J Bionic Mem 2025; 5(3): 69-74 DOI: 10.53545/jbm.2025.51

Journal of Bionic Memory Case Series

A familiar agent in the etiology of cough in adults: Bordetella Pertussis

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ABSTRACT

Aim: Pertussis should be considered in the differential diagnosis of pneumonia that does not resolve clinically, radiologically, or laboratory in adults. This report aims to identify factors that predispose individuals to viral infections, particularly in elderly patients and those with underlying cardiopulmonary diseases.

Methods: We present cases of pneumonia associated with Bordetella pertussis infection in two women with cardiopulmonary disease, two healthy women, and one man with COPD. All patients except the healthy women were hospitalized.

Results: Two female patients (one a teacher, the other with a travel history) with no prior medical conditions presented with persistent cough, and Bordetella pertussis was detected on respiratory tract PCR. Two other female patients, both over 65 years of age, with diagnoses of coronary artery disease, hypertension, and atrial fibrillation, presented with high fever, shortness of breath, and cough; they were admitted for treatment due to hypoxemia. The last patient, diagnosed with COPD, presented to the emergency department with a persistent cough and shortness of breath. A thoracic CT scan revealed bilateral ground-glass opacities, and he was isolated. All patients, both those admitted and those followed up on an outpatient basis, experienced complete resolution of their symptoms and improvement in their radiology.

Conclusion: When making a differential diagnosis for cough in adults, pertussis infection should be considered. Although children under the age of seven should get the diphtheria, tetanus, and acellular pertussis (DTaP) vaccine, people over 65, particularly those with underlying cardiovascular disorders, should be considered for immunization.

Keywords: Bordetella pertussis, cough, pneumonia.

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Received: 2025-12-17

Accepted: 2025-12-23 / Published: 2025-12-30

Introduction

The extremely infectious bacterium Bordetella pertussis is spread by aerosol droplets released during coughing and sneezing. Pertussis has seen a surge in reported cases over the past decade, coinciding with a global resurgence of the disease [1]. Children, especially small infants, are at serious risk from pertussis, since most severe cases and deaths occur in infants less than three months old [2]. Adults who have pertussis in the home are often the source of transmission to this susceptible age group. They are a major source of infection for newborns, although they are frequently underdiagnosed and ignored when they have pertussis [3,4].

This article examined the underestimation and diagnostic challenges of pertussis in adults, and ways to improve clinicians' awareness of

the disease, decrease diagnostic errors, and promote early treatment.

Methods and Case Reports

We report instances of pneumonia linked to Bordetella pertussis infection in one male with COPD, two women with cardiopulmonary illness, and two healthy women. With the exception of the healthy ladies, every patient was admitted to the hospital. Two female patients (one a teacher, the other with a travel history) with no prior medical conditions presented with persistent cough, and Bordetella pertussis was detected on respiratory tract PCR. Also sputum cultures were sent from the cases and no other bacterial or viral pathogens were isolated. Two other female patients, both over 65 years of age, with diagnoses of coronary artery disease, hypertension, and atrial fibrillation, presented with high fever, shortness of breath, and cough; they were admitted for treatment due to hypoxemia. The last patient, diagnosed with COPD, presented to the emergency department with a persistent cough and shortness of breath. A thoracic CT scan revealed bilateral ground-glass opacities, and he was isolated. All patients, both those admitted and those followed up on an outpatient basis, experienced complete resolution of their symptoms and improvement in their radiology. Table 1 and Figures 1-5 summarize the clinical, laboratory, and radiological characteristics of all patients.

Table 1. Clinical, laboratory and radiological characteristics of all patients.

Parameters	**Cases**				
	Case 1	**Case 2**	**Case 3**	**Case 4**	**Case 5**
Age - gender	79 Female	53 Female	44 Female	37 Female	75 Male
Comorbidity	Asthma CAD	HT, AF	-	Asthma	COPD
Symptoms	Cough, dyspnea fever.	Cough, phlegm	Cough	Cough , dyspnea	Cough, fever, dyspnea
Physical examination	Inspiratory Rales	Inspiratory Rales	Normal	Rhonchi	Rhonchi
Sp02 (room air) %	88	92	95	90	82
Laboratories					
WBC	12.2	15.7	6.5	14.9	8.4
NEU	10	12.1	3	13.2	6.2
LYM	1.3	2.4	2.2	1.9	0.7
CRP	173	69	20	37	216
Procalcitonin	0.08	0.5	0.01	0.2	0.7
Thorax CT	GGO - consolidations	Consolidations	Normal	GGO	GGO-consolidation

