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REVIEW ARTICLE

Recommendations on follow-up strategies for idiopathic vocal fold paralysis: evidence-based review

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Abstract

Introduction: Vocal fold paralysis can be an early warning sign of serious extra-laryngeal pathology. Even if imaging investigations show no pathology, there is always concern about the emergence of new pathology in the future. There is currently no consensus on the best follow-up protocol for vocal fold paralysis patients with no abnormalities on investigation.

Methods: Systematic review, using an Ovid and Medline database search of papers written in the English language and published in the last 20 years.

Results: Eight relevant studies were identified. Not all of them were directly comparable. A narrative review of the studies is presented and conclusions are drawn.

Conclusion: Current diagnostic modalities are sufficiently reliable and sensitive to diagnose any significant existing extra-laryngeal pathology. Thus, once initial investigation (including computed tomography) has concluded, no further follow up is necessary.

Key words: Vocal Cord Paralysis; Diagnosis; Duty To Follow Up

Introduction

Vocal fold paralysis is a sign of an underlying disorder, not a disease in itself.

Previous studies have shown a wide range in the reported incidence of this condition and in the prevalence of its various aetiologies, with the prevalence of extra-laryngeal malignancy ranging from 4 to 50 per cent.[1–7] Similarly, significant variation exists in recommended investigation protocols[8] and in the proportion of cases diagnosed as idiopathic vocal fold paralysis.

If a patient with idiopathic vocal fold paralysis develops a subsequent lung carcinoma, it may be debated whether the 'idiopathic' laryngeal paralysis was actually associated with an early stage lung cancer that was missed (i.e. a primary that became evident soon afterwards).

The aim of this review was to determine, from the published literature, (1) whether vocal fold paralysis can be seen as an early warning sign of invasive or compressive extra-laryngeal pathology before such pathology is detectable by conventional imaging, and (2) whether there is any evidence to support the need for a close observational period following the completion of current methods of idiopathic vocal fold paralysis investigation. These aims arose against the backdrop of the current National Health Service financial climate, with a clear need to rationalise the investigation and follow up of patients, without compromising safety or quality of care.

Methodology

A literature search was conducted using the Medline and Ovid databases for the last 20 years, looking for English language papers. The following key words were used: idiopathic AND/OR vocal fold paralysis AND/OR diagnosis AND/OR follow up AND/OR long term. In addition, the references in each identified publication were examined to locate earlier publications that had escaped our initial search.

We excluded the following papers: case report studies, and studies not using computed tomography (CT) as a routine method of investigation. The side of paralysis was not taken into consideration.

Results

The literature search identified five studies that satisfied our inclusion criteria (Table I). All of the selected studies included CT as part of the original investigation

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TABLE I
SUMMARY OF STUDIES

Study	Year	Design	IVFP pts (*n*)	Duration	Method of follow up	Results
Glazer *et al.*[9]	1983	Prospective	3*	4 yr	NS	None developed malignancy
Terris *et al.*[4]	1992	Retrospective	9	8 yr	NS	None developed malignancy
Loughran *et al.*[7]	2002	Prospective	9	16 mth	X-ray, CT	None developed malignancy
Robinson & Pitkaranta[10]	2006	Retrospective	7	NS	NS	None developed malignancy
El Badawey *et al.*[11]	2008	Prospective	62	18–66 mth	Laryngoscopy, SALT, panendoscopy	None developed malignancy

*Two presumed neuropathic. IVFP pts = idiopathic vocal fold paralysis patients; yr = years; NS = not specified; mth = months; CT = computed tomography; SALT = Speech and Language Therapy

for the cohort diagnosed with idiopathic vocal fold paralysis, and also incorporated a period of follow up.

Three other studies which did not satisfy our inclusion criteria were also included as they provided interesting perspectives on the subject. These papers are discussed as supplementary studies.

