Bronchiolite sévère à rhinovirus révélant une fronde de l'artère pulmonaire gauche chez un nourrisson prématuré

Severe Rhinovirus Bronchiolitis Unmasking Left Pulmonary Artery Sling in a Preterm Infant

Asma Ben Halima[1], Amal Elleuch[1*], Rania Gargouri[2], Amina Kammoun[3], Faiza Safi[1]

[1] Department of Pediatric Intensive Care, Hedi Chaker Hospital, Sfax, Tunisia
[2] Department of Cardiology, Hedi Chaker Hospital, Sfax, Tunisia
[3] Department of Radiology, Hedi Chaker Hospital, Sfax, Tunisia

Auteur correspondant / Corresponding author : Elleuch Amal. Department of Pediatric Intensive Care, Hedi Chaker University Hospital, 3029 Sfax, Tunisia. elleuch_amal@medecinesfax.org

ABSTRACT

Introduction : Pulmonary artery sling is a rare congenital vascular anomaly characterized by an aberrant origin of the left pulmonary artery from the right pulmonary artery, with an anomalous course between the trachea and esophagus. This condition can cause varying degrees of airway compression, leading to respiratory distress and recurrent infections, particularly in infants.

Case report : We report a preterm infant admitted for severe rhinovirus bronchiolitis requiring prolonged mechanical ventilation and repeated extubation failures. Further investigations revealed a left pulmonary artery sling.

Conclusion : This case highlights the importance of thorough diagnostic assessment in infants with atypical respiratory presentations.

Keywords : Bronchiolitis, Rhinovirus, Pulmonary artery sling, Infant, Airway anomaly

RÉSUMÉ

Introduction : La fronde de l'artère pulmonaire est une anomalie vasculaire congénitale rare, caractérisée par une origine aberrante de l'artère pulmonaire gauche à partir de l'artère pulmonaire droite, avec un trajet anormal entre la trachée et l'œsophage. Cette malformation peut entraîner des degrés variables de compression des voies aériennes, responsables d'une détresse respiratoire et d'infections respiratoires récidivantes, en particulier chez le nourrisson.

Observation : Nous rapportons le cas d'un nourrisson prématuré admis pour une bronchiolite sévère à rhinovirus ayant nécessité une ventilation mécanique prolongée, compliquée par plusieurs échecs d'extubation. Les investigations complémentaires ont permis de mettre en évidence une fronde de l'artère pulmonaire gauche.

Conclusion : Cette observation souligne l'importance d'une évaluation diagnostique approfondie chez les nourrissons présentant des manifestations respiratoires atypiques.

Licence CC BY-NC-ND 4.0

Pour citer cet article : Ben Halima A, Elleuch A, Gargouri R, Kammoun A, Safi F. Bronchiolite sévère à rhinovirus révélant une fronde de l'artère pulmonaire gauche chez un nourrisson prématuré. Rev Maghr Pédiatr.

CASE REPORT

A preterm male infant, aged 1 month and 16 days, presented with rapidly progressive respiratory distress shortly after discharge following hospitalization for bronchiolitis.

Born at 34 weeks' gestation from a twin pregnancy conceived via in vitro fertilization, with a birth weight of 1700 g, he had no significant neonatal complications.

Initially admitted for moderate bronchiolitis, he was discharged after five days. Within 24 hours, he was readmitted due to worsening respiratory distress. On arrival, he was tachypnoeic with marked suprasternal, intercostal, and subcostal retractions, requiring non-invasive ventilation. Bilateral crackles were present, without cardiac murmur.

Chest radiography revealed right apical atelectasis and left lung hyperinflation. Nasal immunofluorescence was positive for rhinovirus.

Despite supportive care, his respiratory status deteriorated, necessitating intubation and invasive mechanical ventilation. The course was complicated by repeated extubation failures, persistent respiratory distress, and recurrent right-sided

atelectasis following extubation attempts, eventually progressing to complete right-lung atelectasis.

Persistent respiratory symptoms, recurrent atelectasis, and repeated extubation failures prompted further investigation. Transthoracic echocardiography revealed no intracardiac shunt, preserved biventricular function, and no pulmonary hypertension. The main pulmonary artery had a normal diameter; however, the left pulmonary artery was not adequately visualized, and left pulmonary artery stenosis was suspected. Because of the persistent respiratory abnormalities and repeated extubation failures, further imaging was planned to investigate an underlying structural abnormality.