CAD: coronary artery disease, HT: hypertension, COPD: chronic obstructive pulmonary disease, GGO: ground glass opacities, WBC: White Blood Cell, *NEU*: neutrophils, *LYM: lymphocyte, CRP: C-reactive protein, CT: computerized tomography.*

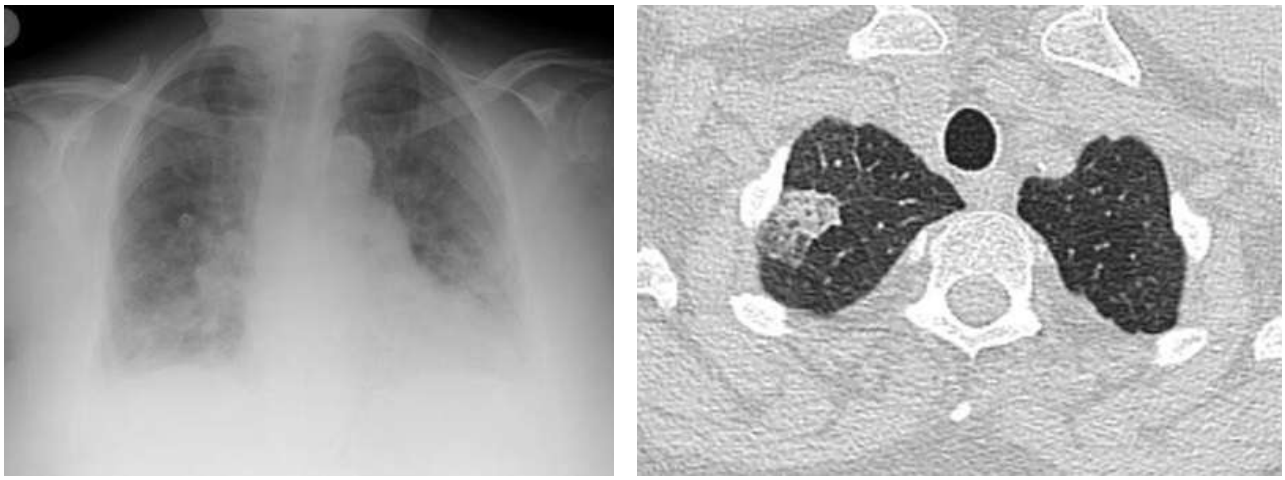

Figure 1. Case 1: Bilateral ground glass opacities and consolidation.

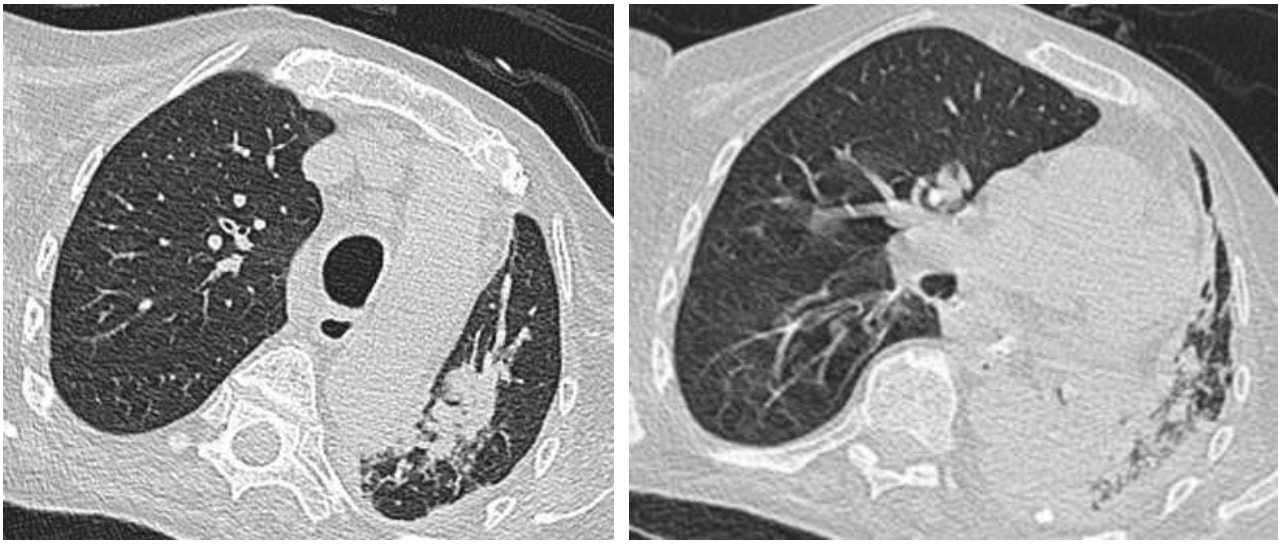

Figure 2. Case 2: Consolidation in left lung.

