

Etiopathogenesis and Diagnosis of Vocal Fold Palsy in a Tertiary Centre: A Retrospective Study

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ABSTRACT

Objective: To profile the etiology of vocal fold paralysis (VFP) and the various diagnostic methods used to determine the aetiology in a tertiary care centre.

Material and Methods: A retrospective review of the records of patients diagnosed with VFP in the last 5 years was done. Details about whether the vocal fold palsy was unilateral or bilateral, the diagnostic workup, and the final diagnosis were obtained from the records.

Results: A total of 182 patients; comprising 118 males and 64 females, had VFP. Unilateral VFP was documented in 155 cases and bilateral VFP was documented in 27 patients. The cause for VFP was found to be neoplastic in 32.9% of cases, with lung cancer being the most common. Idiopathic VFP was observed in 31.9% of the cases. Trauma and inflammatory cause were diagnosed in 17% and 9.9% of cases, respectively. Neurological causes contributed to 8.2% of the cases. Contrast-enhanced computerised tomography (CT) was the most commonly used method to identify the cause.

Conclusion: Identifying the aetiology of VFP is challenging. Thorough clinical examination followed by appropriate investigations is paramount to initiate an early intervention. We propose an algorithm for the same.

Keywords: Vocal fold palsy, vocal cord paresis, etiology, idiopathic

INTRODUCTION

Vocal fold paralysis (VFP) is the loss of normal adduction/abduction. It occurs as a result of injury to the recurrent laryngeal nerve (RLN). Vocal fold paresis is the hypofunction or hypomobility secondary to neurologic injury, while vocal fold paralysis is the complete immobility of the vocal cord. The vocal folds rely on RLN signals for mobility, which is crucial for functions such as swallowing, breathing, and voice production. Due to its longer course, the left RLN is more frequently affected than the right, making left-sided vocal fold paralysis 1.4–2.5 times more common (1-4).

This study aimed to evaluate the etiology and proportion of vocal fold paralysis and the diagnostic techniques used in, a tertiary care hospital in Southern India.

MATERIALS AND METHODS

A retrospective review of the records of patients admitted and evaluated for vocal fold paralysis from December 2017 to January 2023 was conducted. Approval of the Institutional Ethics Committee was obtained (Date: 29.04.203 No: YEC-1/2023/063). Records showing vocal cord fixity secondary to laryngeal or hypopharyngeal malignancies and incomplete records were excluded.

The details of the patient's clinical history, such as change in voice, aspiration, dysphagia, smoking, pre-existing neurological disorders, and previous surgeries were noted. The clinical findings of neurological, cardiovascular, and ear, nose, and throat examinations were also recorded. The details of investigations performed as part of the diagnostic workup include blood investigations, endoscopy, imaging studies, and histopathology.

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The data was entered into an MS Excel worksheet and was analysed for laterality of VFP and, causative factors, and the investigations employed as a part of the diagnostic workup for the identification of the etiology were noted.

RESULTS

Of the 182 patients, unilateral vocal fold paralysis (VFP) was seen in 85.2% (n=155), with left-sided paralysis more common (53.8%; n=98). Of these 64.8% (n=118) were male while 35.1% (n=64) patients were female (Table 1). Neoplastic causes accounted for 32.9% (n=60) of cases, with lung cancer being the most frequent etiology in 17% (n=31). Thyroid cancer accounted for 6.6% (n=12) of cases, while oesophageal cancer, vestibular schwannoma and lymphoma accounted for 3.8% (n=7), 3.3% (n=6), and 2.2% (n=4) respectively (Table 1). Idiopathic VFP was noted in 31.9% (n=58), and trauma-related causes were seen in 17% (n=31) of which surgical trauma accounted for 13.2% (n=24) (Table 1). Thyroidectomy was performed in 9.3% (n=17). Oesophageal surgery was performed in 1.1% (n=2) and schwannoma excision in 2.7% (n=5).

