



## Rhinal Snuff: A Possible Gateway for Sinonasal Malignancy

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### Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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Case Study

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### ABSTRACT

**Aim:** To present a case report of malignancy of maxillary antrum invading the oral cavity associated with the habit of nasal snuff.

**Presentation of Case:** We describe here a case of a 40-year-old man who developed malignancy of maxillary antrum invading the hard palate after 20 years of snuff usage. He reported to our Department with the chief complaint of swelling and nasal discharge from right nostril since 4 months. On further questioning, patient revealed that he noticed swelling on the right middle 1/3<sup>rd</sup> of the face along with clear watery discharge from right nostril. Simultaneously, he also noticed a small pea sized swelling on the surface of hard palate which was gradual in onset and progressed to attain the present size.

**Discussion:** Use of smokeless tobacco products is common worldwide, with its increasing consumption in the developing countries and nasal snuff being the primeval form. Malignancy of the maxillary antrum is an uncommon neoplasm with a small percentage of occurrences. Different studies revealed that continuous use of nasal snuff proved to be carcinogenic.

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**Conclusion:** Malignancy of maxillary antrum is relatively uncommon and its treatment poses several challenges to the head and neck surgeons, radiotherapists and medical oncologists. Nasal snuff is a deleterious habit and its prolonged usage proves to be fatal to the patient's life, as happened in this case. Hence the use of tobacco in any form should be condemned in the society.

*Keywords: Nasal snuff; maxillary antrum; sinonasal malignancy; smokeless tobacco; nicotine; carcinogenic.*

## 1. INTRODUCTION

Through the ages, use of tobacco is a great health problem and has been used extensively by communities in various forms, the most common being the smoking and smokeless tobacco. The major difference between smoking and the smokeless forms of tobacco is the absence of carbon monoxide and oxides of nitrogen and tar. Smokeless tobacco is consumed without burning the product and is ingested either orally or nasally. Among them, nasal snuff being the oldest form [1]. The inhalation of nasal snuff is a common addiction in the Indian subcontinent because a large variety of homemade snuff is easily available. Snuff is made from ground or pulverized tobacco leaves. It is insufflated or "snuffed" into the nasal cavity, delivering a swift hit of nicotine and a lasting flavored scent. According to various literatures, some people consider nasal snuff as a safe alternative of smoking as well as chewing tobacco, but this rare habit of nasal snuff proves to be carcinogenic for paranasal sinuses [2].

Majority of the paranasal sinus malignancies originate from maxillary antrum, of which squamous cell carcinoma is the commonest histological variety [2]. Malignancy of maxillary antrum is a relatively rare neoplasm, representing a small percentage (0.2%) of human malignant tumors [2,3]. The incidence seems to vary in different parts of the world, with highest number of cases being reported in the developing countries [3].

Publications on the incidence of malignancy of maxillary antrum and its relation to taking nasal snuff have been reported very rarely because of the limited spread of this form of tobacco abuse today [3]. We now report a case of malignancy of maxillary antrum invading hard palate with special emphasis laid on usage of nasal snuff.

## 2. CASE REPORT

In October 2015, a 40-year-old male patient presented to the Department of Oral Medicine

and Radiology with the chief complaint of swelling and nasal discharge from right nostril since 4 months. On further anamnesis, patient revealed that he noticed swelling on the right middle 1/3<sup>rd</sup> of the face along with clear watery discharge from right nostril. Simultaneously, he also noticed a small pea sized swelling on the surface of hard palate which was gradual in onset and progressed to attain the present size.

Further questioning revealed that the patient had habit of using nasal snuff since 20 years, with a frequency of 3 to 4 times per day. His medical as well as dental history was irrelevant and vital signs were normal.

Clinical examination showed slight swelling on the right middle 1/3<sup>rd</sup> of the face [Fig. 1]. Two right submandibular lymph nodes were palpable, approximately 1x1.5 cm in size, firm in consistency, non-tender, non-indurated and mobile. Intraorally, a single ulcerative growth was present on right posterior slope of hard palate, roughly oval in shape measuring approximately 4x4 cm crossing the midline. Its medio-lateral extension was 1.5 cm away from 25, 26 to alveolar bone of right maxilla and further extending upwards involving upper right vestibular region. Surrounding mucosa appeared normal [Fig. 2]. On palpation, inspeitory findings with respect to site, shape, size and extent were confirmed. Margins were irregular and the ulcer was tender and bleeding on palpation was also evident. An initial impression of malignancy of maxillary antrum was made.

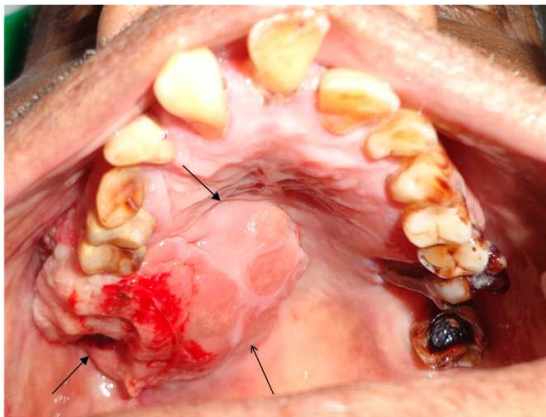
Differential diagnoses of mucoepidermoid carcinoma, acinic cell carcinoma and adenoid cystic carcinoma were considered.