Gradual respiratory improvement subsequently allowed successful extubation after multiple attempts, followed by progressive oxygen weaning. The patient was discharged on November 24, 2025.

Thoracic CT angiography performed on January 23, 2026, at the age of 4 months and 17 days, confirmed a left pulmonary artery sling with associated tracheal compression (Figure 1).

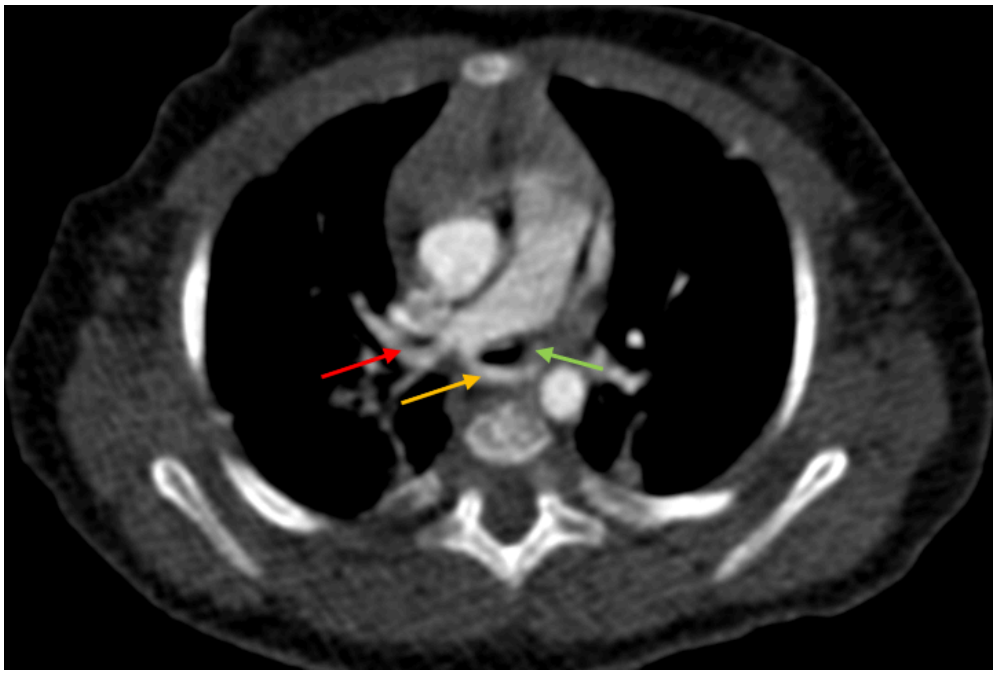


Figure 1. Chest CT scan: Axial mediastinal-window image obtained after intravenous contrast administration
Aberrant left pulmonary artery (red arrow) arising from the right pulmonary artery (yellow arrow), coursing posterior to the trachea (green arrow), and reaching the left hilum by passing between the trachea and the esophagus

The patient subsequently underwent surgical correction on April 22, 2026, at approximately 7 months of age, with reimplantation of the left pulmonary artery into the main pulmonary trunk under cardiopulmonary bypass. No immediate perioperative surgical complications were reported. The postoperative course was complicated by pneumonia, and mechanical ventilation was required for four days.

Postoperative echocardiographic assessment demonstrated successful reimplantation with no Doppler flow acceleration at the anastomotic site. Pulmonary pressures remained low, estimated by Doppler echocardiography from pulmonary regurgitation flow, with a mean pulmonary artery pressure of 8 mmHg and a diastolic pulmonary artery pressure of 3 mmHg.

During subsequent follow-up, the infant remained free from respiratory support, although baseline dyspnea persisted and maintenance asthma therapy was initiated. Tracheomalacia was suspected as a possible contributor to the persistent respiratory symptoms; however, no bronchoscopy or dynamic airway assessment was performed, and therefore tracheomalacia was not objectively confirmed.

