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ETIOLOGICAL, CLINICAL, AND PATHOLOGICAL CAUSES OF UNILATERAL VOCAL CORD PALSY: A DESCRIPTIVE OBSERVATIONAL STUDY

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ABSTRACT

Unilateral vocal cord palsy (UVCP) is a significant clinical entity with diverse etiologies impacting phonation, respiration, and swallowing. This cross-sectional observational study, conducted at AlluriSitarama Raju Academy of Medical Sciences (ASRAM) from 2022 to 2024, aimed to investigate the etiological, clinical, and pathological causes of UVCP in 40 patients. The mean age was 54.03 ± 9.99 years, with a male predominance (65%). Left-sided UVCP was more common (62.5%). The primary etiologies identified were idiopathic (30%), laryngeal cancer (27.5%), and surgical interventions (20%), particularly thyroidectomy. Common symptoms included dysphonia (95%) and aspiration (37.5%). Smoking was associated with most causes except idiopathic and thyroid-related cases, though no significant statistical correlation was found. The study underscores the importance of thorough diagnostic evaluation to rule out malignancies before attributing UVCP to idiopathic causes and highlights the need for integrated diagnostic and treatment protocols.

Keywords: Unilateral vocal cord palsy, recurrent laryngeal nerve, dysphonia, laryngeal cancer, iatrogenic, idiopathic.

INTRODUCTION

Vocal cord palsy, particularly unilateral vocal cord palsy (UVCP), is a clinical condition resulting from impaired neural innervation, primarily of the recurrent laryngeal nerve (RLN), leading to compromised vocal fold movement. UVCP manifests as dysphonia, breathiness, or aspiration, significantly affecting quality of life, social interactions, and vocational capabilities [1,2]. The RLN's anatomical course, particularly the left RLN's longer intrathoracic path, predisposes it to injury from various causes, including surgical trauma, neoplasms, and idiopathic factors [3,4]. Despite its clinical significance, comprehensive studies on UVCP's etiological and clinical profile in diverse populations are limited, particularly in India. This study aimed to elucidate the etiological, clinical, and pathological causes of UVCP in a tertiary care setting in Andhra Pradesh, India, to inform diagnostic and management strategies.

Aims and Objectives

The primary aim was to investigate the etiological, clinical, and pathological causes of UVCP. Specific objectives included:
Evaluating the symptoms and signs of UVCP.
Identifying the underlying causes using laboratory, radiological, and endoscopic investigations.

MATERIALS AND METHODS

Study Design and Setting: This cross-sectional observational study was conducted at the Department of Otorhinolaryngology, ASRAM, Eluru, from 2022 to 2024. The study was approved by the ASRAMS BHR Ethics Committee and adhered to the Declaration of Helsinki.

Participants: Forty patients aged 18–75 years with confirmed UVCP, diagnosed via video laryngoscopy, were enrolled from the outpatient department. Exclusion criteria included bilateral vocal cord palsy, congenital anomalies, or refusal to consent. Informed consent was obtained from all participants.

Data Collection: A detailed history was recorded, including demographics, symptoms (e.g., hoarseness, dysphagia, aspiration), smoking status, and medical history. Clinical examination encompassed head, neck, and systemic assessments. Diagnostic evaluations included:

Video laryngoscopy to confirm UVCP and assess vocal cord position (midline or paramedian).

Radiological imaging (CT neck/chest, MRI skull base, chest X-ray, barium swallow) to identify underlying causes.

Laboratory tests (complete blood count, viral markers, histopathology when indicated).

Data were recorded using a standardized case record form. Etiologies were categorized as iatrogenic (surgical), neoplastic, idiopathic, or other (e.g., cardiac, mediastinal masses).

Statistical Analysis: Descriptive statistics (mean, standard deviation, percentages) were used to summarize demographic and clinical data. Chi-square tests assessed associations between variables (e.g., smoking and etiology, gender and side of palsy). A p-value <0.05 was considered significant. Data were analyzed using SPSS version 25.

RESULTS

Demographic Profile: The study included 40 patients (26 males, 65%; 14 females, 35%) with a mean age of 54.03 ± 9.99 years (range: 36–74 years). The mean disease duration was 9.65 ± 3.45 months, with 95% of cases having a duration of less than one year.

Clinical Presentation: The most common symptom was dysphonia (38 patients, 95%), followed by aspiration (15 patients, 37.5%) and dysphagia (10 patients, 25%). Left-sided UVCP was observed in 25 patients (62.5%), while right-sided involvement occurred in 15 (37.5%). Vocal cord position was midline in 60% and paramedianin 40% of cases.

Etiological Findings

The primary causes of UVCP were:

Idiopathic: 12 patients (30%).

Laryngeal cancer: 11 patients (27.5%).

Surgical (iatrogenic): 8 patients (20%), predominantly post-thyroidectomy (5 cases).

Mediastinal masses: 5 patients (12.5%).

Cardiac surgery: 4 patients (10%).

