

## Case Report

# LARYNGEAL MALIGNANCY MASQUERADING AS BRONCHIAL ASTHMA

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## ABSTRACT

52 years/female house wife, presented with insidious onset non-productive cough of 6 months duration and intermittent breathlessness for last 4 months with no significant past history other than tobacco chewing and biomass exposure for 15 - 20 years back. Patient was taking MDI (metered dose inhaler) salbutamol as needed, oral methylxanthines tablets for last 3 months and MDI salmetrol/fluticasone- 250 mg 2 puffs BD for last 1month prescribed by a family physician. On examination patient was conscious oriented, in respiratory distress (Respiratory Rate=22/minute) and not able to complete full sentences but no hoarseness of voice. Chest examination revealed bilateral diffuse biphasic rhonchi but no added sounds with normal systemic examination. Investigations revealed normal CBC (complete blood counts), renal and liver functions, X- ray chest P/A view and normal CT (computerized tomography) scan thorax. Day 3 admission there was no relief with usual asthma medications for exacerbation. Focused examination of chest revealed biphasic rhonchi, louder on inspiration and increase in respiratory distress and voice feeling muffled now. This lead suspicion of upper airway obstruction, though there was no clear stridor. Vocal cord pathology was suspected as patient started to have voice changes. Urgent Spirometry revealed flattening of both loops, a highly characteristic of fixed upper way Obstruction and CT scan neck showed a large intramural soft tissue shadow occluding around 70 % of airway lumen. Later bronchoscopy confirmed a highly vascular large infra-glottic growth, which on histopathology turn to be poorly differentiated squamous carcinoma. Patient was referred to Head and neck surgeon for further management. FINAL DIAGNOSIS was *laryngeal malignancy masquerading as bronchial asthma*.

**Keywords:** *Laryngeal Malignancy Masquerading, Asthma*

## INTRODUCTION

The sub-glottis is the area within the cricoid ring from the bottom of the vocal folds to the top of the first tracheal ring. The latter is the only complete ring in the airway and structurally functions to support the larynx and suspend the trachea. In the adult human the sub-glottis is the narrowest portion of the airway and ranges from 15 to 18 mm in diameter. The data of the international literature indicate the glottis as the most frequent location, while tumors found in the subglottis are considered extremely rare (Ballenger and Snow, 1996). Most of these malignancies are squamous cell carcinomas. Delay in diagnosis is common because of hidden location of disease and lack of symptoms in early disease. But symptomatic cases usually present with exertional dyspnea and biphasic loud wheeze (or sometimes stridor) and diagnosis is usually done by direct laryngoscopy.

## CASES

52 years house wife, presented to the emergency department with complaints of insidious onset non productive cough of 6 months duration and intermittent breathlessness for last 4 months. Cough was paroxysmal in nature, more during night and increased by exposure dust and smoke. Breathlessness was associated with wheezing and wheezing predominant during night. Breathlessness was intermittent in onset but for last 1 month of presentation it became persistent and for last week it was severe enough to disturb sleep of patient. There was no history of any nasal discharge, fever, weight loss, chest pain, palpitations, skin rashes, joint pains/joint swelling, and difficulty in swallowing / speech. Patient was a tobacco chewer and had significant history of biomass exposure for 15 years 20 years back, but no history of IV drug abuse or sexual promiscuity, occupational or drug exposure or significant family history.

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Patient was taking inhaled salbutamol, tablet theophylline(methylxanthines) 400mg for last 3 months and inhaled bronchodilator/steroids [salmeterol /fluticasone- 250 mg 2 puffs] for last 1 months prescribed by a family physician, but patient was taking it on as needed basis. Patient was received in the emergency department.

On examination patient was conscious, oriented, and afebrile. Vitals revealed pulse of 108 beats / min, regular, no special character, and blood pressure of 130 / 80 mm Hg, respiratory rate of 22/minute and SPO<sub>2</sub> 95% room air.

There was no pallor, Icterus, cyanosis, lymphadenopathy, clubbing or pedal edema. Patient was in respiratory distress and was not able to complete full sentences but there was no hoarseness of voice. Chest examination revealed bilateral diffuse biphasic rhonchi but no other added sounds with rest of systemic examination normal.

