

## Paradoxical vocal cord motion: an unusual cause of stridor

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### Abstract

Stridor due to obstructive causes is relatively common. Functional airway obstruction with paradoxical vocal cord motion is uncommon. Only 12 cases have been reported in the literature in the past 15 years. The majority were young female patients. We have recently encountered two cases. Lack of awareness of this condition caused several problems in management.

### Case report

#### Case 1

A 30-year-old Asian woman was admitted with sudden onset of stridor. She had been the victim of several previous episodes of stridor, none of which had required inpatient treatment. On admission, she was distressed and had noisy inspiratory stridor. Despite this, on auscultation of her chest, she had normal breath sounds and she was not cyanosed. She had a respiratory rate of 35 per minute. Fibreoptic nasolaryngoscopy did not show any obstructive cause for her stridor, except that she had tightly adducted vocal cords on inspiration. The cords were otherwise normal. She was initially treated with intravenous hydrocortisone and humidified oxygen. Forty five minutes after admission her condition rapidly deteriorated. She became cyanosed and collapsed. An emergency tracheostomy was performed under local anaesthesia. The following day fibreoptic nasolaryngoscopy revealed a normal larynx. The vocal cords were now moving normally. After management of the acute medical condition the following family history was obtained. The patient, a recent immigrant, was the subject of an arranged marriage which had irretrievably collapsed. She had been involved in an acrimonious divorce with widespread, adverse family consequences.

Before and during this period she had developed a number of bizarre neurological symptoms and signs which had (several times) been extensively investigated by neurologists, general physicians and psychiatrists. The neurological symptoms were finally diagnosed as hysterical conversion reactions. In view of the finding of a normal larynx she was extubated and over the ensuing six months has had no further episodes of upper airway obstruction.

#### Case 2

A 36-year-old man was admitted with a two hour history of sudden onset stridor. He had suffered similar attacks over the previous five years, which had necessitated innumerable admissions to various hospitals throughout the Midlands. On one occasion his stridor had been so severe that an emergency tracheostomy had been performed. Subsequently he had been decannulated. On this occasion he had noisy inspiratory stridor but although he was cyanosed he was well perfused. He had a normal pulse rate and respiratory rate. Fibreoptic nasolaryngoscopy during the attack showed a normal larynx but the vocal cords were adducted on inspiration. He was treated with simple analgesics and reassurance. The stridor resolved gradually over the next few hours. Fibreoptic nasolaryngoscopy on

the following day revealed a normal larynx with normal vocal cord movement. He was re-admitted with stridor on two further occasions. The laryngeal appearance and the management were the same as the previous admission. This patient also, was suffering severe emotional problems. He had been a company director and was serving a prison sentence for fraud. He had been moved repeatedly to different prisons for reasons of which we were unaware.

### Discussion

Paradoxical vocal cord motion has been defined as adduction of the true vocal cords on inspiration with abduction on expiration (Kellman and Leopold, 1982). Other reported cases show some similar features (Table I). The majority are female patients suffering from severe emotional problems. Often their episodes of stridor were precipitated by a preceding upper respiratory tract infection (Rogers and Stell, 1978; Kellman and Leopold, 1982). Many cases were initially misdiagnosed as asthma but were refractory to the standard treatments for asthma (Christopher *et al.*, 1983). This condition has been reported in patients, who also had severe emotional problems, when recovering from anaesthesia. (Hamer *et al.*, 1987; Michelsen and Vanderspek, 1988).

Various terms have been used to describe stridor with an anatomically normal larynx, for example, Munchausen's stridor, functional stridor and factitious asthma. We suspect that many of these cases were examples of paradoxical vocal cord motion which, before access to fibreoptic nasolaryngoscopy made laryngeal assessment of the airway at the time of presentation relatively simple, were not recognized.