These diagnoses were ruled out as mucoepidermoid carcinoma mostly involves parotid gland and causes facial nerve palsy, lacrimation, trismus and drooling of blood tinged saliva. Acinic cell carcinoma was not considered because it has a strong predilection for females, mostly involves the superficial lobe of parotid gland and the most common intra oral sites are lips and buccal mucosa. Adenoid cystic

carcinoma was also ruled out as no facial nerve paralysis was seen and mostly it is not associated with the habit of nasal snuff.



**Fig. 1. Front profile of the patient showing swelling on the right side of middle 1/3<sup>rd</sup> of the face**



**Fig. 2. Intra oral ulcerative growth present on the hard palate and right alveolus**

Panoramic radiograph revealed a radiolucent shadow measuring 3x3 cm on right half of maxilla involving the palate and the maxillary antrum. There was destruction of right maxillary alveolus [Fig. 3].

Water's view showed a well-defined radio opacity extending into the right maxillary antrum with obliteration of the sinus space and destruction of lateral wall of the nose and medial wall of the orbit [Fig. 4].

The Chest X-ray showed multiple enlarged hilar lymph nodes suggestive of lung metastasis [Fig. 5]. T<sub>4</sub>N<sub>2a</sub>M<sub>1</sub> staging was given.

CT Scan showed a hypo dense lobulated soft tissue mass of approximately 6x6 cm in size in the right maxillary cavity causing significant surrounding bony destruction with destroyed bony maxillary walls, right lateral nasal wall, right maxillary alveolus, right nasal cavity and masticator space [Fig. 6].

Biopsy specimen (10x) revealed stratified squamous epithelial cells invading the deeper connective tissues showing numerous keratin pearls [Fig. 7].

Based upon the above investigations, final diagnosis of well differentiated squamous cell carcinoma of maxillary antrum involving hard palate was reached. Patient was referred to Jawaharlal Nehru Cancer Hospital where 6 cycles of chemotherapy were advised for the patient followed by palliative care for his terminal illness. Later, patient succumbed within 6 months time.

### 3. DISCUSSION

Sinonasal malignancies are very difficult to diagnose and are associated with a poor prognosis. Although, majority of these malignancies are locally advanced because its symptoms are nonspecific [4]. They are often confused with allergies or sinus infection and are neglected for a long time. They tend to remain localized to maxillary antrum and during evolution they invade adjacent structures such as bone, base of the skull, facial soft tissue, oral cavity, and orbits, hence the first line of treatment remains to be radiotherapy followed by surgical intervention and reconstruction [4,5]. Sinonasal malignancy has a predilection for males with a ratio of 2.3:1 and the mean age of occurrence being 64 years [6].

These malignancies are mostly caused due to intake of nasal snuff which are available in various ranges of texture and moistness, from very fine to coarse and from dry to very moist. The most popular use of snuff is to take a pinch between the thumb and forefinger and snuff it into the nose [7,8]. Nasal application of dry snuff comprises intricate sensorimotor rituals, which provide further motivation for the user. This habit became more prevalent in the society because it is significantly more enjoyable than smoking as it gives a unique short lasting feeling of lightheadedness, which is not seen in smokers or after oral intake [9]. The constituents of snuff responsible for malignancy are uncertain but a prime suspect is N – nitroso-nor-nicotine (NNN) with tumor initiating properties. It is present in

relatively higher amounts in snuff as compared to other forms of tobacco [10,11].

Nicotine is the main psychoactive substance in tobacco. It is absorbed very rapidly through the

nasal mucosa into the maxillary sinus and within 10 minutes, blood nicotine concentrations are higher than that of smoked tobacco [12]. The variation of nicotine consumption depends on the strength of snuff, the size of the pinch, and the



**Fig. 3. Orthopantomograph showing a radiolucent shadow on right half of maxilla involving the palate and the maxillary antrum with the destruction of right maxillary alveolus**

