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TRACHEAL STENOSIS MIMICKING ASTHMA.

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ABSTRACT

Tracheal stenosis is a rare complication of endotracheal intubation with serious sequelae. Its early manifestations can be mistakenly diagnosed as other pathology such as asthma or pneumonia. We report a case of a young lady with a history of endotracheal intubation, presenting with a history of noisy breathing for two months. Diagnosis of tracheal stenosis was made using flexible nasopharyngolaryngoscopy and neck radiograph. She was successfully treated by serial direct laryngoscopy and dilatation.

Keywords: Bronchial asthma, Dilatation, Stridor, Tracheal stenosis, Wheezing.

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TRAUMATIC TRACHEAL STENOSIS – A CASE REPORT.

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ABSTRACT

Tracheal stenosis is a rare complication of endotracheal intubation with serious sequelae. Its early manifestations can be mistakenly diagnosed as other pathology such as asthma or pneumonia. We report a case of a young lady with a history of endotracheal intubation, presenting with a history of noisy breathing for two months. Diagnosis of tracheal stenosis was made using flexible nasopharyngolaryngoscopy and neck radiograph. She was successfully treated by serial direct laryngoscopy and dilatation.

Keywords: Bronchial asthma, Cotton-Myer grading, Dilatation, Stridor, Trauma, Tracheal stenosis.

INTRODUCTION

Tracheal stenosis is a narrowing or stricture of the tracheal lumen that can occur as a complication of tracheostomy or endotracheal intubation, trauma, autoimmune disease, and others.¹ It usually has a subtle onset and its early manifestations can be mistakenly diagnosed as other pathology such as asthma. The attending physician should be able to pick up the signs and symptoms of tracheal stenosis so that immediate investigations and intervention can be performed and avoid further grave airway compromise. We report a case of a young lady with a history of endotracheal intubation, who presented with noisy breathing which was initially labelled as “wheezing” and

treated for bronchial asthma. Subsequently, the symptom worsened and reassessment noted that she had tracheal stenosis of Cotton-Myer grade III before being subjected to relevant management of tracheal stenosis.²

CASE REPORT

A 28-year-old lady with underlying controlled bronchial asthma, presented with a history of noisy breathing for 2 months. It was gradual in onset and got worse from intermittent to persistent noisy breathing on both inspiration and expiration. The symptoms were worse during physical activities, associated with intermittent shortness of breath, minimal coughing, and whitish sputum. Otherwise, there was no fever, no upper respiratory tract infection symptoms, hoarseness, dysphagia, or odynophagia. There was also no prolonged cough and no history of contact with tubercu-

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losis patients.

She had a history of motor vehicle accident about 2 months prior and she had sustained a severe traumatic brain injury and polytrauma. She was intubated with a size 7.0 mm endotracheal tube with no documentation of difficult intubation. The total duration of intubation was 11 days with one episode of failed extubation, where she was re-intubated for worsening respiratory distress post-extubation. She was then able to be extubated and discharged home. At home, she was well for 1 month until the presentation of noisy breathing.

During the early presentation of her symptoms, she went to the Emergency Department (ED) and was treated as an outpatient for acute exacerbation of bronchial asthma. The noisy breathing was recognised as 'wheezing' and nebulization was given. Her symptoms were slightly improved post nebulization and she was allowed for discharge. She came again after that with worsening symptoms, where this time tracheal stenosis was suspected given her presentation and history of intubation, hence the referral to an otolaryngologist was made.

Upon our assessment at the ED, the

patient was alert and not in respiratory distress. Biphasic stridor was audible, and there was no wheezing noted. There was no hoarseness and she spoke in complete sentences. She was comfortable under room air with an oxygen saturation of 100% and didn't need any oxygen supplementation. Her arterial blood gasses test showed good oxygenation and no carbon dioxide retention.

