RISK FACTORS FOR VOCAL CORD DYSFUNCTION IN PATIENTS WITH DIFFICULT ASTHMA

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INTRODUCTION

Vocal cord dysfunction (VCD) is characterized by inappropriate adduction of the vocal cords. This gives rise to symptoms of dyspnea, voice change, wheezing and throat tightness.[1] VCD can be misdiagnosed as asthma, resulting in delayed or inappropriate treatment.[2] The two conditions are not mutually exclusive. A high proportion of patients with difficult-to-treat asthma are reported to also have co-existing VCD.[3] VCD does not respond to asthma treatment, but may respond to speech therapy, neuromodulatory medications, and treatment of co-existing comorbidities.[4]

METHODS

One hundred and seventeen difficult asthma patients were referred by respiratory specialists for systematic evaluation at the Alfred between June 2014 and June 2016. Prior to evaluation, referring respiratory specialists were asked whether they thought eight specific asthma comorbidities (including VCD) were present.[5]

Vocal cord dysfunction was diagnosed either by:

1. ENT laryngoscopy during symptoms; or
2. Compatible clinical symptoms (throat symptoms, especially if associated with laryngeal hypersensitivity and sensitivity triggers); supported by a positive Pittsburgh VCD index (comprising: change in voice, absence of wheeze, throat tightness and odour triggers) or high score on VCD-Questionnaire.

Univariate analyses were performed to identify clinical factors associated with vocal cord dysfunction. Predictors were compared using unpaired *t*-test or chi-square test where appropriate. Predictors with a p-value ≤ 0.25 were then included in a multivariate logistic regression model. Each predictor was assessed for confounding and significance. Data was analysed using SPSS version 22 (IBM, Armonk, NY, USA). Continuous variables were expressed in mean (SD) and categorical variables were expressed as number (percentages).

RESULTS

Referring specialists identified ten of the 117 difficult asthma patients with VCD (8.5%). Subsequent systematic evaluation diagnosed forty patients (34.2%) with VCD. The majority (n=33) of these also had asthma, confirmed by variable airflow obstruction (Figure 1).

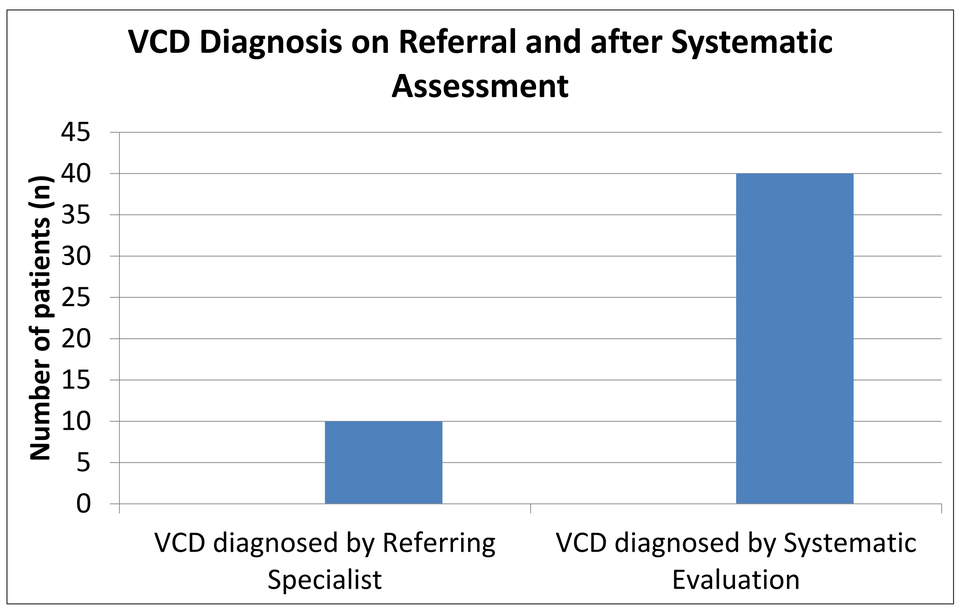

Figure 1. Rates of VCD diagnosis in difficult asthma patients

RESULTS

On univariate analysis, patients with VCD were more likely to be female; have poorer asthma control and quality of life; have more frequent exacerbations; and be less severely obstructed (Table 1).

TABLE 1. COMPARISON OF CHARACTERISTICS OF PATIENTS WITH AND WITHOUT VCD

	VCD	No VCD	P value
Female n (%)	31 (77.5)	45 (58.4)	0.04*
Age, years	49±13	54±14	0.087
BMI, kg/m2,	32±8	30±8	0.118
Comorbidities			
- Allergic Rhinitis	23 (57.5)	41 (53.2)	0.661
- Chronic rhinosinusitis	17 (42.5)	26 (33.8)	0.38
- Gastroesophageal reflux disease	14 (35)	16 (20.8)	0.095
- Obstructive Sleep Apnoea	14 (35)	28 (36.4)	0.961
- Anxiety/Depression	16 (40)	20 (26)	0.119
- Dysfunctional breathing	18 (40)	27 (26)	0.181
Smoking history, n(%)			
- Never	18 (45)	45 (58.4)	0.38
- Ex	19 (47.5)	28 (36.4)	0.67
- Current	3 (7.5)	4 (5.2)	0.91
Pre-bronchodilator FEV1 (%predicted)	68±21	68±22	0.915
FEV1/FVC	68±13	61±16	0.028*
Blood eosinophils (10^9cells/L)	0.17 (0.07-0.36)	0.26 (0.13-0.5)	0.078
FeNO ppb, mean (IQR)	25 (15-57)	24 (16-49)	0.937
In the last 6 months, mean (IQR):			
Exacerbation, requiring oral corticosteroid	3 (2-5)	2 (0-3)	0.003*
Unplanned GP visit	2 (0-5)	0 (0-2)	0.005*
ED visit	0 (0-1)	0 (0-1)	0.189
Hospitalisation	0 (0-0.25)	0 (0-0)	0.462
ACT score, mean (SD)	13±5	15±5	0.023*
AQLQ score, mean (SD)	3.59±1.41	4.61±1.36	<0.001*

** = p<0.05, ACT = Asthma control test, AQLQ = Asthma Quality of life Questionnaire*

TABLE 2. MULTIVARIATE LOGISTIC REGRESSION FOR PREDICTORS OF VCD

Predictors	Odds Ratio	95% CI	P value
FEV1/FVC	1.3	1.1-1.6	0.007
AQLQ	0.39	0.2 -0.6	<0.001
Dysfunctional breathing	0.46	0.13-1.602	0.223
≥3 Exacerbations in six months	4.42	0.98 -20	0.053

On multivariate logistic regression, independent predictors for VCD were FEV1/FVC, and AQLQ. Frequent exacerbations showed borderline significance (Table 2).

DISCUSSION

VCD was present in a third of our patients with difficult asthma, but was under-recognized by referring respiratory specialists. VCD diagnosis was associated with female sex and poorer asthma outcomes despite better lung function. Improved lung function and poorer quality of life were both independent predictors of vocal cord dysfunction. Our findings highlight the importance of identifying and addressing VCD in this challenging patient group and suggest that this important comorbidity remains a substantial contributor to difficult asthma.

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