

# Excessive dynamic tracheobronchial collapse in elderly patient - case report

## Abstract

It is described below a case report of a patient diagnosed with difficult-to-control asthma, with frequent exacerbations, without improvement after bronchodilation and corticosteroid optimization. After an extensive propaedeutic procedure, a diagnosis of tracheobronchomalacia (TBM) was established and continuous positive airway pressure treatment was instituted through CPAP. Based on the existing literature and in the case described, it was carried out a review about how to suspect, to diagnose and the therapeutic possibilities for TBM.

Volume 2 Issue 3 - 2017

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**Received:** May 22, 2017 | **Published:** October 09, 2017

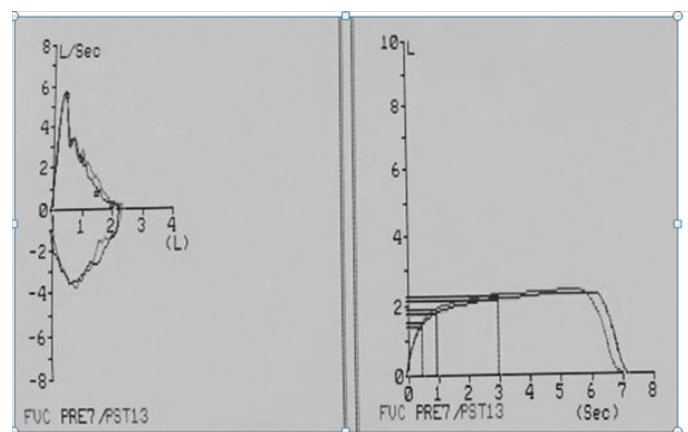
## Introduction

Tracheobronchomalacia (TBM) is defined as a condition in which the wall of the trachea and the primary bronchi becomes hypotonic and soft.<sup>1</sup> This change results in a reduction in the upper airway gauge, resulting in intermittent dyspnea, cough, wheezing, clearing secretions difficulties and recurrent pneumonia. Dynamic tracheo-bronchial collapse (DTBC) occurs even in healthy patients, with invagination of the posterior wall of the trachea during cough with light reduction of 18-39%. A distinction between TBM and DTBC has not yet been well established in the literature. There is still no consensus in the literature to classify a TBM, since there is no standard criteria regarding the techniques of measuring the caliber of the trachea and this is a measure of dependent operator. Thus, TBM is classified in degrees, depending on the clinical symptoms, appearance the trachea on dynamic chest tomography, degree of collapse of the airway on bronchoscopy and comorbidities or other associated abnormalities. This classification guides which therapeutic option is most appropriate for each patient. The prevalence in the general population is also unknown, but it occurs in 12% of patients who have already undergone fiberoptic bronchoscopy.<sup>2</sup> It is a cause to be researched during the period of these symptoms. We describe in this report, a case of a patient with tracheo-bronchial collapse and laryngeal stridor.

## Case report

JMM, 75-year-old male patient, ex-smoker, 53 pack-years, was admitted to a hospital unit complaining of dyspnea, wheezing, recurrent cough, initially dry and then productive with purulent secretion, with evolution about 6 months. In this period 3 cycles of antimicrobials were performed, with no improvement in symptoms, the last one being in the hospital at another service 15 days ago. At examination: obese (BMI 37) dyspnoea MRC 3, tachypnea respiratory frequency 26 and hypoxemia SpO<sub>2</sub> 85% without supplemental oxygen. Auscultation: presence of coarse snores, no crepitations and significant laryngeal stridor. Laboratory tests were performed: PCR 20, Hb 14.0 / Ht 41.3 / Platelets 123.000 / Total leukocytes

