

ORIGINAL RESEARCH

Hoarseness of voice-an aetiopathological study with clinical correlation

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ABSTRACT

Background: Hoarseness is one of the first and only serious local and systemic disease. Hoarseness is defined as perceived, rough, harsh, breathy quality of voice. The pathophysiology of hoarseness is characterized by muscle tone related irregularity in the oscillation of the vocal cords owing to hypertonic dysphonia, incomplete closure of the glottis on vocalisation or an increase in vocal cord bulk, perhaps due to tumor^{1,2}. **Method:** It is a prospective study. 50 Patients selected on simple random selection technique, all patients between age group of 2-70 years with history of hoarseness of voice, attending E.N.T. outpatient department VIMS and patients referred from other departments in Vijayanagar Institute Of Medical Sciences combined group of Hospitals, Ballari, over a period from November 2019 to May 2021. **Results:** In our study, vocal cord polyp was most common lesion in 11 (22%) patients, next common is the vocal cord palsy seen in 10 (20%) patients, vocal nodule seen in 7 (14%) patients. 5 each patients had supraglottic malignancy (10%) and vocal cord growth (10%). Hypopharyngeal malignancy is seen in 3 patients (6%). Tonsillar malignancy seen in 2 patients (4%). One each patient was seen in epiglottic cyst (2%), subglottic malignancy (2%), laryngeal papilloma (2%), vocal cord haemangioma (2%), vocal cord haemorrhage (2%), reinke's oedema (2%) and vocal cord oedema (2%). **Conclusion:** In our study, vocal cord polyp was most common lesion, followed by common is the vocal cord palsy, vocal nodule, supraglottic malignancy, vocal cord growth, Hypopharyngeal, Tonsillar malignancy, epiglottic cyst, subglottic malignancy, laryngeal papilloma, vocal cord haemangioma, vocal cord haemorrhage, reinke's oedema and vocal cord oedema. And the aetiological factors were voice abuse, smoking, tobacco, beetel nut chewing

Key words: Hoarseness Of Voice, Vocal Abuse, Smoking, Tobacco, Malignancy.

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INTRODUCTION

Abnormal changes in the voice are called "hoarseness." When hoarse, the voice may sound breathy, raspy, strained, or show changes in volume or pitch (depending on how high or low the voice is). Voice changes are related to disorders in the sound-producing parts (vocal folds) of the voice box (larynx). While breathing, the vocal folds remain apart. When speaking or singing, they come together and, as air leaves the lungs, they vibrate, producing sound. Swelling or lumps on the vocal folds hinder vibration, altering voice quality, volume, and pitch³.

ETIOLOGY AND PATHOPHYSIOLOGY

Causative factors of hoarseness are numerous. Absence of complete voice during phonation-aphonia, is more likely traced to a neurologic or psychogenic origin than to an organic lesion. Lesions of the vocal folds more often produce vocal symptoms of gradual onset, frequently beginning intermittently and then becoming constant and occasionally worse with time. Patients may experience difficulty projecting their voice because of the presence of a vocal fold lesion or paralysis that interferes with glottic closure. In a patient with a normal laryngeal

examination, difficulty increasing vocal intensity may also reflect inadequate respiratory support because of primary disease of the lungs, lack of overall conditioning following illness, neurologic disorder, or improper technique. Production of a clear voice requires exquisite coordination between respiration, phonation, and articulation. Improper technique (for example, speaking while holding one's breath or with excessive muscle strain in the neck area) may result in dysphonia⁴.

On the other hand, singers with normal sounding speaking voices may seek professional evaluation because of singing voice (usually upper range) limitations. The significance of the vocal fold mucosal disorders derives from the voice's importance for spoken and/or sung communication and occupation, along with its contribution to identity.⁵

As a rule, the symptoms produced by benign and malignant neoplasms are a function of size and location relative to voice production and airway. Thus voice change and stridor are the most common complaints. Occasionally a feeling of a mass in the throat or a visible external swelling will be encountered. Clearly the location of the lesion will

determine any presenting complaints to a large degree.⁶

Gastrointestinal disorders are a common cause of voice complaints.^{4–7} Signs of laryngotracheal reflux include hoarseness that is worse on awakening in the morning and is associated with increased phlegm, heartburn, and frequent throat clearing.

