




# Plastic bronchitis caused by *Haemophilus influenzae*

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## Key message

Plastic bronchitis is characterized by sputum obstructing the bronchus and causing atelectasis. Bronchoscopic removal of the clogged bronchial cast is typically performed, but small-diameter bronchoscopes with narrow suction ports cannot achieve adequate suction. Suction using a bronchoscope as a guide sheath may be effective for treating plastic bronchitis in children.

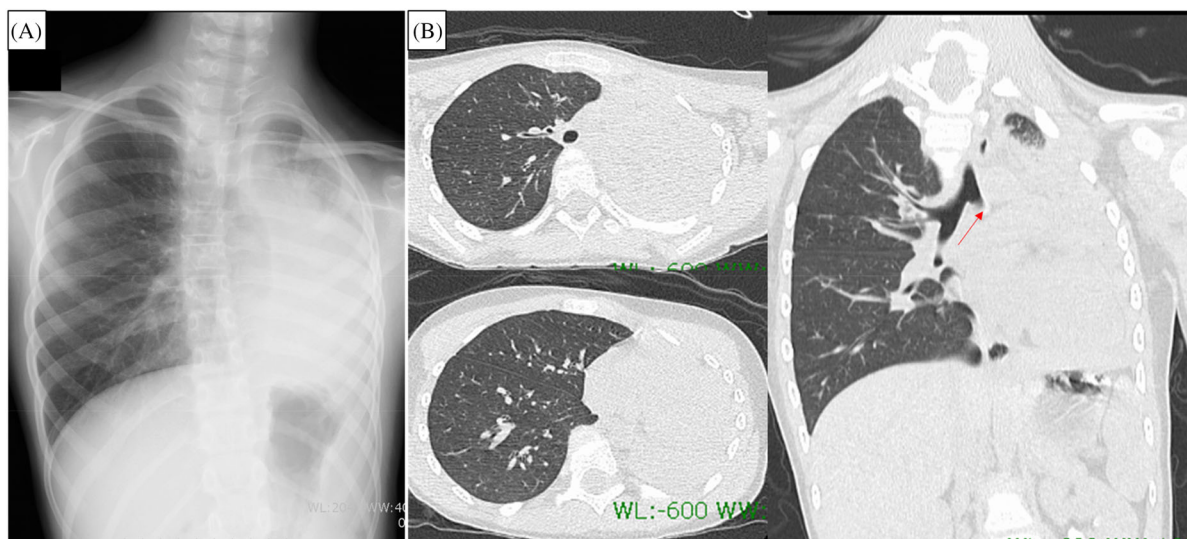
## KEYWORDS

atelectasis, bronchoscopy, chest radiography, *Haemophilus influenzae*, plastic bronchitis

## CLINICAL IMAGE

A 9-year-old Japanese girl with asthma was transferred to our hospital due to dyspnea and hypoxemia. Left chest auscultation

was inaudible, and chest radiography revealed left lung atelectasis (Figure 1). Multi-parametric viral and bacterial tests (FilmArray<sup>®</sup>) were all negative. She was endotracheally intubated (outer diameter, 6.7 mm; inner diameter 5.5 mm) under

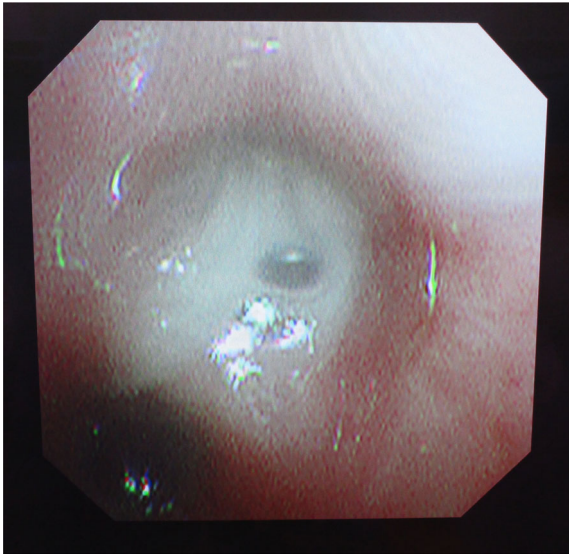


**FIGURE 1** Chest x-ray (A) and high-resolution computed tomography (HRCT) (B) on admission showing atelectasis in the entire left lung and obstruction by bronchial secretions in the lumen of the left main bronchus (red arrow).

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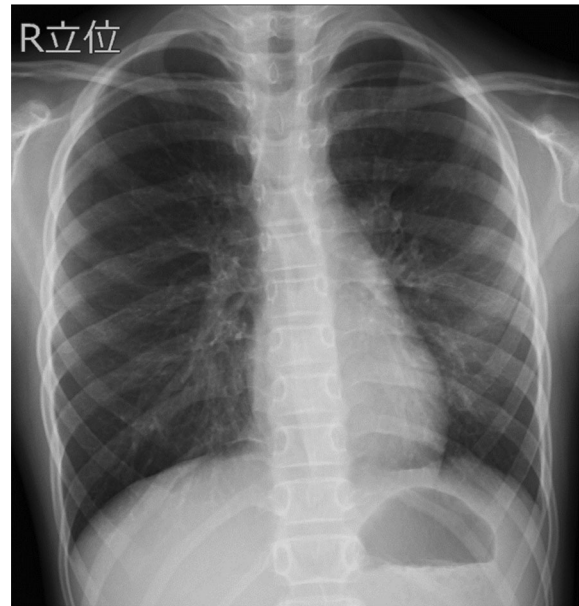
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general anaesthesia, and bronchoscopy was performed using a small-diameter bronchoscope (outer diameter, 3.5 mm; forceps mouth, 1.2 mm). The left main bronchial lumen was obstructed by bronchial secretions (Figure 2); therefore, suction was attempted via a bronchoscope but proved ineffective.