7430 (segmented 56.7% / eosinophils 3.1%), arterial blood gases: pH 7.47 / PCO<sub>2</sub> 35 / PO<sub>2</sub> 64 / HCO<sub>3</sub> 25 / Sat 94%. In the sputum examination, *Klebsiella pneumoniae* isolated, resistant to ampicillin and amoxicillin clavulanate. RX of the sinuses with hydroaerial level in the left maxillary sinus and mucosal thickening, RX thorax with no significant changes. Initiated treatment with piperacillin tazobactam, hydrocortisone 300mg/day and bronchodilator. After 3 days, the patient presented no clinical improvement and intensification of the laryngeal stridor, and so a research was performed for upper airway obstruction. Spirometry with normal spirometric parameters and change in the expiratory loop in the flow-volume curve (Figure 1) chest CT in forced inspiration and expiration with tracheal caliber reduction in 51% between phases (Figure 2) and fiberoptic bronchoscopy with presence of trachea and main bronchi with 90% lumen occlusion. With these exams, the diagnosis of expiratory tracheo-bronchial collapse was confirmed and CPAP treatment was initiated by face mask with a pressure of 8cmH<sub>2</sub>O, with a significant improvement of the clinical picture.



**Figure 1** Spirometry with normal spirometric parameters and change in the expiratory loop in the flow-volume curve.



**Figure 2** Chest CT in forced inspiration (A) and expiration (B) with tracheal caliber reduction >50% between phases.

## Discussion

Expiratory tracheo-bronchial collapse is a difficult diagnosis, and the patient is often treated with difficult to-control asthma or indeterminate mild dyspnea. They often use inhaled bronchodilators and oral corticosteroids with great frequency, without improving the symptoms. The clinical condition is characterized by chronic cough, dyspnea at rest and efforts, wheezing and laryngeal stridor. The diagnosis may be suspected through spirometry that shows reduction of peak flow and notch or oscillations of the expiratory loop of the flow-volume curve.<sup>3</sup> It is confirmed by chest CT in forced inspiration and expiration, with a reduction of 50% or more in the diameter of the trachea between the phases<sup>4</sup> and also by fiberoptic bronchoscopy with direct visualization of the reduction of the dynamic caliber on exhalation.<sup>5</sup> Flexible bronchoscopy is preferable to rigid bronchoscopy, since the patient is able to breathe spontaneously and respond to the examiner's commands.<sup>5</sup> Dynamic bronchoscopy

can also be used, since after changing the patient's decubitus, it is also possible to evaluate the airway dynamics. The recommended treatment depends on the severity of the symptoms.<sup>5</sup> It is based on the stabilization of the upper airway, in most cases, by continuous positive airway pressure (CPAP), and in specific cases, the surgical treatment may be performed with the membranous wall flap of the affected area or tracheo-bronchial stent implant (minimally invasive surgeries).<sup>5</sup>

## Conclusion

Tracheo-bronchial expiratory collapse could be an idiopathic or acquired disease and should be investigated in the patient with persistent cough, like difficult-to-control asthma (suspected by spirometry abnormalities) until respiratory failure. Diagnosis is confirmed by chest CT in forced inspiration/expiration and bronchoscopy. Regarding bronchoscopy, the absence of standard criteria of classification is still a problem, especially because the results depends on the examiner's experience. The treatment varies according to the patient's symptoms, and may consist from medical managements (smoking cessation and treatment of coexistent comorbidity) to the use of continuous positive airways pressure and/or surgical procedures.

## Acknowledgements

None.

## Conflict of interest

The authors declare that they have no competing interest.

## References

1. Majid A, Fernández L, Bussy SF, et al. Tracheobronchomalacia. *Archivos de Bronconeumologia*. 2009;46(4):196–202.
2. Loring SH, O'donnell CR, Feller-Kopman DJ, et al. Central airway mechanics and flow limitation in acquired tracheobronchomalacia. *Chest*. 2007;131(4):1118–1124.
3. Carden KA1, Boiselle PM, Waltz DA, et al. Tracheomalacia and tracheobronchomalacia in children and adults: an in-depth review. *Chest*. 2005;127(3):984–1005.
4. Boiselle PM, Donnell CR, Bankier AA, et al. Tracheal collapsibility in health volunteers during forced expiration: assessment with multidetector CT. *Radiology*. 2009;252(1):255–262.
5. Murgu SD, Colt HG. Tracheobronchomalacia and excessive dynamic airway collapse. *Respirology*. 2006;11(4):388–406.