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A case report of co-infection with two atypical pathogens: a particular case report

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Abstract

This case report describes a young asthmatic patient who contracted a dual infection with *Chlamydia pneumoniae* and *Mycoplasma pneumoniae.* The co-infection exacerbated the asthmatic symptoms, leading to significant complications. A literature review highlights how such atypical infections can aggravate respiratory conditions in patients with pre-existing asthma. Clinical patient management, including antibiotic therapy and respiratory support, led to a progressive resolution of the clinical picture. This case underscores the importance of considering atypical infections in the differential diagnosis of asthmatic patients with acute symptom worsening.

Key words: co-infection, asthma, pulmonology, airflow, obstruction.

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Introduction

Respiratory infections caused by atypical pathogens, such as *Chlamydia pneumoniae* and *Mycoplasma pneumoniae*, present diagnostic and therapeutic challenges, especially in patients with chronic respiratory conditions like asthma. These microorganisms are known to cause lower respiratory tract infections that can mimic other respiratory conditions and complicate the clinical course of asthmatic patients.[1] Simultaneous infection with both pathogens can lead to severe clinical manifestations, including Acute Respiratory Distress Syndrome (ARDS). In this article, we report the case of a young asthmatic patient who contracted a co-infection with *Chlamydia pneumoniae* and *Mycoplasma pneumoniae*, discussing the clinical and therapeutic implications based on evidence from the literature.[2]

Case Report

A 39-year-old Caucasian man presented to my pulmonology clinic, "Ambulatorio La Madonnina," in March 2024, with reported episodes of fever, reaching up to 38.5°C, lasting approximately 2 weeks, accompanied by cough with yellowish mucus, dysphonia, and dyspnoea. The patient also visited the Polistena emergency room (Italy) in March due to abdominal pain, described as unspecified gastralgia. A Computed Tomography (CT) scan of the abdomen revealed a small hernia of epiploic fat in the transverse mesocolon. A subsequent cardiac examination indicated sporadic ventricular extrasystoles, and atrioventricular valve incontinence, primarily affecting the mitral valve, along with left atrial enlargement. The patient's medical history includes being a non-smoker, obese (Body Mass Index: 33 kilograms/m^2), and having a prior episode of bronchopneumonia at 9 years of age. His surgical history includes adenoidectomy and tonsillectomy at 5 years of age, meniscectomy, ankle surgery, and inguinal cyst removal. He has documented allergies to iodinated contrast medium, intolerance to high doses of cortisone, and allergies to aeroallergens, specifically (dust mites). Notably, there was no professional exposure to dust or asbestos. Chest radiography performed in mid-March showed no pleuro-parenchymal lesions. Physical examination revealed a cylindrical chest, clear pulmonary sounds, and hypotransmitted tactile vocal fremitus bilaterally. A respiratory vesicular murmur characterised by crackling rales was noted at the right lung base, with associated expiratory wheezing. Consequently, the patient was advised to start empirical broad-spectrum antibiotic therapy with azithromycin, amoxicillin/clavulanic acid, and oral cortisone, with adequate gastric protection. The patient was also recommended the administration of inhaled corticosteroids/long-acting beta-agonists at two inhalations twice daily as maintenance therapy, along with a chest CT scan, and laboratory tests for *M. Pneumoniae*, and *C. Pneumoniae*, *Legionella*, and *Pneumococcus* (Table 1). Spirometry results indicated normal findings, with a negative bronchoreversibility test for bronchial asthma. However, serial assessments showed significant variations in forced expiratory volume in one second and forced expi-

ratory flow 25-75%, as illustrated in Table 2. The chest CT revealed minimal bilateral fissural thickening without pleuro-pericardial effusion (Figure 1). Based on the laboratory results, the patient was treated with doxycycline 40 milligrams/day for 30 days, along with an additional course of azithromycin, followed by re-evaluation. At the follow-up visit, the following diagnoses were established: asthma exacerbation due to atypical microorganisms and radiological signs of bilateral scissuritis.