Nonsurgical trauma caused VFP in 3.8% (n=7) cases. Intubation injury was responsible for 1.1% (n=2) and laryngotracheal trauma accounted for VFP in 2.7% (n=5) cases. Neurological causes were responsible for VFP in 8.2% (n=15). These included cerebrovascular accidents (6.6%; n=12), Guillain Barre syndrome (0.55%; n=1), amyotrophic lateral sclerosis (0.55%; n=1), and lateral medullary syndrome (0.55%; n=1)

(Table 1). In 9.9% (n=18) of the patients, inflammatory process was the cause of VFP, of which 5.5% (n=10) were attributed to tuberculosis, while 3.8% (n=7) had skull base osteomyelitis and 1 case had paraglottic abscess (Table 1).

A total of 14.8% (n=27) of the patients were diagnosed with bilateral VFP. The most common cause of bilateral VFP was neoplasms, accounting for 4.4% (n=8) of the 27 cases, with lung cancer being the most frequent etiology. Cerebrovascular accidents were the second most prevalent cause seen in 3.8% (n=7).

Computerised tomography (CT) was the most commonly used investigation to diagnose the etiology, followed by bronchoscopy and ultrasonography of the neck. Direct biopsy or Fine Needle Aspiration Cytology (FNAC) confirmed the diagnosis of neoplastic etiology (Table 2).

Hoarseness was the most common complaint reported by 57.1% (n=104) of patients, cough while swallowing was reported by 50% (n=91). In patients with bilateral vocal cord palsy, difficulty in breathing was the most common complaint seen in 9.3% (n=17), followed by change in voice in 5.5% (n=10).

DISCUSSION

Our findings align with those of prior studies showing a higher prevalence of left-sided VFP due to the longer course of the left RLN. Male predominance was observed in both unilateral

Table 1: Percentage-wise distribution of causes of vocal fold palsy

Etiology		Unilateral left VFP	Unilateral right VFP	Bilateral VFP	Total
Neoplastic	Lung malignancies	10.4% (n=19)	3.3% (n=6)	3.3% (n=6)	17% (n=31)
	Oesophageal malignancies	2.7% (n=5)	0.55% (n=1)	0.55% (n=1)	3.8% (n=7)
	Lymphoma	1.65% (n=3)	1.1% (n=2)	0.55% (n=1)	3.3% (n=6)
	Thyroid malignancies	2.7% (n=5)	3.8% (n=7)	0%	6.6% (n=12)
	Schwannoma	1.1% (n=2)	1.1% (n=2)	0%	2.2% (n=4)
Idiopathic		18.1% (n=33)	11% (n=20)	2.7% (n=5)	31.9% (n=58)
Infectious	Tuberculosis	3.8% (n=7)	1.1% (n=2)	0.55% (n=1)	5.5% (n=10)
	Skull base osteomyelitis	2.2% (n=4)	1.1% (n=2)	0.55% (n=1)	3.8% (n=7)
	Paraglottic abscess	0.55% (n=1)	0%	0%	0.55% (n=1)
Trauma	Laryngotracheal trauma	1.1% (n=2)	1.1% (n=2)	0.55% (n=1)	2.7% (n=5)
	Post thyroidectomy	2.7% (n=5)	4.4% (n=8)	2.2% (n=4)	9.3% (n=17)
	Post gastrectomy	1.1% (n=2)	0%	0%	1.1% (n=2)
	Post schwannoma excision	1.65% (n=3)	1.1% (n=2)	0%	2.7% (n=5)
	Post intubation	1.1% (n=2)	0%	0%	1.1% (n=2)
Neurological	Cerebrovascular accident	2.2% (n=4)	0.55% (n=1)	3.8% (n=7)	6.6% (n=12)
	Guillain Barre Syndrome	0.55% (n=1)	0%	0%	0.55% (n=1)
	Lateral medullary syndrome	0%	0.55% (n=1)	0%	0.55% (n=1)
	Amyotrophic lateral sclerosis	0%	0.55% (n=1)	0%	0.55% (n=1)
Total		53.8% (n=98)	31.3% (n=57)	14.8% (n=27)	100% (n=182)

VFP: Vocal fold palsy

Table 2: Investigations performed for VFP and their diagnostic yield.

