoking families and 69 families with 324 members had 99 smokers. There were 59

Table I. Age and Sex of Smokers: Uppada Village

Age (years)	Males	Females	Total
0-10	0	2 (5)	2
11-20	5 (8.5)	2 (5)	7
21-30	16 (27.1)	9 (22.5)	25
31-40	10 (16.9)	9 (22.5)	19
41-50	18 (30.5)	10 (25)	28
51-60	7 (11.9)	7 (17.5)	14
Above 61	3 (5.1)	1 (2.5)	4
Total	59 (100)	40 (100)	99

Percentages are shown in parentheses.

Table II. Prevalence of Smoking Habits and Lesions of Hard Palate

Group		Nature of the sample	No. of persons in the sample	% of total sample	% of total population
Total smokers		Both sexes	99	100	30.6
Male smokers		Regular smokers	38	38.4	11.7
		Reverse smokers	21	21.2	6.5
Female smokers		Regular smokers	9	9.1	2.8
		Reverse smokers	31	31.3	9.6
Smokers with palatal mucosal changes					
Males	Regular smokers	Palate normal	10	10.1	3.1
		Preleukoplakia	19	19.2	5.9
		Leukoplakia	3	3.0	0.9
		Stomatitis nicotina	6	6.1	1.9
		Cancer	0	0	0
	Reverse smokers	Palate normal	1	1.0	0.3
		Preleukoplakia	4	4.0	1.2
		Leukoplakia	8	8.1	2.5
		Stomatitis nicotina	8	8.1	2.5
		Cancer	0	0	0
Females	Regular smokers	Palate normal	4	4.0	1.2
		Preleukoplakia	2	2.0	0.6
		Leukoplakia	1	1.0	0.3
		Stomatitis nicotina	2	2.0	0.6
		Cancer	0	0	0
	Reverse smokers	Palate normal	5	5.0	1.5
		Preleukoplakia	6	6.0	1.9
		Leukoplakia	9	9.1	2.8
		Stomatitis nicotina	10	10.0	3.0
		Cancer	1	1	0.3

Population: 324. Number in sample: 99.

(18.21%) male smokers and 40 (12.35%) female smokers. The number of regular smokers was 47 (14.5%) and that of reverse smokers was 52 (16.05%). The ages of the smokers are given in Table I.

Prevalence of smoking (Table II) Our survey at Uppada in East Godavari District showed that the frequency of reverse smoking is 6.23 (90% confidence limits 2.98–13.04) times higher in females than in males (chi square 16.62, $P < 0.001$). The frequency of smoking is low compared to the rates reported in the neighboring districts of Visakhapatnam and Srikakulam. Ramulu *et al.*⁴⁾ reported that 25% of men and 50% of women smoked in the reverse fashion in the villages of Visakhapatnam. Pindborg *et al.*⁵⁾ studied smoking habits in twenty villages of Srikakulam district and reported that 29.67% of males and 2.38% of females smoked in the regular way and 34.8% males and 59.0% females smoked in the reverse way.

Frequency of premalignant lesions of hard palate (Table II) Normal mucosa of the hard palate was observed more often in regular smokers (14.1%) compared to reverse smokers (6%). Preleukoplakia, leukoplakia and stomatitis nicotina are considered premalignant lesions and a comparison of the frequencies of these mucosal lesions between regular smokers and reverse smokers is given below.

Preleukoplakia: Frequency was 2.26 (0.61–8.36 at 95% confidence interval) times higher in reverse smokers

than in regular smokers (chi square 1.04, $P < 0.05$).

Leukoplakia: Frequency was 13.84 (3.79–50.53) times higher in reverse smokers than in regular smokers (chi square 11.15, $P < 0.01$).

Stomatitis nicotina: Frequency was 7.13 (2.19–23.26) times higher in reverse smokers than in regular smokers (chi square 7.46, $P < 0.01$).

The difference in prevalence rates of premalignant lesions of the hard palate between this and previous studies was probably due to a difference in the prevalence rates of smoking habits in different geographic locations. The location of the present study is 300 km from Srikakulam, and Pindborg *et al.* conducted their survey 18 years earlier.

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