Hormonal imbalances affect vocal production by causing an accumulation of fluid in the superficial layer of the lamina propria, which alters vibratory capabilities. Patients with hypothyroidism may present with abnormally low-pitched voices. Female patients may experience temporary vocal difficulties around menstruation, possibly related to fluid loading. The increased mass causes the vocal folds to vibrate slower resulting in a lower pitch level. The increased use of non steroidal anti-inflammatory drugs during menstruation may also predispose the patient to acute vocal fold haemorrhage. The pubertal growth period affects both males and females, resulting in a lower habitual pitch level. Hormonal changes experienced during menopause may also produce a lowering in the fundamental frequency⁴.

Chronic medical conditions may also affect the voice. Patients who are deconditioned because of cardiac or other major illnesses may not have sufficient pulmonary support to sustain and project their voice. Depending on the underlying etiology, symptoms may be improved with exercise. In addition, arthritis may affect the cricoarytenoid joint, resulting in pain when speaking, hoarseness, and limited pitch variation.

Psychological disturbances are frequently reflected in the voice and may be the primary cause of the presenting vocal disturbance. For example, the voice of depressed patients is typically reduced in loudness and prosody. Stress may also play a significant role. The ability to cope with the daily stressors of life may precipitate or perpetuate an existing voice disorder. In general, stress seems to worsen all problems but should not be overgeneralized as the underlying cause⁴.

MATERIALS AND METHODOLOGY

The study included patients attended ENT opd, Vijayanagara Institute of medical sciences, Bellary during November 2019 to May 2020. All the patients presenting with features of laryngeal disease i.e dysphonia/hoarseness, stridor, globus/foreign body sensation, dysphagia etc were evaluated by taking history, and thorough ENT and head and neck examination was done and subjected them for the procedure (direct/microlaryngoscopy) and biopsy for histopathologic examination after obtaining the written informed consent.

INCLUSION CRITERIA

All patients from 2-70 years with hoarseness of voice. All patients presenting with features suggestive of lesions of larynx (hoarseness, stridor, swelling in neck

,dysphagia etc) after taking complete history and examination on OPD and in patient proforma.

EXCLUSION CRITERIA

1. Age group less than 2 years and more than 70years.
2. All patients who failed for follow up.
3. All patients who did not give the consent for the procedure.
4. All the patients who were unwilling to participate in the study.

A written informed consent will be taken from all patients included in the study.

Detailed history-taking, thorough clinical examination will be done for these patients.

The data collected will be entered into a specially designed case record form.

Sampling technique- non probability purposive sampling.

Ethical Clearance has been obtained from Institutional Ethical Committee (IEC) of VIMS, Bellary.

SAMPLE SIZE ESTIMATION

A total of 50 consecutive patients of both sexes with age above 2 years and below 70 years from the period between December 2019 to May 2020, who were willing to participate in the study were taken as study subjects.

$$n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\epsilon^2}$$

Where

Z is the Z score

ϵ is the margin of error

N is population size

p is the population proportion

STATISTICAL ANALYSIS

Qualitative data represented in the form of frequency and percentage.

To assess the association between variables Chi Square test was used. If the cell were small Fisher's Exact test was used.

Continuous variables were represented as mean & Standard deviation.

A P value of <0.05 was considered statistically significant.

IBM SPSS Version 28 for windows was used to do statistical analysis.