Discussion

The presence of respiratory co-infections in asthmatic patients is a significant area of study, as it can profoundly impact clinical management and outcomes. Co-infection with *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* can be associated with more severe clinical features, especially in the presence of concurrent viral infections such as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), as described by several scientific studies during the pandemic.[3,4] This is particularly relevant in the context of the Coronavirus-2019 (COVID-19) pandemic, where co-infections can further complicate the clinical and therapeutic scenario. Some authors have described clinical cases of Acute Respiratory Distress Syndrome (ARDS) caused by co-infection with these two atypical pathogens, highlighting the importance of timely and accurate diagnosis to prevent adverse outcomes.[5,6] Diagnosing infections with *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* can be challenging due to their clinical presentation overlapping with other respiratory infections and the need for specific diagnostic tests such as Polymerase Chain Reaction (PCR) and serology.[7,8] Scientific literature suggests that these infections can cause lower respiratory tract diseases in pediatric patients, which can be extended to young adults with chronic respiratory conditions. Many studies have also emphasized that co-infection with SARS-CoV-2 can significantly worsen the clinical course in patients with infections caused by *Chlamydia pneumoniae* and *Mycoplasma pneumoniae*.[9,10] In this clinical case, the patient, a young adult with a history of well-controlled asthma, developed an acute exacerbation of respiratory symptoms.[11] Chest X-ray and computed tomography showed bilateral infiltrates, while microbiological tests confirmed the presence of both pathogens.[12] Clinical management required a combination of specific antibiotics and respiratory support therapy, with careful mon-

Table 1. The table displays elevated IgM and IgA levels, which gradually decrease with serial laboratory monitoring and specific antibiotic therapy. Urinary antigen tests for *Legionella* and *Pneumococcus* were negative.

Laboratory exams	29/03/24		30/04/24		29/05/24	
Mycoplasma pneumoniae	*IgA*	21AU/ml	IgA	18 AU/ml	IgA	10 AU/ml
	IgG	9 AU/ml	IgG	10 AU/ml	IgG	5,2 AU/ml
	IgM	21 Index	IgM	13 Index	IgM	8,8 Index
Chlamydia pneumoniae	*IgA*	21AU/ml	IgA	17 AU/ml	IgA	13 AU/ml
	IgG	13AU/ml	IgG	15 AU/ml	IgG	28 AU/ml
	IgM	21 Index	IgM	17 Index	IgM	0,3 Index
Urinary antigen Legionella	Negative		/		/	
Urinary antigen Pneumococcus	Negative		/		/	

Normal values Ig *C. pneumoniae:* For IgA <10 negative; ≥10 and <13 doubtful; ≥13 positive; For IgG <10 negative; ≥10 and <12 doubtful; ≥12 positive For IgM <10 negative; ≥10 and <15 doubtful; ≥15 positive. Normal values *Ig M. pneumoniae*: <10 negative, ≥10 positive.

Table 2. Global spirometry results using PulmOne MiniBox+ (Medical Graphics Italia S.r.l.; Milan, Italy). The spirometry values show a significant increase in Forced Expiratory Volume in one second (FEV_1) (+240 mL) post-bronchodilator after 3 months of therapy with Inhaled Corticosteroids/Long-Acting Beta-Agonists (ICS/LABA). There is also a reduction in mid-expiratory flows (74% of the predicted value), indicative of lower airway pathology responsive to salbutamol. These findings are consistent with bronchial asthma in the context of a lower airway infection.

Spirometric parameters calculated	Predicted value (pre-BD)	Predicted value (post-BD)	Percentage change from predicted value	Predicted value post three months of ICS/LABA
FEV_1	4,33L - 88%	4,52L - 92%	+4%	4,57L - 93%
FVC	5,67L - 92%	5,74L - 93%	+1%	5,75L - 93%
FEV_1/FVC	76,24%	78,79%	+3%	79,41%
FEF 25-75	3,46L/sec - 74%	3,98 L/sec - 85%	+15%	4,05L/sec - 87%
PEF	11,69L/sec - 115%	11,55L/sec - 114%	-1%	12,53L/sec - 124%
TLC	6,82L - 82%	/	/	7,00L - 84%
RV	1,15L - 62%	/	/	1,24L - 66%
RV/TLC	16,87 - 77%	/	/	17,78 - 80%
IC	5,09L - 113%	/	/	5,41L - 121%