Investigations showed Hemoglobin -13.6gm/dl, TLC (total leucocyte count)-5200/ul, with 84 % polymorphs, eosinophil-1.2% and PLC-1.9Lac. Kidney functions and liver profile was normal. X ray-chest P/A view (figure-A) and CT scan chest showed no significant abnormality.

Day 3 admission patient had no relief in the symptoms despite treatment with nebulized short acting beta 2 stimulants, corticosteroids and I/V magnesium. Patient was again assessed and examination of chest revealed biphasic rhonchi which were louder on inspiration and patient was having increase in respiratory distress and voice was feeling muffled now. This lead to suspicion of upper airway obstruction, though there was no clear stridor.

Vocal cord pathology was suspected as patient started to have voice changes. So, patient was taken for urgent spirometry which revealed flattening of both loops, a highly characteristic of fixed upper way obstruction. Following this a CT soft tissue scan neck (figure-B) was performed which demonstrated a large intramural soft tissue shadow occluding around 70 % of airway lumen. So, this lead to strong suspicion of glottic malignancy. Patient was taken for urgent bronchoscopy which revealed a large infra-glottic growth seen just below vocal cords(figure-C) which was highly vascular on NBI (narrow band imaging) –(figure-D) and was occluding almost 70 % of airway lumen. Histopathology revealed poorly differentiated squamous cell carcinoma.

Patient was referred to head and neck surgeon for further management. Final diagnosis was *Laryngeal malignancy masquerading as bronchial asthma*.