Soft tissue neck radiograph (anteroposterior and lateral view) showed tracheal stenosis at the level of the 7th cervical vertebra (C7), with the tracheal structure in midline position and the upper airway seeming patent (Figure 1). Chest radiograph showed no abnormal finding. An urgent plain computed tomography (CT) scan of the neck was performed, showing the presence of short segment tracheal luminal narrowing at the level of the C7 vertebra, which measured 0.5 cm in length, with the narrowest part measuring 0.5 cm in diameter and the distance of 3.5 cm from the vocal cord ([Figure 2](#)).

The patient was admitted for an elective procedure. Tracheostomy was kept in view in case of inability to achieve satisfactory dilatation or presence of stridor post-

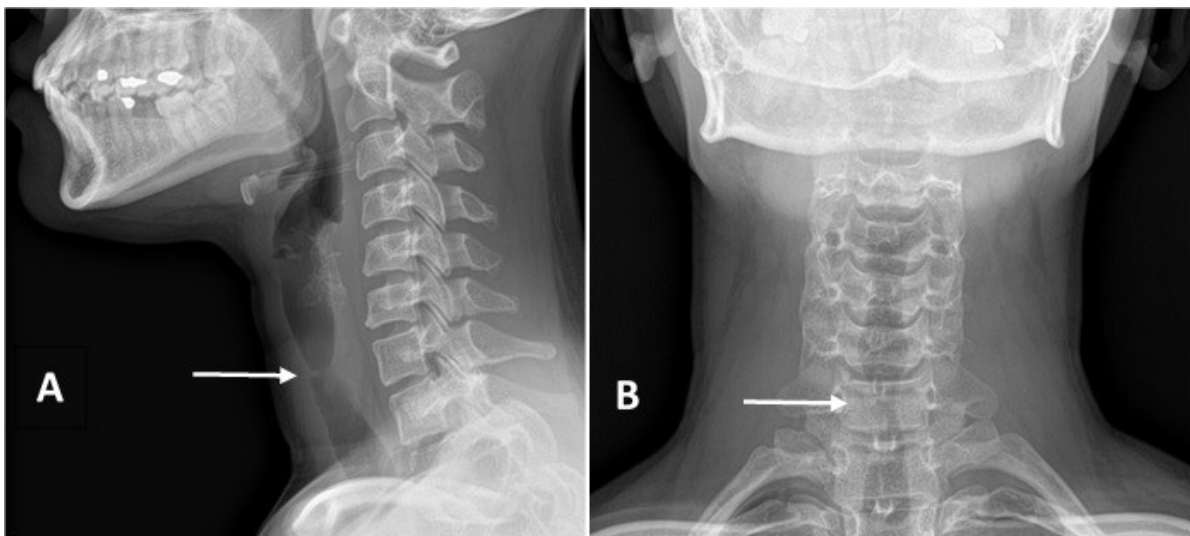


Figure 1: Soft tissue neck radiograph; lateral (A) and anteroposterior (B) view showed tracheal stenosis (arrow) at the level of 7th cervical vertebra (C7), with the tracheal structure in midline position and the upper airway appeared patent.



Figure 2: A plain computed tomography (CT) scan of the neck showed the presence of short segment tracheal luminal narrowing seen at the level of the C7 vertebra, which measures 0.5cm in length, narrowest part measuring 0.5cm in diameter and at the distance of 3.5cm from the vocal cord.

operatively. Flexible bronchoscopy was performed through the laryngeal mask airway (LMA) to assess the stenotic part, and then further procedures were performed with the aid of jet ventilation.

Direct laryngoscopy and telescopy were performed, with the finding of the membranous, short segment, circumferential tracheal stenosis at 86.4% obstruction (Cotton-Myer grade III). Steroid injection, radial incision, and balloon dilatation were performed, and we were able to dilate the stenosis until it became 48.8% obstruction which is Cotton-Myer grade I (Figure 3).

We were able to avoid tracheostomy in this patient and postoperatively, the patient was able to be extubated without any stridor. She further underwent serial dilation thrice using the same method with the latest tracheal stenosis at Cotton-Myer grade I.