Selected studies

In a prospective, four-year study of 33 patients with idiopathic vocal fold paralysis, Glazer *et al.*[9] found neoplasms of the lower neck and upper mediastinum as the predominant cause of the palsy in 27 of the 33 patients. All of the patients who presented with hoarseness had no evident ENT cause for the vocal fold palsy on clinical examination. All patients underwent a CT scan as part of their initial investigation. Of the 22 cases with left-sided vocal fold paralysis, 19 were secondary to malignancy (14 lung, two breast, one thyroid, one oesophagus and one lymphoma), one was secondary to an aortic aneurysm and two were labelled as idiopathic. Of the 11 cases with right-sided vocal fold palsy, eight were secondary to malignancy (three lung, three oesophagus and two thyroid) whilst in the last three no obvious cause was found (two were presumed to be secondary to diabetic neuropathy and one was labelled idiopathic). Glazer *et al.* concluded that negative CT correlated with a neuropathic or idiopathic aetiology. The length of the follow up for each individual patient was not clarified.

In a retrospective study of 84 patients with unilateral vocal fold paralysis over an eight-year period (1983 to 1991), Terris *et al.*[4] found that in no instance was a malignancy discovered subsequent to the initial investigation. In 48 cases (57 per cent), the cause was apparent at the time of the diagnosis, whilst the remaining 36 cases required further evaluation – a diagnosis was achieved in 27 of them, leaving nine as idiopathic. A neoplasm was diagnosed in 23 of these 27 patients (85 per cent), consisting of lung cancer in 13 of the 23. Simple diagnostic modalities were used first. Thirteen of the 27 diagnosed patients (48 per cent) were diagnosed with a chest X-ray. Of the remaining diagnosed patients, seven (30 per cent) were diagnosed via CT and 16 via endoscopy.

Loughran *et al.*[7] investigated 77 patients with vocal fold paralysis, in a prospective study. All patients underwent an initial chest X-ray and CT imaging (skull base to diaphragm). Nine cases were labelled as idiopathic. These patients were followed up with a chest X-ray at six-monthly intervals and a CT scan yearly, for an average follow-up period of 16 months. No patient who had normal imaging at presentation developed subsequent pathology that could have caused the palsy.

In a 2006 retrospective study of 100 idiopathic vocal fold paralysis patients, Robinson and Pitkaranta[10] performed CT imaging on 34 patients in whom no cause was evident on clinical examination. Following imaging (ultrasound scan for right vocal fold paralysis and CT of the neck and mediastinum for left vocal fold paralysis), the number of patients who retained a diagnosis of idiopathic vocal fold paralysis was reduced to eight. After an unspecified period of follow up, one patient developed disseminated encephalomyelitis, leaving seven cases with a diagnosis of idiopathic vocal fold paralysis.

El Badawey *et al.*[11] conducted a prospective study of 86 patients with apparently idiopathic vocal fold paralysis, and followed up 62 patients who had a negative CT report for a period of 18 to 66 months. In this latter group, 30 (48 per cent) had a satisfactory recovery within six months and 15 (24 per cent) had a full recovery within nine months. The follow-up protocol included a 'check' laryngoscopy, stroboscopy, speech and language therapy, and panendoscopy in 20 patients in the cohort. None of the 62 CT-negative patients developed any pathology related to their vocal fold paralysis, and four died of unrelated reasons. The authors concluded that their CT scan protocol (i.e. CT of the neck for right vocal fold paralysis and CT of the neck and chest for left vocal fold paralysis) was sufficient to detect any malignancies. No patients were rescanned during the follow-up period.

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Table I summarises the studies discussed above, and demonstrates that none of the included patients developed malignancy on follow up.