RESULTS

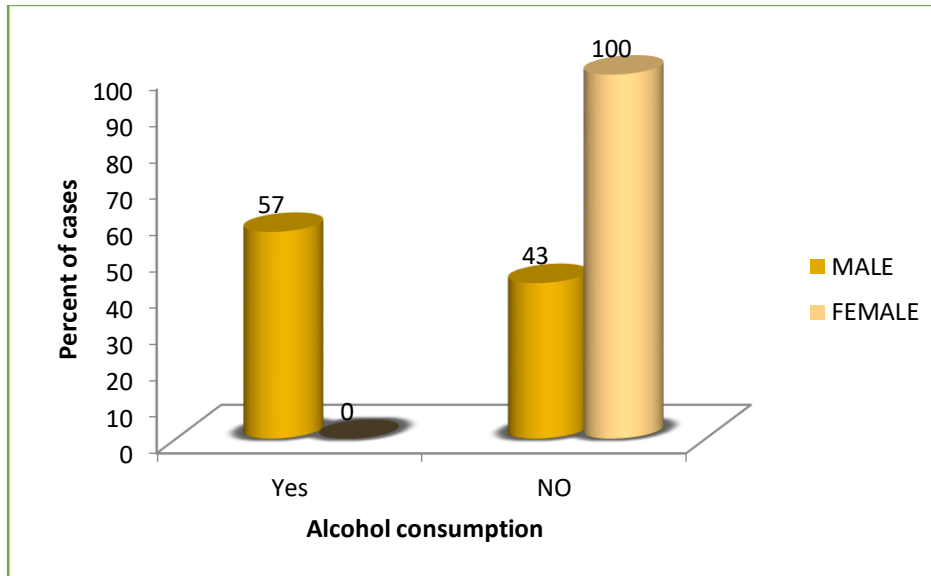
The study included 50 patients, conducted during the period of November 2019 to May 2021 at Department of Otorhinolaryngology, Vijayanagara Institute of Medical Sciences, tertiary care hospital the following results were noted.

Table 1 showing gender distribution among alcoholics

Alcohol use	No of cases	Male	Female
Yes	21	21 (57)	0
NO	29	16 (43)	13 (100)
TOTAL	50	37	13

FISHER'S EXACT T TEST P<0.001, HIGHLY SIG

Among alcoholics who contributed for 21(57%) male patients the mean duration of consumption was 480 months and average quantity of <100ml/ consumption(52.4%). The Fisher's exact T test with P value<0.001 with highly significant correlation with the disease.

