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ORIGINAL STUDY

Chronic Qat Chewing Effects on Nasopharynx, Oropharynx, and Laryngopharynx

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Abstract

Background: Qat (also known as khat, kat, or miraa) is a green plant (*Catha edulis*) that is planted mainly in East and South Africa, and the Arabian Peninsula. It is widely and traditionally consumed by people in some regions. It has general effects on different systems such as cardiovascular and nervous system. Local effects were mainly described in the oral cavity such as periodontitis and white keratotic lesions. Scarce studies proved its relationship with cancer development.

To date, there is a literature gap in reporting other local manifestations. In this study, the authors discuss additional local manifestations noted with chronic qat chewing.

Aim: In this study, the pharyngeal effects of chronic qat consumption were described.

Patients and methods: This study is a retrospective study retrieved from an ear, nose, and throat clinic records. All patients attending the clinic with a history of chronic qat chewing for more than 10 years were included in the study. Patients' complaints were analyzed for the presence of voice change, stridor, and dysphagia. Nasopharyngeal and laryngeal endoscopy were used to assess the velopharynx, oropharynx, epiglottis, aryepiglottic folds, and pyriform sinuses.

Results: This study included 22 patients. Most patients presented with muffled voice and stridor on exertion. More than half of the cases developed velopharyngeal stenosis. All cases had uvular edema, and associated deformities of the posterior pillar and the laryngeal structure were described.

Conclusion: Changes in the nasopharynx, oropharynx, larynx, and hypopharynx were noted in patients with chronic qat consumption.

Keywords: Kat effect in ENT, Khat effect in ENT, Local qat signs, Qat effect in ENT, Velopharyngeal stenosis

1. Introduction

Qat (also known as khat, kat, or miraa) is a green plant (*Catha edulis*) that is planted mainly in East and South Africa, Yemen, and Madagascar [1]. It is estimated that 10 million people around the world chew qat [2]. Qat chewing is considered a traditional habit by some countries such as Yemen. The WHO considered qat as a drug of abuse that can cause mild to moderate psychological dependence [3–5]. Qat consists of a number of chemicals in which cathinone, similar to amphetamine, is the main active component with a

sympathomimetic function [6]. It has general effects on the body such as rise in pulse rate and blood pressure and may predispose to myocardial infarction [7]. Local effects on the oral cavity such as periodontitis and white keratotic lesions as well as temporomandibular joint disorders were also reported [8]. Few studies prove a relationship between its consumption and cancer development [9].

To date, there is a literature gap in reporting local manifestations apart from those of the oral cavity. In this study, the authors discuss additional local manifestations noted in patients with a history of chronic qat chewing who presented to an ear, nose, and throat clinic (ENT).

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2. Patients and methods

This study is a retrospective study retrieved from an ENT clinic records, starting from July 2019 until December 2020. Consenting was not applicable as data were retrieved retrospectively from the surgeon's medical records while keeping the anonymity of the patients. All patients attending the clinic with a history of chronic qat chewing for more than 10 years were included in the study. Patients' complaints were analyzed for the presence of voice change, stridor, and dysphagia. Nasopharyngeal and laryngeal endoscopy were used to assess the velopharynx, oropharynx, epiglottis, aryepiglottic folds, and pyriform sinuses.

Cases with velopharyngeal stenosis (VPS) were graded according to Krespi and Kacker [10] grading as follows:

Grade I (mild): the lateral sides of the soft palate were adherent to the posterior pharyngeal wall.

Grade II (moderate): circumferential narrowing with 1–2-cm velopharyngeal opening.

Grade III (severe): complete fusion of the soft palate with the posterior and lateral pharyngeal walls with less than 1-cm velopharyngeal opening.

2.1. Statistical methods

Data were coded and entered using the Statistical Package for the Social Sciences (SPSS) (SPSS Inc., Chicago, Illinois, USA), version 25. Data were summarized using mean, SD, median, minimum, and maximum for quantitative data and using frequency (count) and relative frequency (percentage) for categorical data.

3. Results

This study included 22 patients, with a mean \pm SD age of 38 ± 10 years. A total of 19 (86%) subjects were males, whereas three (14%) cases were females. Details of the demographic characteristics are shown in Table 1.

Table 1. Demographic data of the presented cases.

