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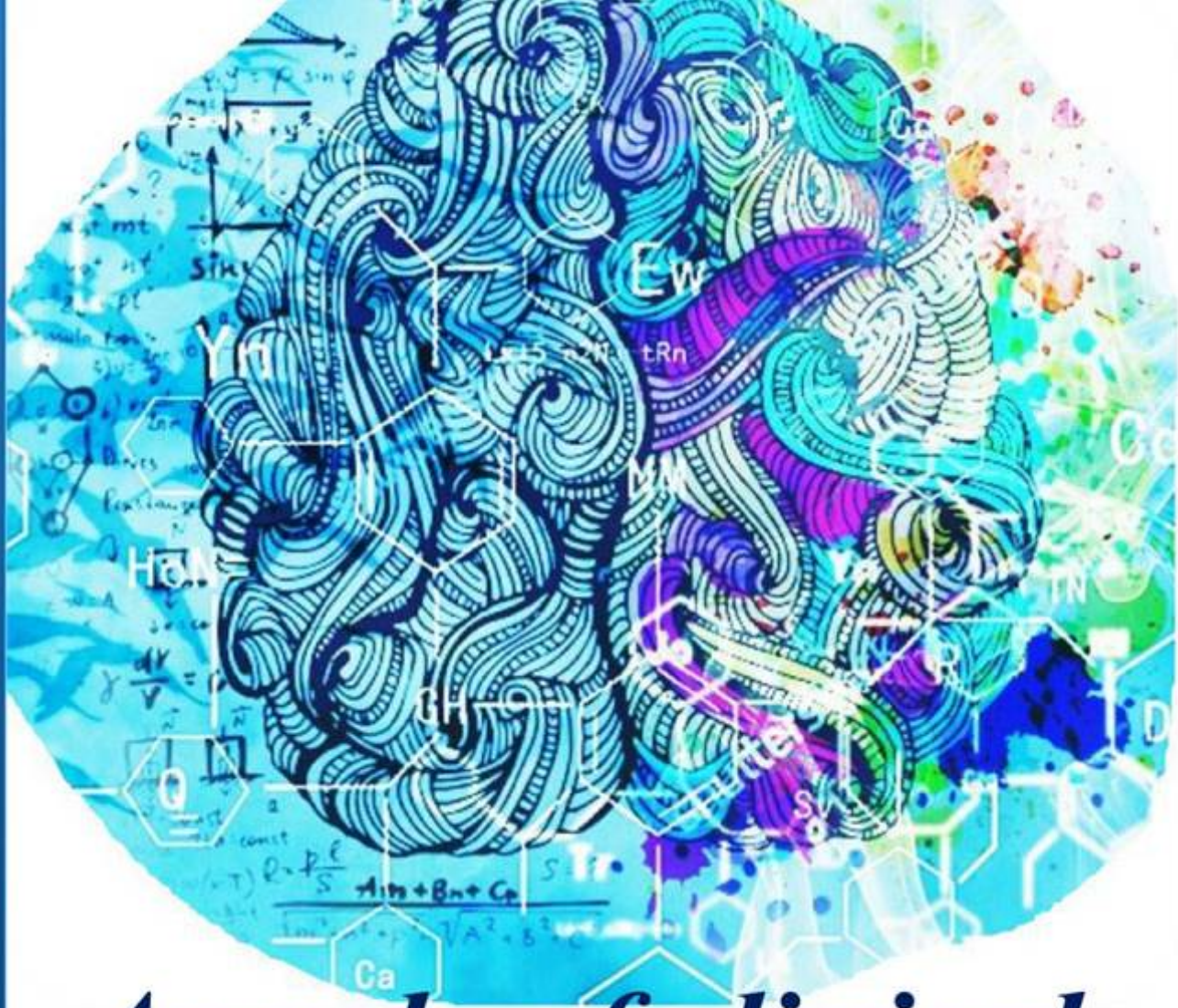