DISCUSSION

Bronchiolitis is usually a self-limited condition; however, an atypical or severe course should prompt consideration of underlying structural abnormalities [1]. Persistent respiratory distress, recurrent atelectasis, and repeated extubation failure are important clinical clues suggesting an alternative or associated diagnosis. Left pulmonary artery sling is a rare congenital vascular anomaly in which the left pulmonary artery arises from the right pulmonary artery and courses between the trachea and esophagus [2,3]. This abnormal trajectory may result in airway compression and varying degrees of respiratory compromise [4].

Although the infant was conceived through in vitro fertilization, no causal relationship between assisted reproductive technology and pulmonary artery sling can be established from this individual case. IVF is therefore reported as part of the clinical history without attributing a causal role.

The clinical presentation is heterogeneous, ranging from mild respiratory symptoms to severe distress requiring ventilatory support [3,4]. In some cases, symptoms may be triggered or exacerbated by intercurrent respiratory infections, delaying diagnosis by mimicking common conditions such as bronchiolitis [5]. In the present case, the diagnosis was suspected due to persistent and severe respiratory symptoms despite appropriate management. Recurrent atelectasis and repeated extubation failure led to further imaging, which identified the vascular anomaly.

Persistent respiratory symptoms after surgical correction may occur in some patients because of associated airway abnormalities, particularly tracheomalacia. In the present case, tracheomalacia was suspected as a possible contributor to the persistent respiratory symptoms; however, no bronchoscopy or dynamic airway assessment was performed, and therefore this diagnosis was not objectively confirmed. Thoracic computed tomography plays a key role in confirming the diagnosis and evaluating the relationship between vascular structures and the airway [3,6,7]. Early recognition is essential, as management depends on symptom severity and may require surgical correction in selected cases [2,6,8]. This case emphasizes the importance of considering vascular airway anomalies in infants with severe or atypical bronchiolitis, particularly when the clinical course involves prolonged respiratory support or difficulty weaning from ventilation.

CONCLUSION

An atypical or severe course of bronchiolitis warrants prompt evaluation for underlying structural abnormalities, including rare entities such as pulmonary artery sling. Early recognition enables timely and targeted management, while persistent respiratory morbidity may remain in the presence of associated airway abnormalities. Clinicians should maintain a high index of suspicion in cases unresponsive to standard therapy.

Conflict of Interest. The authors declare that they have no conflict of interest.

Author Contributions. Amal Elleuch : Supervision, critical revision of the manuscript, and final approval of the version to be published. Asma Ben Halima: Conceptualization, data collection, clinical management of the patient, and drafting of the manuscript. Rania Gargouri : Data collection and interpretation, participation in manuscript drafting. Amina Kammoun : Contribution to patient management and manuscript revision. Faiza Safi : Senior supervision, critical revision of the manuscript, and final approval.

Funding Statement / Financial Disclosure. The authors have no relevant financial or non-financial interests to disclose. No external funding was received for this work.

Acknowledgements. I thank the co-authors for their expertise and assistance throughout all aspects of our study and for their help in writing the manuscript. Informed Consent / Patient Consent: Written informed consent for publication of the patient's clinical details was obtained from the patient's parent. Trial Registration Number / Date: Not applicable. Grant Number: Not applicable.

Data Availability Statement. The data that support the findings of this study are available from the corresponding author upon reasonable request.

RÉFÉRENCES

[1] Meissner HC. Viral bronchiolitis in children. N Engl J Med. 2016;374:62–72.

[2] Backer CL, et al. Pulmonary artery sling: current results with surgical repair. J Thorac Cardiovasc Surg. 2012;143:144–51.

[3] Chen SJ, et al. Left pulmonary artery sling: prenatal and postnatal features. Circulation. 2005;111:1582–8.

[4] Newman B. Congenital anomalies of the pulmonary arteries. Radiol Clin North Am. 2005;43:215–24.

[5] Midulla F, et al. Respiratory syncytial virus and rhinovirus bronchiolitis. Pediatrics. 2010;126:e1453–61.

[6] Humphrey C, et al. Pulmonary artery sling: classification and surgical management. Ann Thorac Surg. 2006;82:225–31.

[7] Berdon WE. Rings, slings, and other things: vascular compression of the infant trachea. Radiology. 2000;216:624–32.

[8] Newman B, et al. Imaging of congenital pulmonary vascular anomalies. Radiographics. 2007;27:1023–34.