BD, Bronchodilator; ICS/LABA, Inhaled Corticosteroids/Long-Acting Beta-Agonists; FEV_1, Forced Expiratory Volume in one second; FVC, Forced Vital Capacity; FEV_1/FVC, FEV_1/FVC ratio; FEF 25-75, Forced Expiratory Flow 25-75%; PEF, Peak Expiratory Flow; TLC, Total Lung Capacity; RV, Residual Volume; RV/TLC, RV/TLC ratio; IC, Inspiratory Capacity.

itoring to prevent severe complications. Several scientific studies have underscored the importance of recognizing acute *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* infections in children with wheezing episodes, suggesting that timely antibiotic therapy can improve clinical outcomes.[13,14] This principle also applies to young adults, where appropriate treatment can prevent progression to more severe conditions.[15]

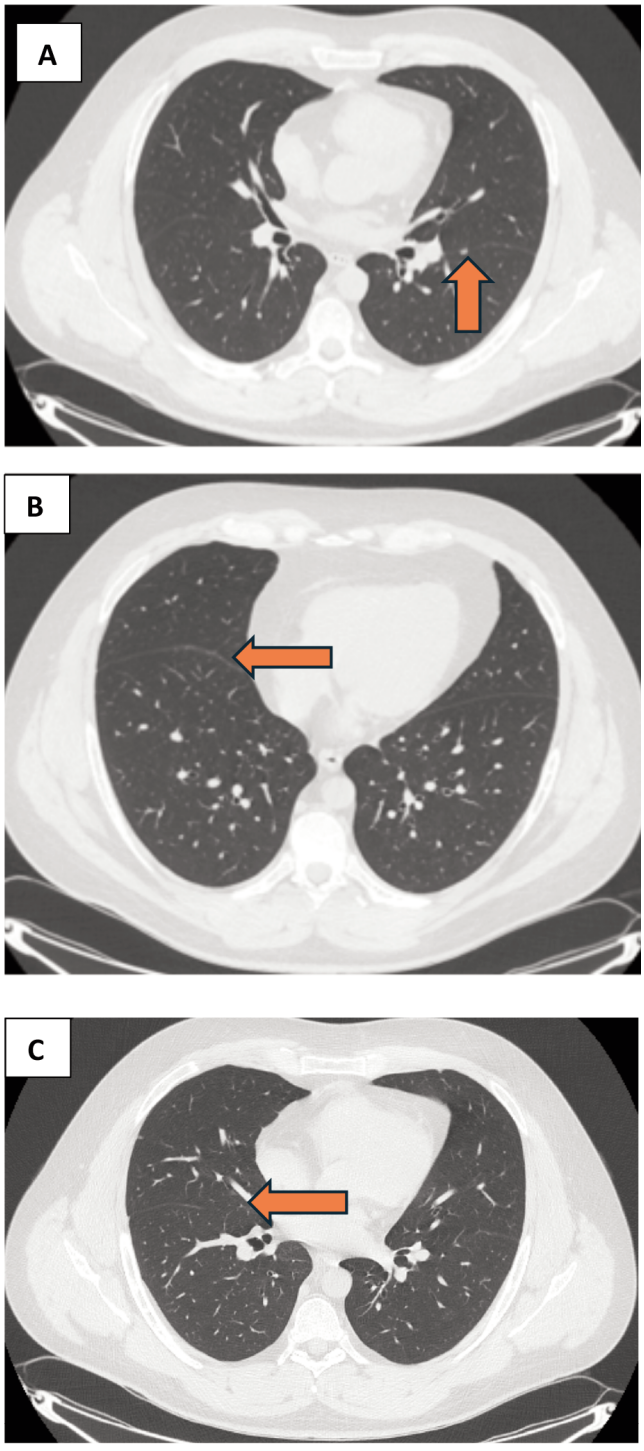

Figure 1. Panels A-C illustrate the presence of an intrascissural micronodule and bilateral thickening of the fissures. These findings suggest infection by atypical pathogens.

Conclusions

The described case highlights the importance of considering infections by atypical pathogens such as *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* in asthmatic patients with acute symptom exacerbation. Early diagnosis and appropriate treatment are crucial to preventing severe complications and improving clinical outcomes. The literature review supports the need for greater awareness and a targeted diagnostic and therapeutic approach in patients with respiratory co-infections, especially in the context of the COVID-19 pandemic. Future studies should focus on optimizing diagnostic and therapeutic strategies to manage these infections in patients with chronic respiratory diseases effectively.

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