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CHRONIC HYPERTROPHIC LARYNGITIS LEUKOKERATOSIS AND LEUKOPLAKIA

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ANNOTATION

Chronic Hypertrophic Laryngitis (CHL) is a long-term inflammatory condition of the laryngeal mucosa that leads to thickening, hyperplasia, and epithelial changes. It is frequently associated with leukokeratosis and leukoplakia, both of which are considered precancerous lesions of the larynx. These conditions are of great clinical importance because early detection and management can prevent the development of laryngeal carcinoma, one of the most common malignancies of the upper respiratory tract.

Keywords: chronic hypertrophic laryngitis; leukokeratosis; leukoplakia; larynx; precancerous lesions; epithelial dysplasia; vocal cord pathology; chronic inflammation; keratinization; laryngeal cancer risk; voice disorders; histopathology; narrow band imaging (nbi); smoking; gerd.

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ХРОНИЧЕСКИЙ ГИПЕРТРОФИЧЕСКИЙ ЛАРИНГИТ, ЛЕЙКОКЕРАТОЗ И ЛЕЙКОПЛАКИЯ

АННОТАЦИЯ

Хронический гипертрофический ларингит (ХГЛ) — это длительное воспалительное заболевание слизистой оболочки гортани, приводящее к утолщению, гиперплазии и изменениям эпителия. Он часто сочетается с лейкокератозом и лейкоплакией, которые рассматриваются как предраковые поражения гортани. Данные состояния имеют большое клиническое значение, поскольку их ранняя диагностика и своевременное лечение

позволяют предотвратить развитие рака гортани — одного из наиболее распространённых злокачественных новообразований верхних дыхательных путей.

Ключевые слова: хронический гипертрофический ларингит; лейкокератоз; лейкоплакия; гортань; предраковые поражения; эпителиальная дисплазия; патология голосовых связок; хроническое воспаление; кератинизация; риск рака гортани; голосовые расстройства; гистопатология; узкополосная эндоскопия (NBI); курение; гастроэзофагеальный рефлюкс (ГЭРБ).

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SURUNKALI GIPERTROFIK LARINGIT, LEYROKERATOZ VA LEYKOPLAKIYA

ANNOTATSIYA

Surunkali gipertrofik laringit (SHL) — bu hiqildoq shilliq qavatining uzoq davom etadigan yallig‘lanish kasalligi bo‘lib, u epiteliy qatlamining qalinlashishi, giperplaziyasi va tuzilishdagi o‘zgarishlarga olib keladi. Ushbu holat ko‘pincha leyrokeratoz va leykoplakiya bilan birga kuzatiladi. Ular hiqildoqning saratondan oldingi (prekansyer) o‘zgarishlari sifatida qaraladi. Bu kasalliklar klinik jihatdan muhim ahamiyatga ega, chunki ularni erta aniqlash va davolash hiqildoq saratonining — yuqori nafas yo‘llarining eng ko‘p uchraydigan o‘sma kasalligidan birining — rivojlanishini oldini oladi.

Kalit so‘zlar: surunkali gipertrofik laringit; leyrokeratoz; leykoplakiya; hiqildoq; saratondan oldingi o‘zgarishlar; epitelial displaziya; ovoz boylamlari patologiyasi; surunkali yallig‘lanish; keratinizatsiya; hiqildoq saratoni xavfi; ovoz buzilishlari; gistopatologiya; tor polosali endoskopiya (NBI); chekish; gastroezofageal reflyuks (GERD).