Diagnostic tests	Tests performed	Diagnostic yield (%)
CT scan	143	50.3% (n=72)
Endoscopy	46	82% (n=38)
MRI scan	21	76% (n=16)

CT: Computerised Tomography, MRI: Magnetic Resonance Imaging, Endoscopy- bronchoscopy or upper gastrointestinal endoscopy

and bilateral cases, consistent with gender differences in healthcare-seeking behaviour and smoking prevalence (5-7).

The left VFP is nearly twice as common as the right VFP with a ratio of 1.72:1. This finding was consistent with earlier research conducted in Japan and Denmark (8, 9). This variation is attributed to the longer course of the left RLN (1).

According to studies conducted in Egypt, Taiwan, and Italy, the three most common causes of unilateral VFP are tumours, surgery, and idiopathic paralysis (2, 10, 11).

In our study, neoplastic etiology was the leading cause of VFP. Lung cancer was the most common cause followed by thyroid malignancies. A study conducted in Taiwan comprising 291 patients to identify the etiopathology of VFP reported surgical causes in 40.2% and, neoplastic in 29.9% of cases. Lung cancer was responsible for 11.6% of cases and was the most common neoplastic etiology (12).

In our study, most patients presented with a change in voice followed by cough while swallowing. The severity of this depended on the position of the vocal folds. The other symptoms were breathing difficulty and stridor, which was reported most often in bilateral VFP. A 12-year retrospective study in Pune encompassing 711 patients found change in voice as the most common presenting complaint in both unilateral and bilateral palsy. Idiopathic VFP accounted for 23% of the

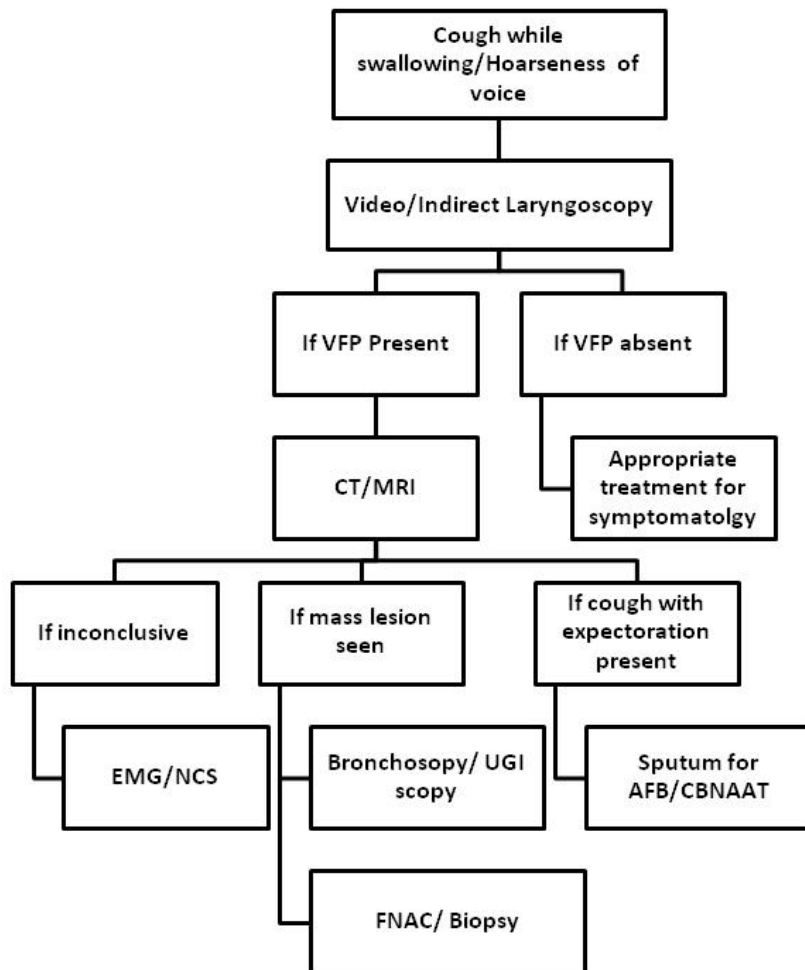


Figure 1: Flow chart representing the diagnostic algorithm for Vocal Fold Paralysis