Supplementary studies

Willat and Stell[3] published one of the first studies that attempted to answer the clinical question addressed by the current review. In this prospective study, published in 1989, 42 patients with idiopathic vocal fold paralysis were followed up for seven years. During this period, four patients developed malignancies (three in the chest and one in the larynx) that in retrospect were deemed to be responsible for the vocal fold paralysis. As part of their original investigation, patients underwent a chest X-ray, and radiographs of the skull base, petrous bones and nasopharynx were performed as indicated. Patients also received further chest X-rays during follow up, but this was done on an ad hoc basis. Willat and Stell concluded that patients with vocal fold paralysis should be considered to harbour a malignancy unless the vocal fold recovers, and that management should be expectant for up to 12 months. This is an interesting study as it is the only one that advocates follow up. The main limitation of this study was that patients did not have a CT scan during the course of their initial investigation, which means that an early, coexistent malignancy could have been missed. Prolonged follow up therefore may not have been necessary had CT been performed as part of the initial routine investigation. Therefore, we do not think that this study provides any argument or evidence to support the case for follow up.

In a retrospective study of 49 patients, Liu *et al.*[12] estimated the cost-effectiveness of investigating patients with vocal fold paralysis using CT and magnetic resonance imaging. These patients were divided into high and low suspicion groups based on the presence or absence of a clinically detectable abnormality other than vocal fold paralysis. The authors found that the average cost of finding space-occupying lesions as a cause of vocal fold paralysis was 4.5 times higher in patients without suspicious antecedent clinical findings, compared with patients with such findings. They concluded that the benefit of obtaining negative findings and of detecting a small number of space-occupying lesions should be weighed against the costs of such examinations and of possible additional investigation for false positive findings.

In an interesting 2006 study, Bando *et al.*[13] studied retrospectively 133 cases with vocal fold paralysis due to chest disease, over a 15-year period. This study did not fulfil our inclusion criteria as it did not involve patients with a final diagnosis of idiopathic vocal fold paralysis; nevertheless, it is mentioned as the findings are considered relevant. Bando *et al.* examined 42 cases of vocal fold paralysis due to chest disease, in which the primary lesion was not detected before the first visit to the ENT clinic. Lung cancer was the most common reason, followed by aneurysm, metastatic tumour, tuberculosis and oesophageal cancer. The authors' conclusion was that, in cases of vocal fold paralysis with existing chest disease, a CT scan was useful to detect any mass in the region.

Discussion

Although direct comparison of the results mentioned in the studies above is not easy owing to these studies' heterogeneity, it is clear that when cross-sectional imaging demonstrates no pathology, patients will not need regular follow up for the detection of subclinical tumours that may emerge later. There is a lack of common agreement on what constitutes an initial and comprehensive investigation, with different studies advocating different investigation protocols. In a survey of members of the American Broncho-esophagological Association, published in 2006, Merati *et al.*[8] reported that only 51 of 71 (72 per cent) respondents described CT as 'always' or 'often' a necessary investigation.

In a 1994 study, McGregor *et al.*[14] reported that only 6 per cent of UK respondents would request routinely a CT scan of the neck and/or chest, whilst 72 per cent would do so 'sometimes'. Some studies have involved groups of patients who undergo 'waves' of investigations, each time reducing the total number of cases labelled as idiopathic. As a result, the correct time point at which a case can be safely diagnosed as idiopathic, and the point at which initial investigation ends and follow up begins, is not always clear cut. From the above, it appears that, in a patient with idiopathic vocal fold paralysis, CT imaging of the neck and chest is a reliable method to exclude the possibility of any existing invasive or compressive extra-laryngeal pathology. The possibility of a biological reason for an occult (i.e. subepithelial) malignancy presenting with vocal fold paralysis is considered too rare to merit mention. In a tertiary referral hospital setting, a simple chest X-ray is probably not necessary. A negative chest X-ray will require CT imaging (of the neck and chest), whilst a positive one will still require CT for staging.

In some centres, chest X-ray may have a role in left vocal fold paralysis, in directing whether the chest only or the neck and chest are to be scanned. For example, if the chest X-ray is abnormal, only the chest and liver are scanned, but if the chest X-ray is normal, then the neck and chest will be scanned.

Provided the initial investigation has included CT imaging, any further follow up should be for issues of voice quality, including observation prior to possible phonosurgical intervention.

Needless to say, any new symptoms or signs will require thorough investigation.

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