Leukoplakia is clinically defined as a white or grayish lesion of the oral or mucosal surface that cannot be scraped off and cannot be characterized as any other definable disease. It is considered one of the most common potentially malignant disorders (PMDs) of the oral cavity. The condition arises primarily from chronic irritation of the mucosal epithelium, often linked to tobacco use, alcohol consumption, mechanical trauma, or poor oral hygiene. Histopathologically, leukoplakia may exhibit epithelial hyperkeratosis, dysplasia, or even early carcinomatous changes, depending on its duration and exposure to carcinogenic factors. Although many lesions remain benign, a significant percentage may undergo malignant transformation into squamous cell carcinoma, particularly those located on the tongue, floor of the mouth, or buccal mucosa. Early detection through biopsy and histological assessment, along with the elimination of risk factors, remains essential for preventing progression and improving patient prognosis. The development of leukoplakia is closely associated with a variety of environmental and lifestyle-related risk factors that chronically irritate the mucous membranes. Tobacco smoking remains the most significant etiological factor, as thermal injury and exposure to carcinogens such as polycyclic aromatic hydrocarbons and nitrosamines cause epithelial hyperplasia and dysplastic transformation. Alcohol abuse acts synergistically with tobacco by dehydrating and damaging mucosal tissue, facilitating the penetration of carcinogenic substances. Continuous vocal overuse and chronic laryngitis contribute to repetitive mechanical trauma and inflammation of the laryngeal and oral epithelium, promoting abnormal keratinization. Additionally, occupational or environmental exposure to chemical irritants—such as formaldehyde, asbestos, or acidic vapors—can lead to long-term mucosal injury and cellular mutation. The cumulative effect of these factors significantly increases the likelihood of

malignant transformation, particularly in individuals with compromised immune responses or pre-existing mucosal disorders.

Fibrosis of the lamina propria refers to the abnormal accumulation of collagen fibers and fibroblasts within the connective tissue layer that lies beneath the epithelial surface. In the context of leukoplakia or other chronic mucosal disorders, this process develops as a response to persistent irritation or inflammation, caused by factors such as smoking, alcohol, or chemical exposure. The continuous injury stimulates fibroblast proliferation and excessive extracellular matrix deposition, leading to thickening and stiffening of the lamina propria. Over time, this fibrotic remodeling disrupts normal tissue architecture, impairs nutrient diffusion, and reduces mucosal elasticity. Microscopically, the lamina propria exhibits dense collagen bundles, reduced vascularity, and occasionally chronic inflammatory cell infiltration. Clinically, such fibrosis may contribute to reduced mucosal mobility, voice changes, or delayed healing, and in precancerous lesions, it can alter the microenvironment, facilitating epithelial dysplasia and malignant transformation. Epithelial hyperplasia refers to an increase in the number of epithelial cell layers, resulting in visible thickening of the mucosal surface. In conditions such as leukoplakia, this change represents a reactive adaptation of the epithelium to chronic irritation or inflammation caused by agents like tobacco smoke, alcohol, mechanical trauma, or chemical exposure. The basal and parabasal layers exhibit enhanced mitotic activity, leading to the proliferation of keratinocytes and the formation of a hyperkeratotic surface. Although epithelial hyperplasia is a benign process, it signifies an early step in mucosal alteration that may precede dysplastic or neoplastic transformation if the irritant persists. Histologically, affected tissues show acanthosis (widening of the prickle-cell layer), parakeratosis or orthokeratosis, and occasionally elongation of rete ridges. These structural changes reduce epithelial flexibility and may alter the barrier and regenerative functions of the mucosa. Continuous monitoring and removal of predisposing factors are essential to prevent progression toward epithelial dysplasia and malignancy.

Leukokeratosis manifests as excessive keratin layer formation without severe dysplasia.Leukoplakia, however, may show a range of epithelial changes — from simple hyperplasia to severe dysplasia or even carcinoma in situ (CIS).Studies have demonstrated that up to 90% of laryngeal cancers develop from pre-existing precancerous lesions such as leukoplakia, erythroplakia, or chronic hypertrophic laryngitis.