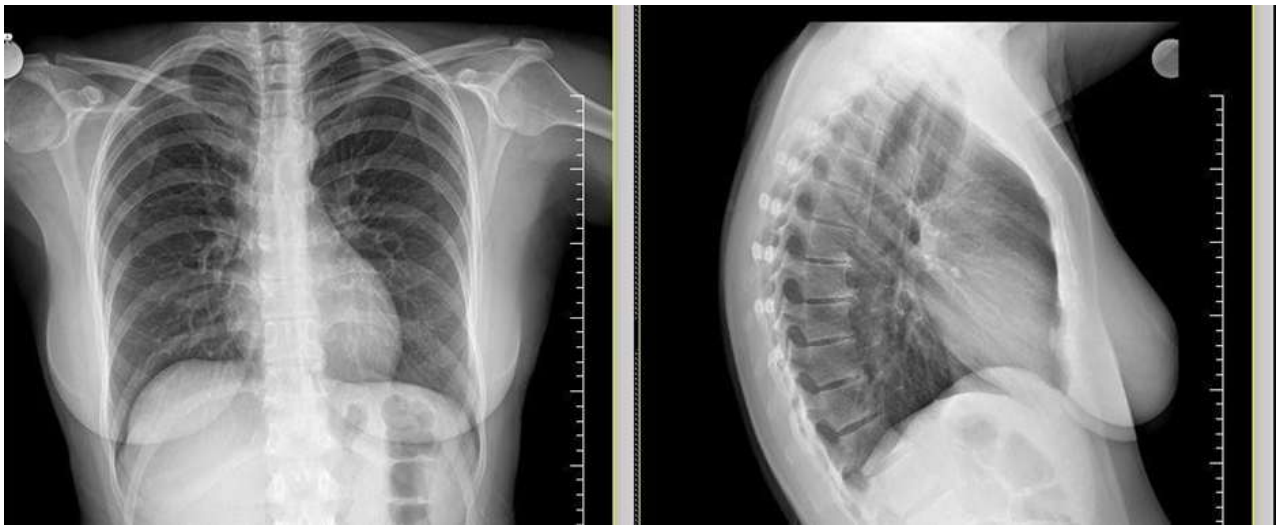

Figure 3. Case 3: Normal PAAG.