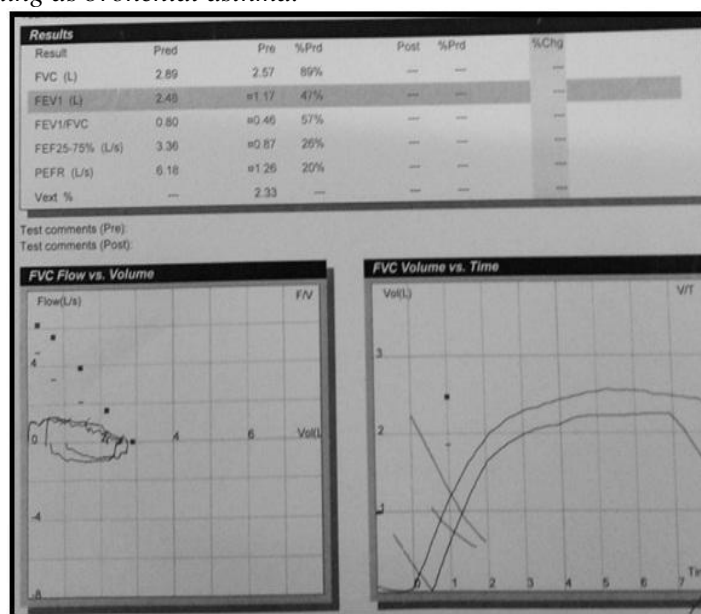
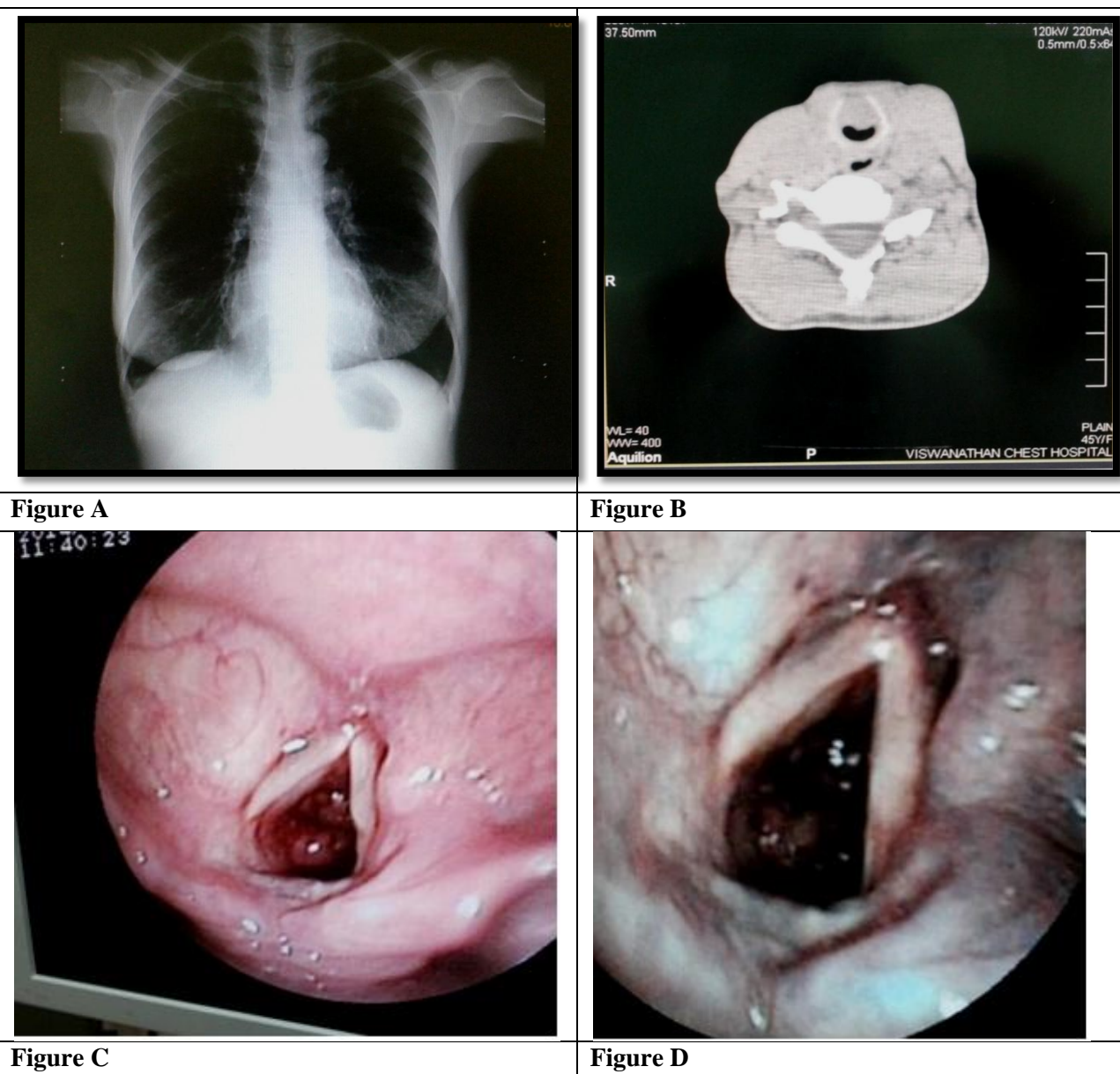


Figure 1

This case illustrates how upper airway pathology mimics bronchial asthma.

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## DISCUSSION

**Upper Airway Obstruction (UAO):** Studies have shown that patients who have sub-acute onset of upper airway obstruction are often miss-diagnosed as bronchial asthma or COPD (Pratter *et al.*, 1983). But onset and rate of progression of symptoms may be important clue to the etiology. For example, foreign body aspiration often has an acute onset of symptoms, while a goiter compressing the airway or endobronchial tumor typically cause slowly progressive dyspnea. A past history of neck or thyroid surgery may direct attention to possible vocal cord pathology while prior intubation suggests for possible vocal fold trauma or paralysis, tracheal stenosis, or trachea-malacia (Geffin *et al.*, 1971). Typically, significant anatomic obstruction usually precedes overt symptoms. Significant upper airway obstruction may be obscured for a considerable period of time, resulting in delayed diagnosis and possible catastrophic outcome. By the time exertional dyspnea occurs, the airway diameter is likely to be reduced to about 8 mm and dyspnea at rest develops when the airway diameter reaches 5 mm, coinciding with the onset of stridor (Ernst *et al.*, 2004).