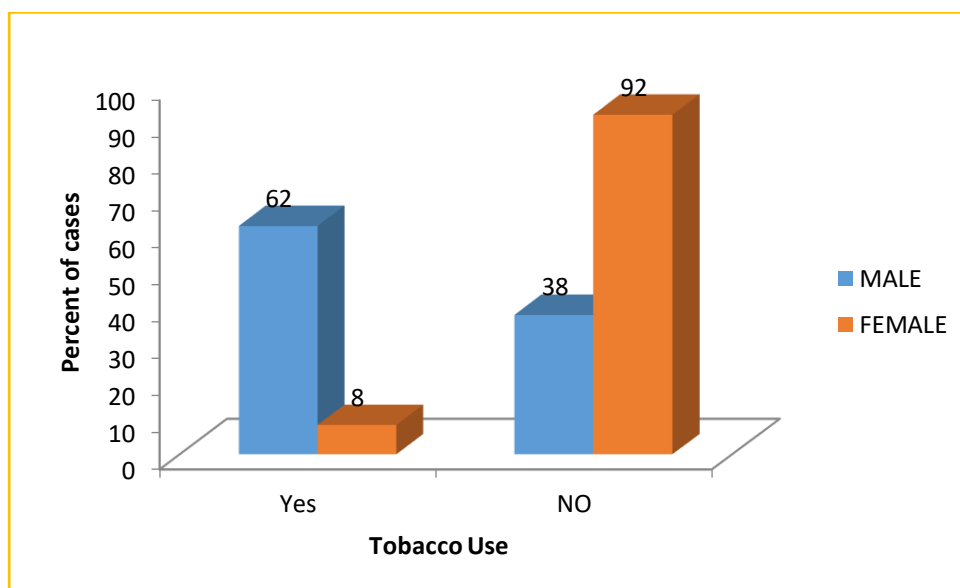


Graph 01– Bar graph showing gender distribution among alcoholics

Table 2 – Table showing distribution of gender studied with tobacco habits

Tobacco	No of cases	Male	Female
Yes	24	23	1
NO	26	14	12
TOTAL	50	37	13

FISHER'S EXACT TEST P<0.001, HIGHLY SIG

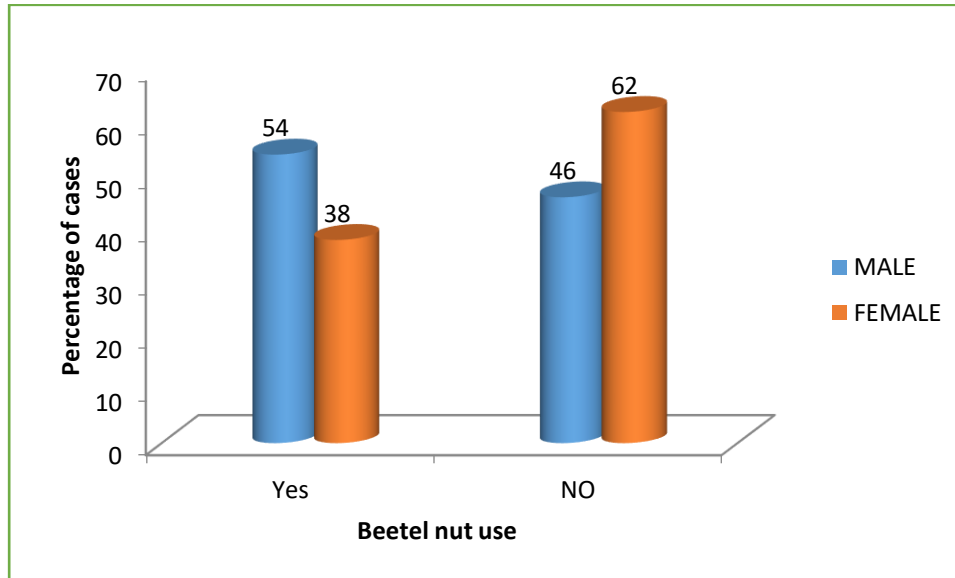


Graph 2- Bar diagram showing distribution of gender studied with tobacco habits

In our study use of tobacco study was noted in 24 patients (62%) with 23 male and 1 female patient and Fisher's exact T test P value <0.001 with highly significant.

Table 3– Table showing distribution of patients studied with betel nut habits

Beetel nut chewing	No of cases	Male	Female
Yes	25	20	5
NO	25	17	8
TOTAL	50	37	13
CHI SQUARE TEST P<0.001, HIGHLY SIG			

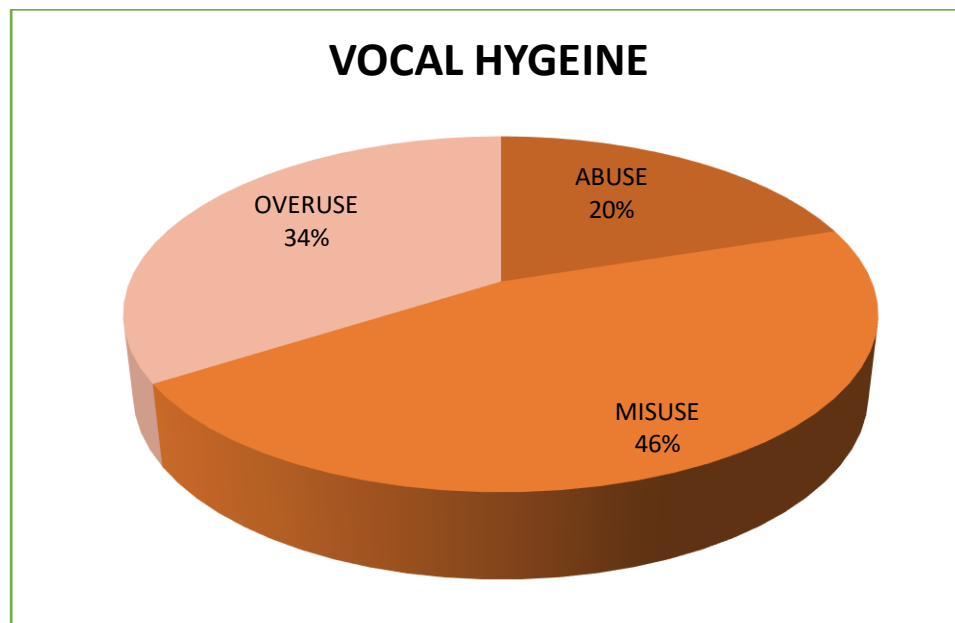


Graph 3– Bar diagram showing gender distribution among betel nut chewing patients.

In our study betel nut chewing was seen in 25 patients ,20 male(54%) 5 female(38%) ,and the Chi square test P value is <0.001 and it is highly significant.

