

## TRACHEOBRONCHOMALACIA

P.A. de Jong, M.G. Lam<sup>1</sup>

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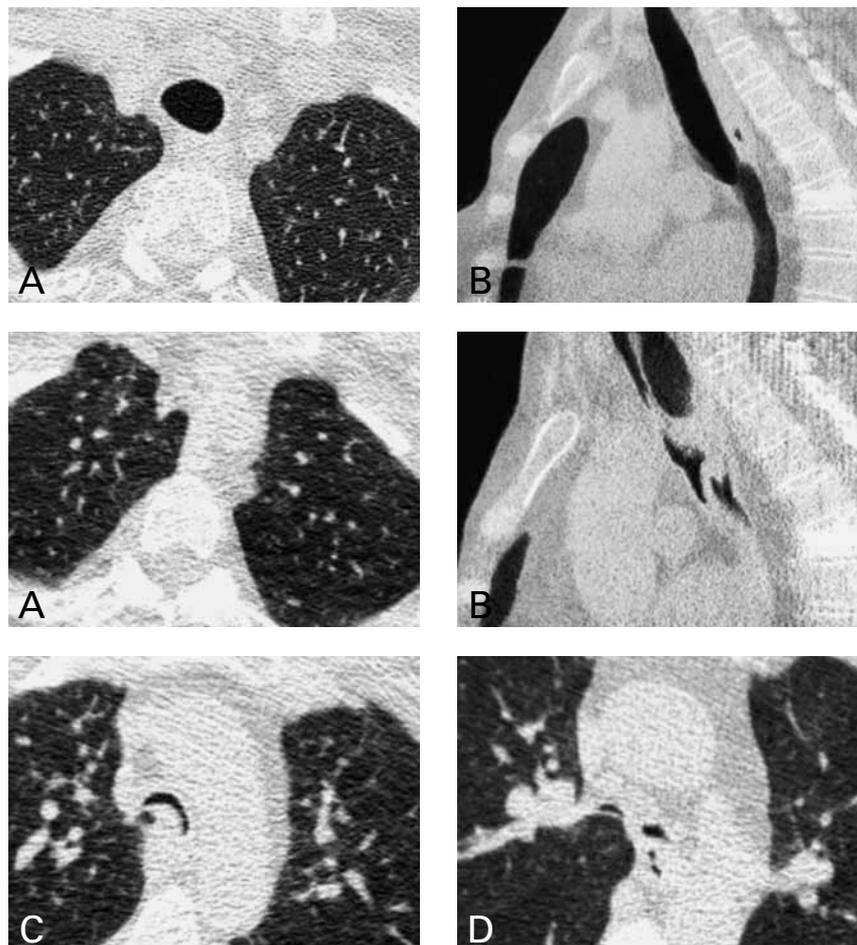
**Background:** A 51-year-old female patient was referred for a high-resolution CT scan of the lungs, to screen for bronchiectasis and infection. She had a long medical history starting with right sided breast cancer (pT2N0M0) in 1993 for which she was treated with curative intention (mastectomy with peri-operative chemotherapy and post-operative radiotherapy: 50 Gray in 25 fractions).

In 2001, a suspicious lesion was seen on routine chest radiograph during follow-up. On a subsequent CT scan, the lesion could not be characterized with certainty. Therefore, a diagnostic thoracotomy was performed. On pathologic examination, the lesion consisted of reactive organizing cells without signs of malignancy.

After thoracotomy, she started having chest pain with severe dyspnea and suffered from recurrent lung infections, unexplained airway obstruction and atypical asthma (there was little reversibility of the airway obstruction with medical bronchodilatation).

She was hospitalized many times because of dyspnea and chest pain. Coronary insufficiency, lung emboli or cardiac failure could not be diagnosed. The final working diagnosis was atypical asthma with recurrent exacerbations and infections. The chest pain was diagnosed as neuropathic pain after mastectomy, radiotherapy and thoracotomy.

She was severely disabled, depending on oxygen supply at home.



	1A	1B
Fig.	2A	2B
	2C	2D

1. Department of Radiology, University Medical Center Utrecht, Utrecht, The Netherlands

## Work-up

CT scan of the thorax (high resolution) (Fig. 1) is a volumetric scan during inspiration. It consists of an axial (A) and sagittal reformatted (B) image. The inspiratory scan is unremarkable. There are no signs of acute infection nor bronchiectasis.

CT scan of the thorax (high resolution), volumetric scan during expiration (Fig. 2) includes an axial (A) and sagittal reformatted (B) image. The expiration scan demonstrates a total collapse of some parts of the intra-thoracic trachea. No focal areas of air trapping are observed. Sections at a lower level (C, D) show major reduction (> 50%) of the cross-sectional airway lumen area of some other parts of the trachea as well as the proximal right and left main bronchus.

## Radiological diagnosis

Based on these findings, the radiological diagnosis *tracheobronchomalacia* was made.

## Discussion

Tracheomalacia and tracheobronchomalacia (TBM) are conditions characterized by excessive collapse of the trachea and/or main bronchi related to weakness of the airway wall and supporting cartilaginous rings and by increased flaccidity of the membranous portion of the central airways. TBM leads to inefficient cough, mucus retention and recurrent infections. Clinical symptoms are non-specific and may consist of dyspnea, chronic cough, stridor, wheeze and recurrent respiratory tract infections. Many adults are misdiagnosed with emphysema, asthma or chronic bronchitis, and the condition is widely regarded as underdiagnosed.

Bronchoscopy with direct visualization of tracheal or bronchial collapse is considered the diagnostic reference standard. Coughing maneuvers during bronchoscopy are considered the most sensitive method of diagnosis. A test is generally considered positive when there is a > 50% reduction in airway lumen.

In adults, TBM is most commonly acquired: it can develop post-intubation, post-tracheostomy, related to emphysema, chronic infection and inflammation or to chronic airway compression. In symptomatic individuals TBM requires treatment ranging from supportive care (physiotherapy,

antibiotics, influenza vaccination) to nasal continuous positive pressure ventilation to stent placement and surgery. In the presented case, chest pain and dyspnea started after a diagnostic thoracotomy and, therefore, TBM may have been related to the thoracotomy and the peri-operative period.

A greater than 50% reduction of cross-sectional airway lumen area on expiratory CT may be an incidental finding and it is considered diagnostic for the disease.

In a recent study of 14 patients suspected of having tracheo(broncho)malacia, it was demonstrated that dynamic cine multidetector computed tomography (MDCT) demonstrated a greater degree of tracheal collapse compared to end-expiratory CT. So, when CT imaging is requested specifically in a patient suspected of TBM, dynamic CT (during forced expiration and/or coughing) may be the preferred technique. In routine clinical practice, high-resolution CT images are usually obtained at suspended inspiration and end-exhalation. TBM is often misdiagnosed and patients with aspecific symptoms often do not undergo bronchoscopy. Therefore, the radiologist has an important role by mentioning excessive tracheobronchial cross-sectional area reduction on expiratory CT scans. It is important not only to look at the posterior tracheal wall to determine whether the scan was obtained during good expiration, but also whether the expiratory aspect of the trachea harbors the diagnosis.

## Bibliography

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