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Stridor is a loud, musical sound of constant pitch that usually connotes obstruction of the larynx or upper trachea (Forgacs, 1978). The patient may complain more breathless in recumbent position and may have a severely disrupted sleep pattern. Even some patients may present as sleep apnea syndrome with day time sleepiness. Maneuvers that increase air flow, such as voluntary hyperventilation, accentuate stridor (Forgacs, 1978). If neck flexion increases the intensity of stridor, it suggests a thoracic outlet obstruction. When the obstructing lesion is below the thoracic inlet, both inspiratory and expiratory stridor may be heard which may be mistaken for loud wheeze (Loudon and Murphy, 1984) as seen in above case. Muffling of the voice without hoarseness represents a supra-glottic process and hoarseness is the sign of a laryngeal abnormality (Loudon and Murphy, 1984). UAO may be functional or anatomic and may develop acutely or sub-acutely. Being tubular in nature narrowing of the upper respiratory tract has an exponential effect on airflow because linear airflow is a function of the fourth power of the radius (Khosh and Lebovics, 2001). The narrowest portion of the larynx is at the glottis in adults and the subglottis in infants. Laryngeal obstruction has a particular importance because the larynx is the narrowest portion of the upper airway and in acute cases needs emergency management (Dickison, 1987).

**Etiology Upper Airway Obstruction:** Etiology of upper airway obstruction depends upon the age and onset of obstruction. Infectious causes and foreign bodies are more common in children and onset tends to be more acute while post traumatic and malignancies are more common in adults and tend to present with sub-acute onset and hence may be missed in early stages. Various etiologies can be grouped as:

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|--|---|
| <b>1. Infections:</b>                                | 1) Tracheal stenosis post-tracheostomy  |
| 1) Suppurative parotitis                             | 2) Tracheal stenosis post-intubation  |
| 2) Retropharyngeal abscess                           | 3) Mucous ball from transtracheal catheter  |
| 3) Tonsillitis                                       | 5. <b>Vocal Cord-</b> paralysis/ Vocal cord dysfunction   |
| 4) Ludwig's angina                                   | 6. <b>Tumors:</b> Laryngeal tumors (benign or malignant)/ esophageal lesion, Laryngeal papillomatosis |
| 5) Epiglottitis                                      | 7. <b>Tracheal Stenosis:</b> (caused by intrinsic or extrinsic tumors)                                |
| 6) Laryngitis  | 8. <b>Angioedema:</b> Anaphylactic reactions  |
| 7) Laryngotracheobronchitis (croup)                  | C1 inhibitor deficiency, Angiotensin-converting enzyme inhibitors                                     |
| 8) Diphtheria  | 9. <b>Vascular rings-</b> e.g. Right-side aortic-arch   |
| <b>2. Trauma:</b>                                    |   |
| 1) Laryngeal trauma/ Hemorrhage                      |   |
| 2) Airway burn                                       |   |
| 3) Facial trauma (mandibular or maxillary fractures) |   |
| <b>3. Foreign Bodies</b>                             |   |
| <b>4. Iatrogenic:</b>                                |   |

**Investigations:** The most important diagnostic tool if UAO is suspected is a quick history and physical examination. It is useful to separate patients with potential UAO into those with severe symptoms and impending respiratory failure and those with a more indolent course and less severe symptoms.

**Plain Chest and Neck Radiographs:** Plain neck and chest films may show features such as tracheal deviation, extrinsic compression, or radiopaque foreign bodies but overall sensitivity is low. In one study, only 13 of 53 tracheal tumors were evident to the radiologist on the standard PA roentgenogram (Aboussoua and Stoller, 1994).

**Computed Tomography:** Computed tomography (CT) is important investigations in the stable as well in the unstable patients with an already secured airway. It provides information on the degree and extension of airway compromise in UAO. The sensitivity of CT scanning for detecting upper airway disease is 97 percent versus 66 percent compared to routine chest roentgenogram (Lee and Boisselle, 2010).

**MRI:** This is best used to investigate vascular structures surrounding central airways, such as vascular rings or aneurysms that may compress the trachea.