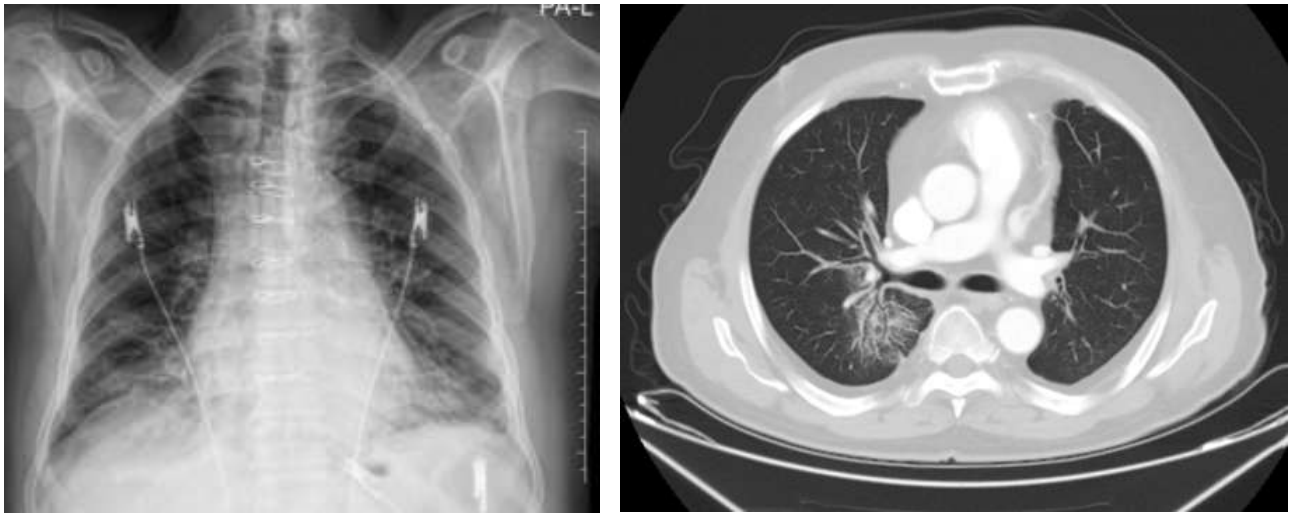

Figure 4. Case 4: Bilateral ground glass opacities.

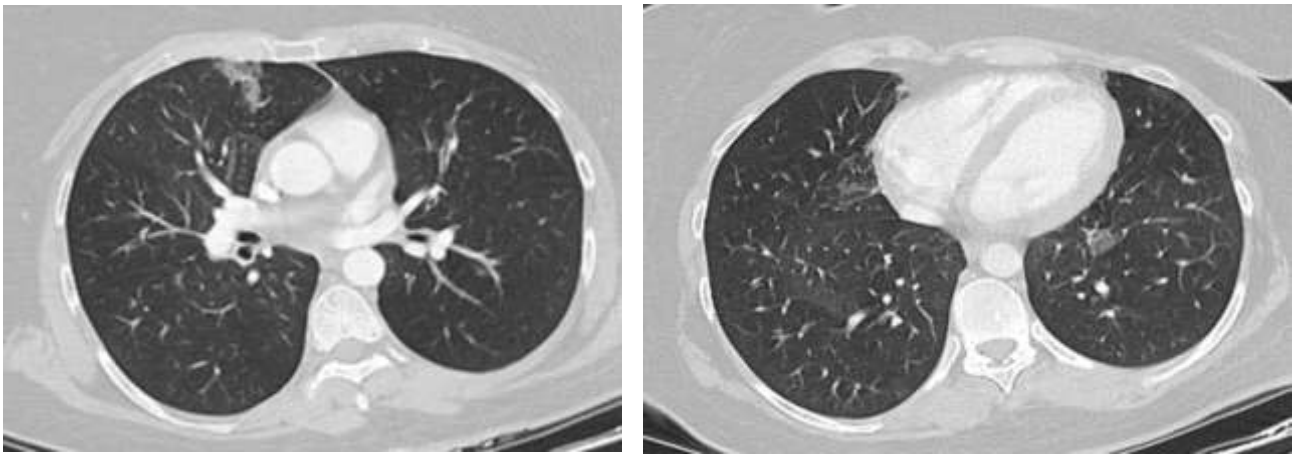

Figure 5. Case 5: Bilateral ground glass opacities and consolidation.

Discussion

The Gram-negative bacteria Bordetella pertussis is the main cause of whooping cough, often known as pertussis, a respiratory infectious illness that can be prevented by vaccination. A respiratory illness with paroxysmal or protracted cough, post-tussive vomiting, and inspiratory "whoops" are common presentations of pertussis. However, the usual whoop is not always evident in the clinical presentation of pertussis in adults and adolescents, which leads to underdiagnoses and misinterpretation [1,2]. Finding risk factors for viral infections is the goal of this paper, especially for older patients and those with underlying cardiac and pulmonary diseases.

Global vaccination rates were impacted by COVID-19 lockdowns that interfered with outreach and immunization delivery. In fact adults have herd immunity against pertussis due to childhood illnesses and subsequent immunity increases from repeated exposures in the population, rendering them less susceptible. But after the COVID 19 PANDEMIC, which results from a combination of declining immunity from both vaccination and natural infection, pertussis is rising [3]. Even if the COVID-19 pandemic has significantly changed the epidemiology of respiratory infections, impacting viral seasonality and altering hospitalization patterns, including social distancing, mask use, and lockdowns, helped

curb the spread of the virus As this study also highlighted the increase in whooping cough cases, which are quite rare in adults. Also out of case 3, all of our patients had a history of COVID-19 Large outbreaks of pertussis, an acute, highly contagious respiratory illness brought on by Bordetella pertussis (B. pertussis), happen sporadically every few years [4-6]. This is underdiagnosed and under-informed in most age groups in many countries, especially among older children, adolescents, and adults, underestimating the burden of pertussis disease in this population. Despite high vaccination rates among newborns and young children, whooping cough (pertussis) outbreaks continue to occur worldwide [7,8]. A pool of unprotected adolescents and adults is created by declining vaccination immunity, which contributes to the pertussis outbreak in high-income nations. However, pertussis is typically less severe in adults and adolescents, and because of this difference in presentation, medical personnel frequently fail to recognize it, which results in a significant underdiagnoses of the illness in older groups [9,10]. In our study, all of the patients treated with macrolides successfully.