VFP: Vocal Fold Paralysis, CT: Computerized Tomography, MRI: Magnetic Resonance Imaging, EMG: Electromyography, NCS: Nerve Conduction Study, UGI scopy: Upper Gastro-Intestinal endoscopy, FNAC: Fine Needle Aspiration Cytology, AFB: Acid Fast Bacilli Stain, CBNAAT: Cartridge Based Nucleic Acid Amplification Test

unilateral cases, while malignancy was reported in 13.6% of the bilateral cases (13). Our study reflects the same with 34% of the unilateral VFP diagnosed as idiopathic and 29.6% of the bilateral VFP diagnosed as having neoplastic etiology. All patients with idiopathic etiology underwent adequate testing to eliminate other possibilities.

Only 13% of the cases in this study were secondary to surgical trauma. A retrospective cohort study conducted in Michigan reported, a maximum number of cases caused secondary to surgical trauma, most commonly thyroid surgeries. The study compared changing trends in the etiology of VFP over 20 years and reported an increase in the incidence of surgical causes (14). Similar trends were reported in a study conducted in Pune (13).

Neurological causes accounted for 8.2% of all cases marked by 12 cases of CVA of which 7 were bilateral VFP. In another study conducted in Taipei, from 2010 to 2019, 194 patients were evaluated for VFP. Only 4% of patients had neurological etiology (2).

Infectious causes accounted for 9.9% of the cases in our study. Similar percentages were reported by other studies conducted in Maharashtra and Himachal Pradesh (5, 6).

The most extensively used diagnostic tool was seen to be computerised tomography; either contrast-enhanced or high-resolution scans were used. It is preferred over MRI scans due to the lower cost and it being technically easier as well as faster. In some cases where lesions were seen in the oesophagus and the tracheobronchial tree, bronchoscopy and gastrointestinal endoscopy were performed to attain tissue diagnosis.

Causation of VFP can be due to injury anywhere from the cerebral cortex to mechanical injury of the larynx and can be secondary to trauma, malignancies, mass lesions, or infections (1). The diagnosis of the etiology of VFP is challenging but of utmost importance so that appropriate and early intervention can be initiated. Diagnostic techniques can vary in sensitivity and specificity. Previously, diagnosis was mainly via indirect laryngoscopy, but it has been replaced by flexible or rigid endoscopy in most centres. Early detection can help prevent complications like aspiration and stridor (15). This study systematically evaluated diagnostic techniques and presented their yields to enable clinicians to optimise diagnostic strategies for VFP.

The findings of our study align with the findings of previous studies and add regional data to existing literature, highlighting certain differences in demographics, etiology, and diagnostic trends specific to this population considering the socioeconomic factors and resources available.

Limitations

A long-term prospective study with a larger sample size would help fine-tune the working protocol for early diagnosis.

CONCLUSION

Vocal fold paralysis is a clinical finding requiring thorough evaluation to identify its etiology and enable timely intervention. This study highlights the need for comprehensive diagnostic protocols to improve outcomes. The current study provides insight into areas to focus efforts to prevent neuropathy and limit the morbidity associated with VFP.

While algorithms exist, we propose a customised protocol for the south Indian population, considering the paucity of available resources and diagnostic tools (Figure 1).

Ethics Committee Approval: This study was approved by the Institutional Ethics Committee was obtained (Date: 29.04.203 No: YEC-1/2023/063).

Informed Consent: Due to the retrospective design of the study, informed consent was not taken.

Peer Review: Externally peer-reviewed.

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