Table 4– Table showing distribution of vocal status among patients

Vocal hygiene	No of cases	Percent
ABUSE	10	20.0
MISUSE	23	46.0
OVERUSE	17	34.0
TOTAL	20	100.0



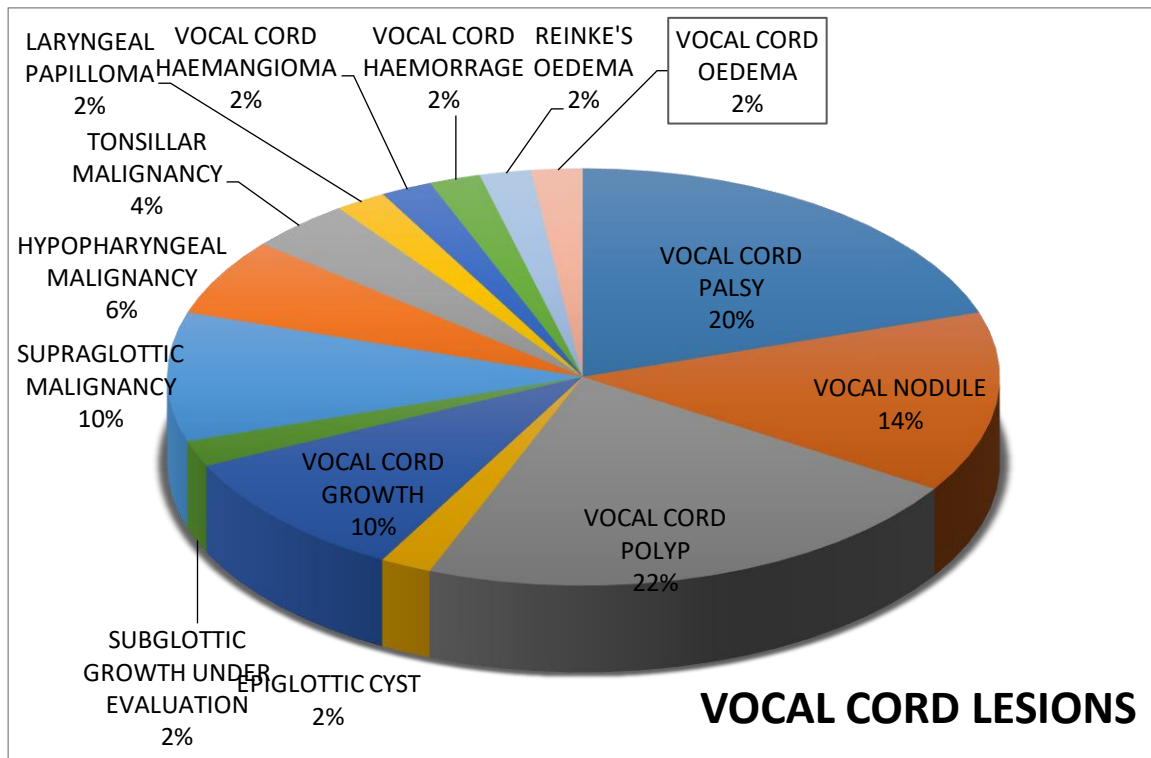
Graph 4- Pie chart representing distribution of vocal hygiene status among patients

With regard to status of vocal hygiene, vocal misuse was noted in most patients 23(46%) followed by voice overuse in 17(34%) and abuse in 10(20%) patients.

In our study the hoarse type of voice is the most common 29(58%) patients, muffled in 10 (20%) patients, breathy 8(16%) patients and husky in 3(6%) patients.

In our study, vocal cord polyp was most common lesion with 11 (22%) patients among them 8 male and 3 female, next common is the vocal cord palsy seen in 10(20%) patients , 5 male 5 female, vocal

nodule seen in 7(14%) patients among them 5 male and 2 female.5 each patients had supraglottic malignancy(10%) and vocal cord growth(10%) and all 10 patients were males. Hypopharyngeal malignancy is seen in 3 patients(6%) all were males. Tonsillar malignancy seen in 2 patients(4%) all were males. one each patients were seen in epiglottic cyst(2%), subglottic malignancy(2%),laryngeal papilloma (2%),vocal cord haemangioma (2%),vocal cord haemorrhage(2%), reinke'soedema(2%) and vocal cord oedema(2%).