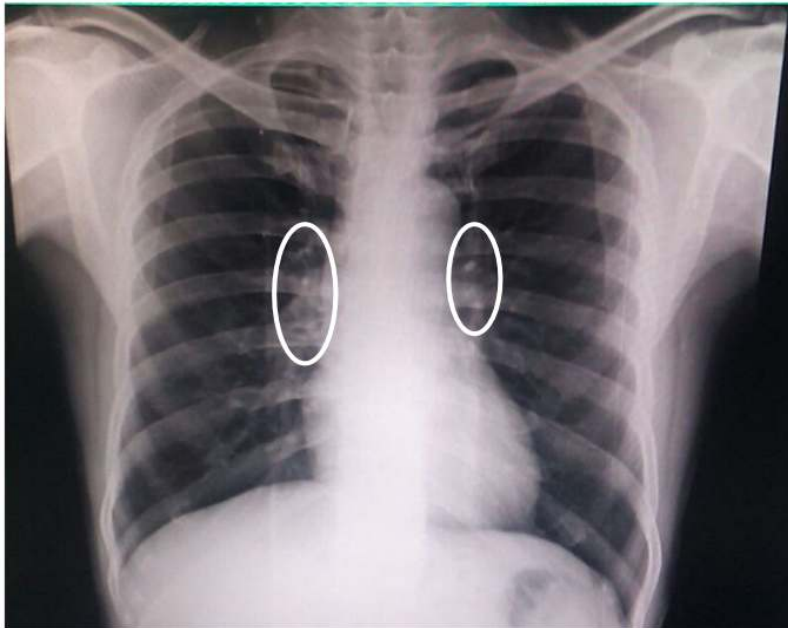


**Fig. 4. Water's view showing a well-defined radio opacity extending into the right maxillary antrum with obliteration of the sinus space and destruction of lateral wall of the nose and medial wall of the orbit**

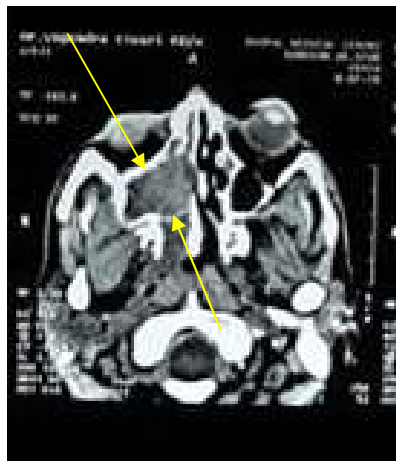
way it is snuffed. The nasal absorption of nicotine is influenced strongly by the pH of the snuff, if alkaline the nicotine is completely protonated and the rate of absorption is very high [13].

For some people snuff may be a satisfactory and acceptable substitute for cigarette smoking, but it will not decrease the number of cancers

seemingly caused by tobacco usage, it will merely change the site of occurrence [14,15]. The close proximity of usage of nasal snuff and it being the most important rationale of sinonasal malignancies, makes it life threatening and fatal for many people as happened in the above reported case. "Early detected is well cured" is the key to success for such cases.

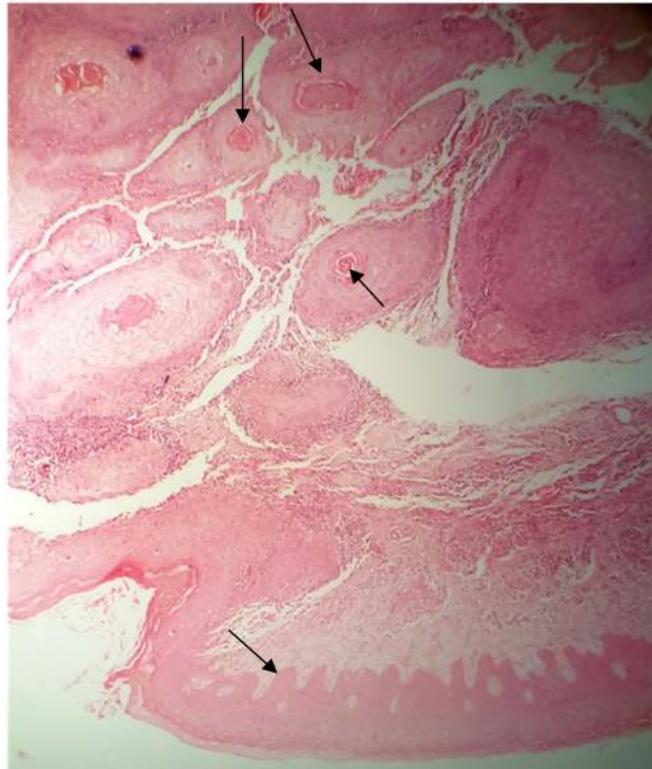


**Fig. 5. The chest X-ray showing multiple enlarged hilar lymph nodes suggestive of lung metastasis**



**Fig. 6. CT Scan (transverse section) showing significant bony destruction with destroyed bony maxillary walls, right lateral nasal wall, right maxillary alveolus, right nasal cavity and masticator space**





**Fig. 7. Biopsy specimen (10x) revealed stratified squamous epithelial cells and numerous keratin pearls**

#### **4. CONCLUSION**

Malignancy of the maxillary antrum is relatively uncommon and its treatment poses several challenges to the head and neck surgeons, radiotherapists and medical oncologists. The reasons for the poor outcomes are that they often present in advanced stages, the complex anatomy and the close proximity of critical structures compromise effectual surgical excision and radiation deliverance, and substantial uncertainty surrounds fundamental aspects of treatment, hence the optimal therapy remains to be defined. Conflicting ideas are found concerning the uses of snuff, a substitute for other forms of tobacco as snuff does not contaminate the atmosphere for non-users but the long term use of nasal snuff induces malignant changes and its usage should not be promoted in the society.

#### **CONSENT**

As per international standard or university standard written patient consent has been collected and preserved by the authors.

#### **ETHICAL APPROVAL**

It is not applicable.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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