Among surgical causes, thyroidectomy was the most common, followed by cardiac surgery. Neoplasticcauses were primarily laryngeal cancer, with mediastinal masses also contributing.

Association with Smoking

Smoking was prevalent in 26 patients (65%). Most etiologies (laryngeal cancer, mediastinal masses, cardiac causes) were associated with smoking, except for idiopathic and thyroid-related cases. However, the association was not statistically significant (Chi-square = 5.831, p = 0.212).

Gender and Side of Palsy

Left-sided UVCP was more common in males (18/26, 69.2%) than females (7/14, 50%), but the difference was not significant (Chi-square = 0.733, p = 0.392). Laryngeal cancer and idiopathic causes predominated in males, while surgical causes (thyroidectomy) were more frequent in females (Chi-square = 4.932, p = 0.294).

Diagnostic Yield

Video laryngoscopy confirmed UVCP in all cases, with CT imaging identifying neoplastic and mediastinal causes. MRI and histopathology were crucial for ruling out central and malignant etiologies, respectively.

DISCUSSION

Demographic and Clinical Insights: The mean age of 54.03 years aligns with previous studies reporting UVCP predominance in the fifth to sixth decades.[5,6] The male predominance (65%) is consistent with findings by Pavithran et al. (72.3% males) and Gupta et al. (2.3:1 male-to-female ratio),[7,8] possibly reflecting higher smoking prevalence and occupational exposures in males. Dysphonia as the primary symptom (95%) corroborates its role as a hallmark of UVCP, with aspiration and dysphagia indicating glottal insufficiency.[9]

Etiological Spectrum: The study's etiological profile mirrors global trends, with idiopathic (30%), neoplastic (27.5%), and iatrogenic (20%) causes being predominant.[10,11] The high prevalence of idiopathic UVCP underscores the need for exhaustive diagnostic workups to exclude occult malignancies, as suggested by Chen et al.[12] Laryngeal cancer as a leading cause (27.5%) highlights the importance of early endoscopic and imaging evaluation, particularly in smokers. Surgical causes, especially thyroidectomy, align with reports by Senniappan et al. (20.4% post-thyroidectomy),[13] emphasizing the role of intraoperative nerve monitoring to reduce iatrogenic RLN injury.

The predominance of left-sided UVCP (62.5%) is attributable to the left RLN's longer intrathoraciccourse, making it more susceptible to compression or trauma.[14] This is consistent with Gupta et al. (69.64% left-sided) and Toutounchi et al. (56.82% left-sided).[8,15]

Smoking and UVCP

The association of smoking with laryngeal cancer and mediastinal masses is expected, given its role in carcinogenesis.[16] However, the lack of statistical significance (p =0.212) may reflect the small sample size, warranting larger studies to confirm this relationship.

Gender Differences

The gender-specific etiological patterns—laryngeal cancer and idiopathic causes in males, surgical causes in females—align with Chen et al.'s findings.[12] This may reflect higher malignancy rates in males due to

smoking and greater thyroid surgery prevalence in females due to thyroid disease epidemiology.

Pathophysiological Implications

UVCP results from RLN denervation, leading to flaccid vocal folds and glottal incompetence.[17] The study's findings of midline and paramedian vocal cord positions reflect varying degrees of denervationand compensatory contralateral fold movement. These observations underscore the need for tailored interventions, such as voice therapy or surgical medialization, based on the degree of glottal insufficiency.

Comparison with Literature

Compared to Bhatta et al., who reported non-surgical causes as predominant (57.1%),[18] this study found a balanced distribution between surgical and non-surgical etiologies. The higher idiopathic rate in Pavithran et al. (42.1%),[7] contrasts with our findings, possibly due to differences in diagnostic rigor or population characteristics. The consistency of left-sided predominance across studies reinforces anatomical predispositions.

Clinical Implications

The study highlights the necessity of a multidisciplinary approach to UVCP, integrating laryngoscopy, imaging, and histopathology to identify reversible causes (e.g., neoplasms) and guide management. The significant proportion of neoplastic causes emphasizes the need to exclude malignancy before labeling UVCP as idiopathic.

Integrated diagnostic protocols, including routine CT/MRI and endoscopic evaluation, are essential for optimizing outcomes.

Limitations

The small sample size (n=40) and single-center design limit generalizability. The lack of long-term follow-up precludes insights into recovery or progression. Future multicenter studies with larger cohorts and longitudinal designs are needed to validate these findings.

CONCLUSION

This study provides valuable insights into the etiological, clinical, and pathological spectrum of UVCP in a South Indian tertiary care setting. Idiopathic causes, laryngeal cancer, and surgical trauma (particularly thyroidectomy) were the leading etiologies, with left-sided palsy and dysphonia being predominant. Smoking was associated with most causes, though not significantly. Gender-specific patterns suggest tailored diagnostic approaches. Comprehensive evaluation to rule out malignancies is critical before attributing UVCP to idiopathic causes. These findings advocate for integrated diagnostic and treatment programs to enhance patient outcomes. Future research should focus on larger, multicenter studies to establish robust epidemiological data and refine management strategies.

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