	Demographic data
Age (years)	
Mean	38
SD	10
Minimum	20
Maximum	55
Sex [n (%)]	
Male	19 (86)
Female	3 (14)

Overall, 86% of patients (19 cases) presented with muffled voice, 82% (18 cases) had stridor on exertion, and 46% (10 cases) experienced dysphagia.

A total of 12 (55%) cases developed VPS, comprising 11 (50%) cases with grade I and one (5%) case with grade III.

All cases had uvular edema, and in 19 (86%) cases, the posterior pillar of the tonsillar bed was absent.

The epiglottis was deformed and prolapsed backward partially closing the airway in 19 (86%) cases, the aryepiglottic folds were shortened in 21 (96%) cases, and the pyriform sinuses were obliterated in six (27%) cases. Associated esophageal stenosis was present in one (5%) case, verrucous tongue cancer in one (5%) case, and hard palatal perforation in one (5%) case.

The summary of the symptoms and signs is shown in Table 2.

4. Discussion

Qat is predominantly cultivated in the Eastern, South African, and the Arabian Peninsula regions [11]. The Family Health Survey, carried out in Yemen in 2003, estimated that 58% of males and 29% of females over 10 years of age had tried qat chewing at some point in their life [12]. In this study, the mean age of the presenting cases was 38 (10 SD) years, and the male cases were 19 (86%), whereas the female cases were three (14%).

Although qat is traditionally consumed for social life in some countries, it has some hazardous effects on the body generally and on upper aerodigestive tract specifically. Chronic consumption affects the cardiovascular system (increases the risk for infarction and coronary spasm), the nervous system (tremors, insomnia, stroke, and psychosis), the

Table 2. Summary of symptoms and signs of the presented cases.

Clinical presentation	n	%
Symptoms		
Muffled voice	19	86
Stridor	18	82
Dysphagia	10	46
Signs		
Velopharyngeal stenosis		
Mild	11	50
Severe	1	5
Edematous uvula	22	100
Absence of posterior pillar	19	86
Deformed epiglottis	19	86
Shortened aryepiglottic folds	21	96
Obliterated pyriform	6	27
Esophageal stenosis	1	5
Tongue verrucous cancer	1	5
Palatal perforation	1	5

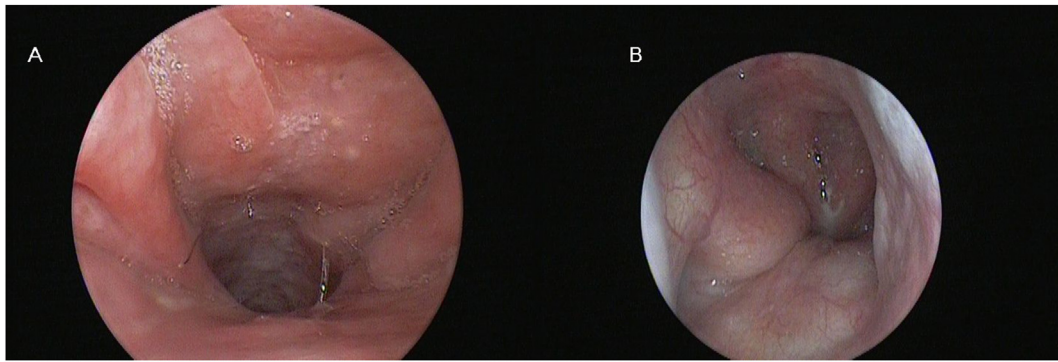


Fig. 1. Nasopharyngeal endoscopy showing two cases with velopharyngeal stenosis. (A) Mild (grade I) and (B) severe (grade III).

gastrointestinal system, the reproductive system, and the kidneys [11,12].

Locally, qat causes chemical and/or mechanical irritation with subsequent mucosal thickening, keratinization, periodontal pocket formation, and gingival recession [12]. Moreover, teeth discoloration, xerostomia, teeth attrition, and temporomandibular joint disorders have been reported with its chronic use [8].

