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Original Research Article

The smoker's larynx: a histopathological study

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ABSTRACT

Background: Larynx of chronic smokers was clinically evaluated under high powered magnification as well as on histopathology to study the effect of fumes of nicotine on the vocal cords.
Methods: 32 chronic smokers undergoing Lewis suspension micro laryngeal surgery were selected from the laryngology clinics of Dayanand Medical College and Hospital, Ludhiana. Intraoperative findings were recorded and the specimens were sent for histopathological examination. The study was undertaken in a period of one and a half years (June 2009-December 2010).
Results: Maximum patients 31% (10 patients) underwent microlaryngeal surgery were smokers in the middle age group (40-50 years) and minimum 9.3% (3 patients) were above 60 years of age. Vocal polyp/polypoidal change was seen in 7 (21.87%) patients was the predominant finding followed by a chronic hypertrophic change 5 (15.62%) patients. leucoplakia 4 (12.5%) cases, tubercular caseation 3 (9.3%), vocal nodules 4 (12.5%) and vocal cysts 1 (3.125%) were the other findings in our series.
Conclusions: Nicotine fumes affect the epithelium of the vocal cord leading to hypertrophic or hyperplastic transition. Vocal cord polypoidal change, squamous cell carcinoma and chronic hypertrophic laryngitis, in that order were the lesion in our series.

Keywords: Vocal cords, Smokers, Hoarseness, Micro laryngeal surgery

INTRODUCTION

The habit of smoking has affected all age groups and genders and is prevalent throughout the world. Unmindful of the side effects either because of ignorance or over confidence it is spreading its tentacles day by day. Ranging from crude rolled up betel leaves, to well packaged cigarettes and cigars and inspite of various legislations, it is still rampant. Thermal as well as chemical irritation of the laryngeal mucosa, secondary to nicotine fumes elicits a cascade of changes in its lining. The lesions range from simple oedema to hypertrophic vocal cord to hyperplastic sequel. A suspicious gross appearance, categorised as premalignant, necessitates a micro-laryngeal biopsy and a regular follow up.

The benign glottic lesions are quite frequent. The ratio of benign to malignant as found in a retrospective study by Harell being 7:3 in the entire population.[1] In females it was 8:1. And in males it was 2:3 in the Shaw et al series.[2]

Objective

The objective was to study the histopathological findings in the laryngeal tissue in chronic smokers.

METHODS

In this prospective study 32 chronic smokers were selected from the laryngology clinics of Oto-rhino-laryngology and head neck services, Dayanand Medical College and

Hospital, Ludhiana. The study was undertaken in a period of one and a half years (June 2009-December 2010).

The subjects were taken up for Lewis suspension laryngoscopy and micro laryngeal excisions under general anesthesia, at 400× magnified vision. The excised tissue was sent for histopathological examination with haematoxylin and eosin staining.

The lesions were tabulated, accordingly.

Inclusion criteria

The study included chronic smokers.

Exclusion criteria

Patients with hypothyroidism, Koch chest, and malignant lesions were excluded from the study.

All the subjects belonged to the male gender and had a history of smoking more than 2 cigarettes a day, for a minimum of five years.

Statistics

All statistical calculations were done using statistical package of social sciences (SPSS) 17 version statistical program for Microsoft windows (SPSS Inc. released 2008. SPSS statistic for windows, version 17.0, Chicago).

Ethical approval of the study was taken from the institutional ethics committee.

RESULTS

There were 32 chronic male smokers in this study, and the under mentioned observations were made.

All the subjects belonged to the male gender and had a history of smoking more than 2 cigarettes for a minimum of five years.

Table 1: Age distribution of patients undergoing microlaryngeal surgery.

Age group	Number of patients	Percentage
20-30	5	15
30-40	7	21
40-50	10	31
50-60	7	21
>60	3	9.3

n=Total number of patients

Maximum patients 31% (10 patients) underwent microlaryngeal surgery were in the middle age group (40-50 years) and minimum 9.3% (3 patients) were above 60 years of age.

Table 2: Histopathological report of lesions in smokers (n=32).

S. no.	Lesions in smokers	No. of cases	Percentage
1	Vocal cord polypoidal change	7	21.87
2	Chronic hypertrophic laryngitis	5	15.62
3	Leukoplakia	4	12.5
4	Tubercular laryngitis	3	9.3
5	Vocal nodule	4	12.5
6	Vocal cyst	1	3.125
7	Squamous cell carcinoma	6	18.75
8	Amyloidosis	1	3.125
9	Reinke's edema	1	3.125

n=Total number of cases

Vocal polyp/polypoidal change was seen in 7 (21.87%) patients was the predominant finding followed by a chronic hypertrophic change 5 (15.62%) patients. Leucoplakia 4 (12.5%) cases, tubercular caseation 3 (9.3%), vocal nodules 4 (12.5%) and vocal cysts 1 (3.125%) were the other findings in our series.