Recurrent coughs, persistent radiographic infiltrations, and laboratory results that are unresponsive to non-specific antibiotic treatment may usually increase susceptibility to opportunistic infections, even in the absence of other immunosuppressive diseases [11]. We diagnosed pneumonia in our patients, which is characterized by persistent, severe cough and fever, by requesting respiratory tract PCR tests as a differential diagnosis. Also our laboratory and radiological findings were similar to the literatüre as leukocytosis and consolidation [12,13].

Conclusion: Even in the absence of other immunosuppressive comorbidities, we think that chronic radiographic infiltrations, persistent coughs, and laboratory findings insensitive to non-specific antibiotic therapy may generally contribute to greater vulnerability to opportunistic infections. Raising awareness about pertussis and the importance of immunization outside of the pediatric population is crucial since immunosuppression, poor treatment, and misdiagnosis are still issues for adults and the elderly.

Funding: *The author(s) received no financial support for the research, authorship, and/or publication of this article.*

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

Consent: *The patient in this manuscript has given written informed consent to the publication of her case details.*

References

[1]Zhang JS, Deng JK. [Adult pertussis: an emerging clinical problem requiring urgent attention]. Zhonghua Jie He He Hu Xi Za Zhi. 2025;48(11):1005-1008.

[2]Sberna G, Linardos G, Lalle E, et al. Resurgence of Bordetella pertussis in Lazio: A Cross-Age Surveillance Study from Two

Referral Hospitals. Microorganisms. 2025;13(8):1808.

[3] Vargas-Zambrano JC, Abrudan S, Macina D. Understanding the Epidemiology and Contributing Factors of Post-COVID-19 Pertussis Outbreaks: A Narrative Review. Infect Dis Ther. 2025 Dec 1. doi: 10.1007/s40121-025-01277-1.

[4] Macina D, Evans KE. Bordetella pertussis in School-Age Children, Adolescents and Adults: A Systematic Review of Epidemiology and Mortality in Europe. Infect Dis Ther. 2021;10(4):2071-2118.

[5] MacIntyre CR, de Sousa JC, Heininger U, et al. Public health management of pertussis in adults: Practical challenges and future strategies. Hum Vaccin Immunother. 2024;20(1):2377904.

[6] Oliveira SM, Gonçalves-Pinho M, Freitas A, et al. Trends and costs of pertussis hospitalizations in Portugal, 2000 to 2015: from 0 to 95 years old. Infect Dis (Lond). 2018;50(8):625-633.

[7] Kazama I, Tamada T, Nakajima T. Resolution of migratory pulmonary infiltrates by moxifloxacin in a patient with dual infection of Mycoplasma pneumoniae and Bordetella pertussis. Infez Med. 2012;20(4):288-92.

[8] Yacoub A, Nanjappa S, Janz T, Greene JN. Infectious Disease Report: Bordetella pertussis Infection in Patients With Cancer. Cancer Control. 2016;23(2):163-6.

[9] Leung AK, Robson WL, Davies HD. Pertussis in adolescents. Adv Ther. 2007;24:353–61.

[10] Centers for Disease Control and Prevention (CDC). Pertussis (Whooping Cough). 2017. [cited 2017 Sep 12]. Available from: https://www.cdc.gov/pertussis/index.html. Google Scholar

[11] Poltorak V, Cabré-Riera A, Martínez-Botías F, et al. Working Group for surveillance of pertussis in Vallès. Increase of pertussis cases in the Vallès region, Catalonia, Spain, September 2023 to April 2024. Euro Surveill. 2024;29(24):2400332.

[12] Poeta M, Moracas C, Albano C, et al. Pertussis outbreak in neonates and young infants across Italy, January to May 2024: implications for vaccination strategies. Euro Surveill. 2024;29(23):2400301.

[13] Friedlander AL, Fessler MB. A 70-year-old man with migratory pulmonary infiltrates. Chest. 2006;130(4):1269-74.