To date, the authors could not find studies in the literature describing other local effects apart from the oral cavity. This study, focused on local symptoms and signs from an ENT perspective. Most patients presenting to the clinic had muffled voice (19 cases, 86%) and stridor on exertion (18 cases, 82%), whereas those complained of dysphagia were 10 (46%) cases. Nasopharyngeal endoscopy revealed mild VPS in half of the presenting cases (11 cases) and severe VPS was found in one (5%) case (Figs. 1 and 2). Oral examination showed uvular edema in all cases and melting of the posterior pillar to the

lateral pharyngeal wall in 19 (86%) cases. Laryngeal endoscopy gave the impression of circumferential laryngeal collapse, where the epiglottis, in 19 (86%) cases, was prolapsing backward, folded upon itself, and totally deformed and had granular surface in some cases. In addition, the arytenoids had granular mucosal surfaces and were pulled forward by shortened aryepiglottic folds in 21 (96%) cases (Fig. 3). The pyriform sinuses were melted and completely obliterated in six (27%) cases (Fig. 4). Other findings found in solitary cases were hard palatal perforation, esophageal stenosis, and verrucous tongue cancer.

The relation between qat and oral cancer development is debatable. Several studies suggested a relation between its consumption and development of premalignant/malignant lesions [11,12]. However, other studies did not find a direct association with oral malignancy [13,14]. One of the criticizing points for the studies that supported a relation between qat and oral malignancy is that they did not exclude confounders such as contamination by pesticides,

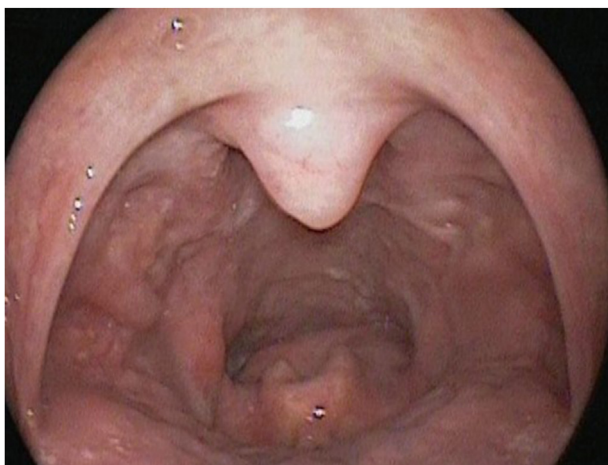


Fig. 2. Oropharyngeal endoscopy. Note the absence of posterior pillar on both sides, edematous uvula, the narrow velopharyngeal port behind the uvula, the folding, and backward prolapse of the epiglottis.

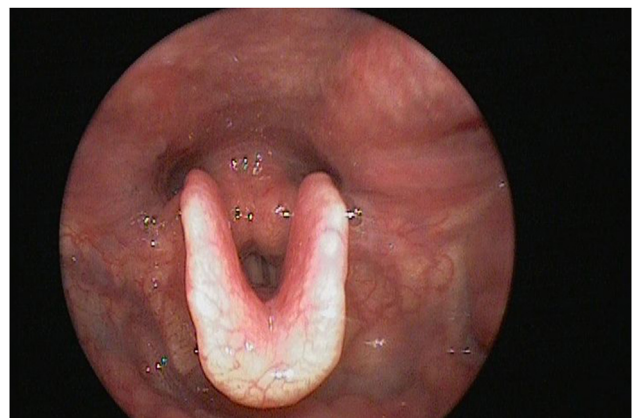


Fig. 3. Laryngeal endoscopy showing circumferential narrowing of the larynx with folded backwardly prolapsed epiglottis and short aryepiglottic folds.



Fig. 4. Laryngeal endoscopy showing deformed granular epiglottis with obliterated pyriform sinus on both sides.

which could be responsible for cancer development [9]. It is worth mentioning that some studies described antibacterial activity for qat against *Staphylococcus aureus* and *Mycobacterium spp.* as well as anticancer effect against leukemia [15].

This study was done in Egypt where this plant is not commonly planted or consumed. Therefore, collecting more data was a limiting factor. However, the similar clinical manifestations for the presented patients drove the authors' attention toward reporting these features, which could be a beginning for a future larger research recruiting more people from the affected countries.

4.1. Conclusion

Changes in the nasopharynx, oropharynx, larynx, and hypopharynx were noted in patients with chronic qat consumption.

Compliance with Ethical Standards

This research was done in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

Conflicts of interest

There are no conflicts of interest.

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