Out of all the benign laryngeal lesions recurrence was more in patients with Reinke's edema, laryngeal web, 1eukop1akia and pachydermia laryngitis. These patients were taken up for revision surgery.

DISCUSSION

The human larynx is a unique organ and performs a wide spectrum of functions. The most vital being the maintenance and protection of airway and its role in normal respiration. It interacts in deglutition and coughing. The phonatory function has achieved the highest level of development in the human species. Any benign lesion of the larynx large enough to obstruct the laryngeal airway can threaten the life of an individual or may produce a disorder of voice, putting the livelihood of some (singers, teachers, and hawkers) in jeopardy.

New and Erich' suggested, the term "benign laryngeal tumor to include any abnormal mass of the tissue ·in the larynx, if it lacked the infiltrative qualities and characteristic of a malignant lesion.[3] Laryngoscopic biopsies performed at the Royal National Throat, Nose and Ear Hospital, London in 1978-1982 revealed that majority of the lesions were vocal cord polyps, nodules followed by squamous papillomata, keratosis, chronic laryngitis and cysts.[4]

There is often difficulty in deciding whether a swelling is inflammatory, degenerative, traumatic or neoplastic. Infact histological appearance of benign tumors serves a very useful basis for establishing a classification. Many polyps, papillary projections and diffuse.

vocal cord swellings appear as one group under the microscope. They are often edematous folds of laryngeal mucosa. The reverse is also true as documented by New and Erich.[3] The clinical appearance of many benign lesions may be identical, and it is only on histopathological examination the interpretation of the epithelial changes and cellular infiltration in the connective tissue is assessed.

Vocal nodules consist of fibrous connective tissue and organized inflammatory tissue covered with intact epithelium. Ash and Schwartz have attempted to follow the evolution of these lesions in four chronological stages i.e. fibroid, polyploid, varix, and hyaline.[5]

The larynx as a whole and the vocal cords in particular are especially prone to abuse due to, atmospheric pollution, smoking, alcohol intake, dust and fumes and misuse of voice. Over and above all these are the recurrent upper and lower respiratory tract infections, which considerably alter the course of the laryngeal disease. Strong emphasized the innocence and enthusiasm of children making it habitual for them shout with utter abandon, and the frustration of motherhood, making it difficult for women to restrain the volume of their vocal rebuke; probably account for the occurrence of nodules in children and house wives.[6] The professional use of voice with underlying tension, anxiety and important role in these individuals. The examinations of larynx has passed through many phases.

Bossini et al attempted to view the larynx with the aid of a mirror using sunlight or candle light.[7-9] Manual Garcia used previously warmed dental mirror and reflected sun light to view his own larynx and gave birth to indirect laryngoscopy.[10] It was made practical by Czermak.[11] The direct laryngoscopy with external lighting was developed by Kirstein and Killian.[12] In the middle of the 20th century magnification was introduced in laryngoscopy. Kleinsasser added a magnifying telescope to observe the epithelial and vascular changes of vocal cords and gave birth to micro laryngeal surgery.[13]

Jako and Kleinsasser spearheaded the development of wide bore laryngoscopes with fiber-optic illumination for use with the operating microscope.[14] Microscopic laryngoscopy and microsurgery of larynx came of age in 1970. While microscopic laryngoscopy is not a substitute for biopsy and histological examination, it greatly increases the likelihood of taking the biopsy from the dysplastic areas and reduces the need for repeat biopsies to the minimum. Precise surgery and preservation of function is an important and an attainable goal in cases of vocal cord nodules, polyps, cysts and granulomas. Areas of leukoplakia and localized keratosis may be removed with minimal damage to the underlying tissue.[6]

Mackenzie's comment that "the smaller the growth the greater the difficulty of its removal" is still pertinent today.[15] However a 1-2 mm nodule can be confidently excised without causing unnecessary damage to the microscopic laryngoscopy, elastic fibers of the cord or removing an excessive amount of normal epithelium. Using the usual arrangement of the surgical microscope fitted with, straight ocular tube, and 350-400 mm font lens and a Jake-Pilling or a Kleinsasser laryngoscope, the vocal cords can be viewed with 5× magnification using power setting of 10-16× on the microscope under general anesthesia.

In our series of 32 chronic smokers' vocal cord polypoidal change, squamous cell carcinomas, chronic hypertrophic laryngitis followed by leukoplakia were seen in that order. Leukoplakia and vocal nodules showed equal incidence. Moreover, other lesions reported on histology were tubercular laryngitis, vocal cyst amyloidosis and Reinke's edema.

CONCLUSION

Nicotine fumes affect the epithelium of the vocal cord leading to hypertrophic or hyper plastic transition. Vocal cord polypoidal change, squamous cell carcinoma and chronic hypertrophic laryngitis in that order were the lesion in our series.

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