Persistent Hoarseness or Rough Voice (Dysphonia)

Dysphonia, characterized by a persistent hoarse, rough, or breathy voice, often indicates functional or structural changes in the vocal apparatus. In patients with leukoplakia, chronic hoarseness commonly results from thickening or keratinization of the vocal fold epithelium, which interferes with the normal vibration of the vocal cords. Inflammatory processes, fibrosis of the lamina propria, or edema may further alter the mucosal wave and diminish phonatory quality. Long-standing exposure to tobacco smoke, alcohol, and chemical irritants leads to repeated epithelial trauma and impaired regeneration, aggravating dysphonia. Clinically, hoarseness that persists for more than two to three weeks—especially in individuals with risk factors—should prompt laryngoscopic examination to rule out premalignant or malignant lesions. Early identification and management of dysphonia are essential, as persistent voice changes can be an early manifestation of laryngeal leukoplakia or carcinoma in situ. White or Gray Patches on the Vocal Cords or Laryngeal Mucosa

During laryngoscopic examination, white or grayish patches observed on the vocal cords or laryngeal mucosa are characteristic clinical manifestations of laryngeal leukoplakia. These lesions represent areas of epithelial keratinization and hyperplasia resulting from chronic irritation or inflammation. Depending on the degree of keratin buildup and epithelial thickness, the patches may appear as smooth, flat plaques or irregular, elevated lesions with well-defined borders. They are firmly adherent to the underlying mucosa and cannot be rubbed off, distinguishing them from superficial deposits such as fungal infections or mucus. The location of these lesions—particularly when involving the anterior two-thirds of the vocal folds—can significantly impair vibration and phonation, leading to hoarseness or vocal fatigue. From a diagnostic perspective, such patches

warrant biopsy and histopathological evaluation to differentiate benign keratosis from epithelial dysplasia or early carcinoma, as leukoplakic lesions carry a measurable risk of malignant transformation. Chronic Cough, Throat Discomfort, or Mild Pain When Speaking or Swallowing

Patients with laryngeal or oral leukoplakia often present with chronic throat irritation, a persistent dry cough, or mild pain during phonation or swallowing. These symptoms arise from chronic inflammation and epithelial thickening of the mucosal surfaces, which increase local sensitivity and disrupt normal mucosal lubrication. Keratinized lesions and fibrotic changes in the lamina propria may cause friction and tension during vocal cord movement, leading to discomfort, especially with prolonged speaking. In some cases, secondary infection or mucosal ulceration further exacerbates pain and coughing. Unlike acute infections, the discomfort in leukoplakia tends to be gradual and persistent, often unresponsive to standard anti-inflammatory or antibiotic therapy. Such symptoms are important clinical warning signs, particularly in individuals with risk factors like smoking or alcohol use, as they may indicate early-stage epithelial dysplasia or incipient malignant transformation. Careful laryngoscopic assessment and targeted biopsy are essential for accurate diagnosis and timely intervention.

Laryngoscopy / Videostroboscopy — to visualize vocal cord vibration, mucosal texture, and lesion location. Laryngoscopy and videostroboscopy are essential diagnostic tools for the evaluation of laryngeal leukoplakia and other mucosal lesions of the vocal folds. These techniques allow direct visualization of the laryngeal structures, enabling detailed assessment of lesion size, shape, color, and distribution. Standard laryngoscopy provides a clear view of white or gray patches, mucosal thickening, and areas of incomplete glottic closure. Videostroboscopy, which uses synchronized flashing light to simulate slow-motion vocal cord vibration, offers additional functional information by revealing mucosal wave characteristics, vocal fold symmetry, and vibratory stiffness caused by keratinized or fibrotic lesions. Alterations in mucosal pliability and vibration pattern often correlate with the severity of epithelial hyperplasia or dysplasia. These diagnostic methods are indispensable for early detection, differentiation between benign and precancerous lesions, and treatment planning, including the decision for biopsy, surgical excision, or conservative monitoring.