Graph 5– Pie chart showing various type of vocal cord lesions in patients

DISCUSSION

Cigarette smoking causes a wide array of benign and malignant vocal pathologic changes, ranging from inspissated mucosal secretions to the development of malignancy. Smoking may result in the continuum from leukoplakic dysplasia to squamous cell carcinoma of the vocal fold, a condition that often presents with dysphonia as the chief complaint. Ingesting alcohol promotes dry mucous membranes, and alcohol may act as a cofactor with tobacco in the development of laryngeal malignancies. Limited water intake and high consumption of products containing caffeine also cause drying of secretions. In our study we have considered only tobacco smoking, tobacco chewing, beetel nut chewing and alcohol consumption. Smoking was noted in 15(36.58%) patients with mean duration 115.2 months and average quantity of 12.26 beedies/cigarettes/day. Among alcoholics who contributed for 11(26.82%) patients the mean duration of consumption was 67

months and average quantity of 87.27ml/ consumption. 4(9.75%) patients had a habit of consuming smokeless tobacco.

Baitha et al study showed chronic laryngitis 43.63%, acutlaryngitis23.63%, vocal cord paralysis 9.09%, TB laryngitis 5.40%, carcinoma14.54%, senile laryngitis 1.8%.⁷

Mehta et al showed chronic laryngitis 42.50%, vocal cord paralysis 9.16%⁸

Parikh et al showed chronic laryngitis 48%, acute laryngitis 9%, vocal cord paralysis 3%, TB laryngitis 23%, carcinoma 12%.⁹

In our study most common lesion are laryngeal malignancies with most common HPE of squamous cell carcinoma 15(53.6)patients, vocal cord polyp 8(28.6)patients and other pathologies like vocal cord papilloma 3%,vocal cord nodule 3%,vocal cord papilloma 3%, reinkesoedema 4% and epiglottic cyst 4%.

Dinesh Kumar Sharma(2011) concluded that ,Out of the 30 cases of squamous cell carcinoma, 15 (50%) were well differentiated, 8 (26.6%) were moderately differentiated and 3 (10%) were poorly differentiated¹⁰.

In our study , vocal cord polyp was most common with 11 (22%) patients, next common is the vocal cord palsy in 10 patients(20%),next is the vocal nodule in 7(14%) patients .5 patients had supraglottic malignancy (10%),5 patients had vocal cord growth (10%) , 3 patients had hypopharyngeal malignancy (6%), 2 patients were with tonsillar malignancy (4%). one each patients were seen in epiglottic cyst(2%), subglottic malignancy(2%),laryngeal papilloma(2%),vocal cord haemangioma(2%),vocal cord haemorrhage(2%),reinke'soedema(2%) and vocal cord oedema (2%).

In our study we did following investigations. All patients under went routine blood investigations and imaging like digital x ray neck chest, CECT neck and thorax according to appropriate clinical findings.

In our study patients were treated according to the pathology most of the benign lesions are treated conservatively 21(42%)patients and others lesions treated accordingly MLscopy biopsy 19(38%)patients ,DL scopy 6(12%) patients,with tracheostomy in 4 patients .

CONCLUSION

The etiology of hoarseness ranges from trivial infections to life threatening Malignancies. A sequential history, physical examination and appropriate investigations can lead to appropriate diagnosis. In our study , vocal cord polyp was most common lesion with 11 (22%) patients , next common is the vocal cord palsy seen in 10(20%) patients, vocal nodule seen in 7(14%) patients.5 each patients had supraglottic malignancy(10%) and vocal cord growth(10%). Hypopharyngeal malignancy is seen in 3 patients(6%). Tonsillar malignancy seen in 2 patients(4%). one each patients were seen in epiglottic cyst(2%), subglottic malignancy(2%),laryngeal papilloma (2%),vocal cord

haemangioma (2%),vocal cord haemorrhage(2%), reinke'soedema(2%) and vocal cord oedema(2%).

In our study the risk factors were voice hygiene vocal misuse 46%, voice overuse in 34% and abuse in 20% of patients. other risk factors include smoking in 68% predominant in males than female. Beetel nut chewing is seen in 50% patients,use of tobacco in 62%patients. Alcohol in 57% of patients.

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