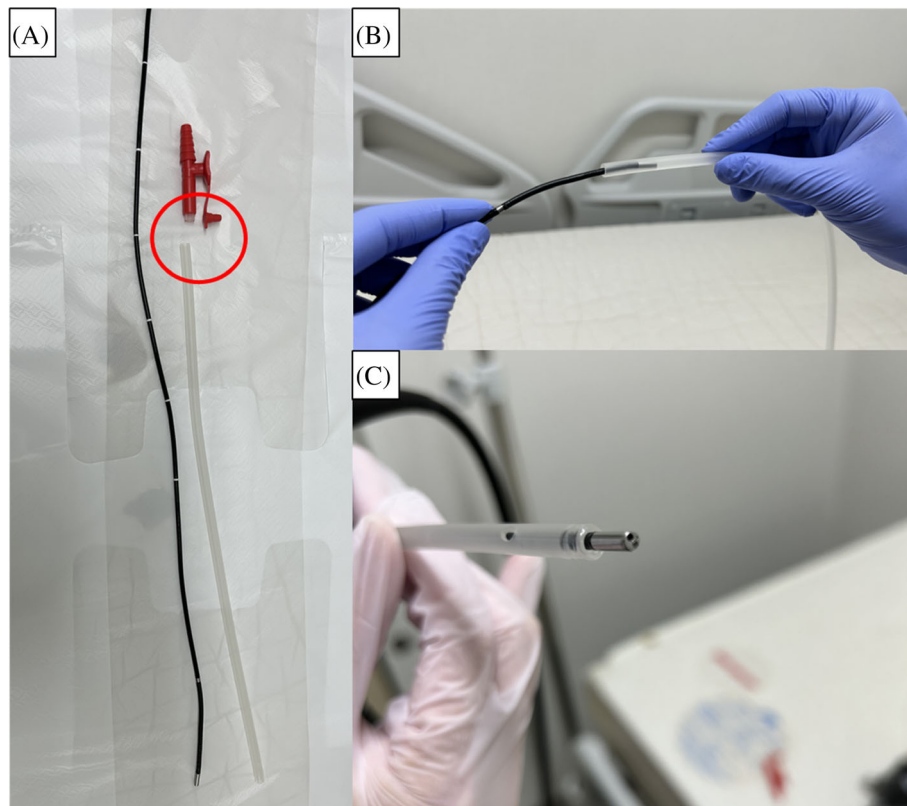


**FIGURE 2** The left main bronchial lumen obstructed with bronchial secretions.

Consequently, a bronchoscope was inserted into the suction tube (outer diameter, 6.0 mm; inner diameter 4.2 mm) (Figure 3), advanced, and pulled out at the occluded area, and



**FIGURE 4** Chest x-ray taken 5 days after the bronchoscopic treatment, showing resolution of the left-lung atelectasis.



**FIGURE 3** Bronchoscope and suction tube. We cut a part of the suction tube (A, red circle), inserted the bronchoscope into the suction tube (B), set it as shown in C, and inserted it into the endotracheal intubation tube.

suctioning was performed using the suction tube. This successfully released the obstructing bronchial secretions, from which *Haemophilus influenzae* was cultured. The patient was treated with antibiotics and regular bronchial secretion suctioning. Chest radiography on the fifth day after admission showed resolution of the left lung atelectasis (Figure 4). From these clinical findings, she was diagnosed with plastic bronchitis caused by *H. influenzae*. The aetiology of plastic bronchitis is diverse and includes infections such as *H. influenzae*,<sup>1</sup> iatrogenic causes, and surgical procedures.<sup>2</sup> Extracellular trap cell death (ETosis) and the reticulated DNA released from the cell nucleus, especially eosinophils, during ETosis are notably viscous. This viscous DNA has been reported to contribute to the formation of mucous plugs in plastic bronchitis.<sup>3</sup> Plastic bronchitis has also been reported in patients with bronchial asthma,<sup>4</sup> and the aetiology of plastic bronchitis in our patient may be attributed to a combination of bronchial eosinophil activation induced by uncontrolled bronchial asthma and increased bronchial secretions due to *H. influenzae* infection.

#### AUTHOR CONTRIBUTIONS

Kei Yamasaki was responsible for drafting the work; conception and design of the work; and acquisition, analysis, and interpretation of the data. Toshiki Morimoto performed bronchoscopy and critically revised the manuscript for important intellectual content. Kohei Hashimoto performed bronchoscopy and critically revised the manuscript for important intellectual content. Sadanobu Yamaguchi critically revised the manuscript for important intellectual content. Masaru Kawamura critically revised the manuscript for important intellectual content. Kazuki Nemoto critically revised the manuscript for important intellectual content. Takako Kawaguchi was responsible for revising the manuscript critically for important intellectual content. Takashi Tachiwada provided special advise for bronchoscopy and critically revised the manuscript for important intellectual content. Kazuhiro Yatera was responsible for the final approval of the manuscript version to be published.

#### CONFLICT OF INTEREST STATEMENT

None declared.

#### DATA AVAILABILITY STATEMENT

Data sharing not applicable - no new data generated.


#### ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained from the patient's parents for the publication of this manuscript and the accompanying images.

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