Narrow Band Imaging (NBI) or White Light Endoscopy (WLE) — enhances vascular visualization and helps assess malignant potential. Narrow Band Imaging (NBI) and White Light Endoscopy (WLE) are advanced endoscopic techniques that play a crucial role in the early detection and evaluation of laryngeal leukoplakia and other mucosal lesions. WLE provides a broad, natural view of mucosal color and surface texture, allowing clinicians to identify white or gray plaques, epithelial irregularities, and subtle morphological changes. In contrast, NBI utilizes filtered blue and green wavelengths that enhance the visualization of superficial and subepithelial vascular patterns. This optical contrast helps distinguish benign inflammatory lesions from those with increased angiogenesis and malignant potential, as abnormal intraepithelial capillary loops or irregular vascular networks often indicate dysplasia or early carcinoma. Combined use of NBI and WLE significantly improves diagnostic accuracy, facilitates targeted biopsy, and supports non-invasive monitoring of lesion progression or recurrence following treatment. These imaging modalities have therefore become essential components of modern laryngologic evaluation and oncologic surveillance.

Biopsy — essential for differentiating benign hyperplasia from dysplasia or carcinoma. Biopsy remains the gold standard for diagnosing and differentiating benign epithelial hyperplasia, dysplasia, and carcinoma in patients with suspected laryngeal or oral leukoplakia. While imaging and endoscopic techniques provide valuable visual information, only histopathological examination of tissue can confirm the degree of epithelial alteration and the presence of malignant transformation. During the procedure, tissue is typically obtained from the most suspicious or vascularized area of the lesion—often guided by Narrow Band Imaging (NBI) or videostroboscopic findings—to ensure diagnostic accuracy. Microscopic evaluation allows pathologists to assess cellular atypia, nuclear pleomorphism, loss of polarity, and basement membrane integrity, which are key indicators of dysplasia or invasive carcinoma. In cases of benign hyperplasia, the architecture is preserved, with increased cell layers but without cytologic atypia. Because leukoplakic lesions can

harbor multifocal changes, multiple or map biopsies are often recommended. Accurate histological diagnosis is critical for treatment planning, risk stratification, and ongoing surveillance to prevent malignant progression.

Histological grading — mild, moderate, or severe dysplasia according to WHO classification. Histological grading of epithelial dysplasia is a crucial step in assessing the malignant potential of leukoplakic and other precancerous lesions. According to the World Health Organization (WHO) classification, epithelial dysplasia is categorized into mild, moderate, or severe grades based on the extent and severity of cellular atypia and architectural disorganization within the epithelium.

In mild dysplasia, atypical changes are confined to the lower one-third of the epithelial layer, with minimal nuclear irregularity and preserved stratification.Moderate dysplasia involves the lower two-thirds of the epithelium, showing more pronounced nuclear pleomorphism, loss of polarity, and increased mitotic figures.In severe dysplasia, atypical cells extend through more than two-thirds or the full thickness of the epithelium, approaching carcinoma in situ, but without invasion beyond the basement membrane.This histopathological grading provides valuable prognostic information, as the risk of malignant transformation rises significantly with increasing severity. Accurate classification guides clinical decision-making, including the need for surgical excision, closer surveillance, or adjunctive therapy, thereby improving patient outcomes through early intervention.

Conclusion. Chronic hypertrophic laryngitis, leukokeratosis, and leukoplakia are interconnected inflammatory and precancerous conditions of the larynx.While chronic inflammation initiates epithelial thickening and keratinization, continued exposure to irritants promotes dysplasia and potential malignancy.Diagnosis must rely on endoscopic and histopathological evaluation, and management should include risk elimination, medical therapy, and, when necessary, surgical intervention. Chronic hypertrophic laryngitis, leukokeratosis, and leukoplakia constitute a spectrum of chronic inflammatory reactions and epithelial transformations in the laryngeal mucosa, representing early stages of laryngeal carcinogenesis.Continuous follow-up is essential, as these conditions represent the early stages of laryngeal carcinogenesis.

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