**Spirometry:** Its sensitivity is low in early stages as abnormalities in flow-volume loop develop only when airway lumen is less than 8 mm in diameter. Also the forced expiratory volume in 1 s (FEV<sub>1</sub>) remains



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above 90 percent of control until a 6-mm orifice is created (Owen and Murphy, 1983). But analysis of the flow-volume loops may be helpful suggesting the location and functional severity of the obstruction. Typical patterns of the flow-volume loop may be seen, depending on whether the obstruction to flow is “fixed” or “variable,” and whether the site of the obstruction is above or below the thoracic out let or suprasternal notch (Miller and Hyatt, 1969).

**Bronchoscopy:** Rigid or flexible bronchoscopy is the most effective tool in establishing diagnosis and frequently provides the best way to secure the airway as well to deliver treatment including laser therapy, photoresection, electrocautery electrosurgery, balloon bronchoplasty, and tracheal stenting once the airway has been secured and the patient stabilized (Ayers and Beamis, 2001).

**Management:** Establishing a secure and patent airway is the most important goal in the resuscitation of a patient with acute UAO. A quick evaluation considering age group, history, physical examination, and clinical circumstances helps determine the site and cause of obstruction, the severity of the obstruction, and the need to establish an airway urgently. Several medical and surgical approaches are available in the management of UAO. The selection of the intervention will depend on the cause of UAO and the urgency to obtain a secure airway.

**Heimlich Maneuver:** In the outpatient setting the most common cause of UAO is obstruction of the larynx with a foreign body. Heimlich maneuver is recommended for relief of the airway obstruction in adults and children one to eight years of age. Repeat abdominal thrusts may be needed to clear the airway.

**Racemic Epinephrine:** Racemic epinephrine administered by means of a nebulizer has been proven to be effective in treating croup (laryngotracheo- bronchitis) in the pediatric population decreasing morbidity, mortality, and hospital stay but is not effective in the treatment of epiglottitis and may be deleterious (Quan, 1992).

**Corticosteroids:** Corticosteroids have been used to treat UAO because of their potential beneficial effect in reducing airway edema.

**Heliox:** Heliox, a helium-oxygen gas mixture, is effective in reducing the work of breathing by decreasing airway resistance to turbulent flow in the density-dependent pressure drop across the airway obstruction. Use of heliox in patients with severe UAO should only be used to provide temporary support pending definitive diagnosis and management (Boorstein *et al.*, 1989).

**Endotracheal Intubation:** In most cases of UAO, the patency of the upper airway can be reestablished with endotracheal intubation after rapid assessment of the patient’s airway anatomy.

**Surgical Interventions:** Overall, emergency laryngotracheal intubation is effective in approximately 97% of cases. Thus, a surgical airway is needed in only 3% of such emergencies. Surgical airway is considered emergently mainly in cases of laryngotracheal trauma, foreign body lodged in the pharyngolaryngeal area or severe anatomic deformity caused by trauma.

**Cricothyroidotomy:** It is the procedure of choice in the emergency setting as it is easier to perform, simpler, and more likely to be successful than tracheotomy.

**Tracheostomy:** It is probably the last option available to establish an airway in acute UAO. The only indication for emergency tracheostomy is laryngeal trauma as it is a relative contraindication to cricothyroidotomy and laryngotracheal intubation. This procedure is time-consuming and requires expertise and attention to detail (Grillo, 2003).

**Laser Therapy:** Carbon dioxide or neodymium: yttrium-aluminum-garnet (Nd:YAG) laser therapy is used to treat intraluminal tracheobronchial lesions like tracheal webs, to treat benign obstructive lesions (papillomas), or as palliative therapy for malignant tracheobronchial lesions.

**Tracheal Stents:** These are helpful to maintain a patent airway in patients with tracheal obstruction caused by benign or malignant conditions. They are put either via rigid or flexible bronchoscopy. Airway stents can provide prolonged palliation from an unresectable recalcitrant benign stenosis or rapidly recurrent endoluminal tumor.

## Conclusion

Upper airway pathology presents with varied number of symptoms. So, always evaluate upper airway in patients who present with wheezy chest and are not responding to your treatment as response is expected.

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