Paradoxical vocal cord motion may be difficult to diagnose initially if severe respiratory distress is present. Early consideration of a functional problem after obstructive causes have been eliminated may influence management. Table I shows that previously reported cases had been extensively investigated before a diagnosis of paradoxical vocal cord motion was made. In Case 1, we would probably have used intubation as a method of choice to secure the airway, had we been aware of this clinical entity. Case 2 had also had a tracheostomy several years before for stridor. Again, with retrospect and knowledge of this condition tracheostomy may have been avoided.

Although severe emotional problems are thought to be important in the aetiology of paradoxical cord motion (Rogers and Stell, 1978; Appelblatt and Baker, 1981; Kellman and Leopold, 1982) and the treatment policy advocated (Kellman and Leopold, 1982) is one of sedation and reassurance the severity of the airway obstruction in one of our cases was sufficient to

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TABLE  
A REVIEW OF THE LITERATURE ON PARADOXICAL VOCAL CORD MOTION

Case report Author	Age	Sex	History	Past medical History	Psychiatric History	Physical examination	Indirect laryngoscopy	Investigations	Treatment	Congenital
Patterson <i>et al.</i> (1974)	33	F	Acute respiratory distress Inspiratory stridor	5 Medical admissions for atypical asthma	Emotional upsets correlated with attack	NAD	NAD	FBC X-ray chest Total complement (NAD)	1:1000 Epinephrine adrenaline	Functional
Rogers and Stell (1978)	30	F	Hoarseness Noisy breathing	Asthma	Disturbed family background Neurotic personality Emotional stress	NAD	PVCM		Steroid antibiotics	PVCM
Appelblatt and Baker (1981)	23	F	2 Admissions Stridor		Hysterical personality Marital problems	NAD	PVCM	EEG CAT scan Diaphragmatic electromyogram Pertussis culture (NAD) Work up for pulmonary emboli ABG (NAD)	Intubation tracheostomy	PVCM
Kellman and Leopold (1982)	18	F	Sore throat Inspiratory stridor	Post-op laryngospasm	Emotional stress regarding child custody	NAD	PVCM		Oral diazepam	PVCM
Christopher <i>et al.</i> (1983)	5 patients		Aphonia Mimicked bronchial asthma with wheezing	Resistant to standard treatment for asthma	Variety of personality psychiatric disorders	NAD	PVCM	Pulmonary function assessment ABG (NAD)	Speech therapy Oxygen & Helium	PVCM
Hammer <i>et al.</i> (1987)	32	F	Stridor in recovery period after GA	Chronic cough wheezing nasal polyps Aspirin sensitivity Pregnancy polyhydramnios	Attack related to emotional stress	NAD	PVCM	ABG (NAD) X-ray chest Direct laryngoscopy	Relaxation techniques intubation	PVCM
Michelson and Vanderspek (1988)	26	F	Stridor during recovery from GA		Previous emotional stress	NAD	PVCM		Thiamylal Suxamethonium	PVCM
Snyder and Weiss (1989)	30 10 18	F	Tachypnoea Stridor	Hoarseness Dyspnoea Chest pain	Anxious	NAD	PVCM		Intravenous diazepam Reassurance	PVCM

Abbreviations: NAD: no abnormality detected  
 PVCM: paradoxical vocal cord motion  
 GA: general anaesthetic  
 ABG: arterial blood gases  
 EEG: electroencephalogram  
 FBC: full blood count

induce loss of consciousness and cyanosis. In the report by Appelblatt and Baker (1981) on functional upper airway obstruction three patients were presented. They developed pO<sub>2</sub> levels during the acute phase of 50 mmHg, 52 mmHg and 44 mmHg respectively. Although no deaths have been reported due to paradoxical vocal cord motion, a fatality cannot be assumed to be impossible. Also the efficacy of psychiatric treatment in prevention of further episodes of stridor is unknown at present.

However, with awareness of this condition, unnecessary tracheostomies may be avoided as intubation is favoured if airway intervention is required.

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