DISCUSSION

Although tracheal stenosis is a rare occurrence, it can lead to life-threatening airway

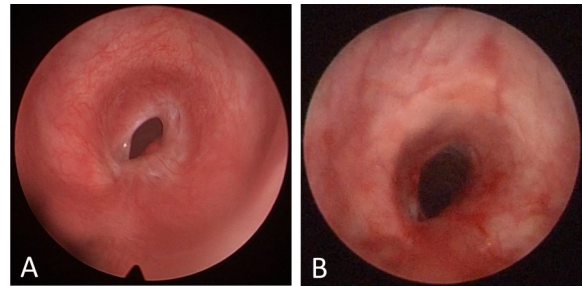


Figure 3: Intraoperative finding of pre-dilatation (A) and post-dilatation (B) of tracheal stenosis. Figure 4 (A) showed the membranous, short segment, circumferential tracheal stenosis at 86.4% obstruction (Cotton-Myer grade III) while Figure 4(B) showed post-dilatation of stenosis with 48.8% obstruction (Cotton-Myer grade I).

compromise and cause serious morbidity. The most common cause of tracheal stenosis is iatrogenic (54.7%), either post tracheostomy or endotracheal intubation, followed by idiopathic (18.5%), autoimmune (18.5%), and traumatic (8%).¹ There are a few mechanisms where endotracheal intubation can lead to tracheal stenosis. It can exert mechanical damage to the tracheal mucosa leading to ischemia-associated necrosis of the segment. Local infections and hypotensive states also can exacerbate the condition. A total of 654 intensive care patients that were reviewed showed the incidence of late post-intubation laryngotracheal stenosis is 4.6%.³

Among the risk factors for a patient to develop tracheal stenosis post-intubation include the size of the endotracheal tube and excessive pressure applied by the intubation tube cuff. The size of the endotracheal tube should be carefully considered in the smaller female trachea. Other risk factors include higher body mass index (BMI), diabetes mellitus, a period of intubation for more than 48 hours, and patients who are treated with irradiation.⁴ This patient was intubated for 11 days, using an endotracheal tube size 7.0 mm with a cuff which was an appropriate size for her. However, there was no available record of the cuff pressure monitoring during the intubation. This could be one of the potential causes for the tracheal injury as cuff pressure of 27 cm H₂O may reduce blood flow to the cuff side by 75%.⁵

It is of paramount importance that the attending primary care physician be able to pick up the signs and symptoms of tracheal stenosis so that immediate investigations and intervention can be performed and avoid further grave airway compromise. It can be difficult to diagnose a lower extent of stenosis. These patients are sometimes mistakenly treated for bronchial asthma, chronic bronchitis, or respiratory and circulatory insufficiency. Furthermore, patients usually remain asymptomatic until the tracheal stenosis involves up to 30% of its initial diameter.⁶

In a patient with a history of endotracheal intubation, a high index of clinical suspicion is very important because once suspected, tracheal stenosis can be easily diagnosed. A simple soft tissue neck radiograph and bedside FNPLS are among the immediate straightforward tests that can be done and give valuable information during the initial assessment.

In this patient, the extent and level of tracheal stenosis can be seen even with a soft tissue neck radiograph (Figure 1). We used Cotton-Myer grading for severity of laryngotracheal stenosis.²

The treatment options for tracheal stenosis depend on the aetiology, degree, and complexity of the stenosis. It includes steroid injection, endoscopic dilatation, laser therapy, stent placement, or open surgery. With early detection, tracheal stenosis can be adequately managed with intralesional steroid therapy and minimally invasive surgery, while high-grade stenosis, may require open laryngotracheal reconstruction or tracheal resection and anastomosis.⁷

CONCLUSION

The attending physician should be able to pick up the signs and symptoms of tracheal

stenosis so that immediate investigations and intervention can be performed and avoid further grave airway compromise. This condition can be assessed with the basic investigation, such as soft tissue neck radiograph and bedside FNPLS. Misdiagnosis or delay in diagnosis may result in an acute life-threatening event putting the patient's life at risk and medicolegal consequences.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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