Not Everything That Wheezes Is Asthma

Aysha Ebrahim Qarata, MBBCh BAO, LRCSI, LRCPI* Abdelhaleem Bella, MBBS, FRCP, FRCPI, MSc, FCCP**
Hani Alfadhel, MBBS, FFR-RCSI, DRCR, EBIR***

Bird fancier's lung disease (BFLD), also known as bird breeder's lung; it is a type of hypersensitivity pneumonitis (HP) caused by exposure to avian antigens. It can present as acute to sub-acute hypersensitivity pneumonitis. If not recognized early, it can progress into the chronic/fibrotic form leading to respiratory failure and fatal consequences.

We present a case of a fifty-seven-year-old, non-smoking female who presented with dry cough and dyspnea. She had been previously diagnosed with asthma. She is on combined inhaled corticosteroids and long-acting beta 2 agonist. Upon reviewing and carefully assessing the risk factors, diagnosis of BFLD was made. She showed significant improvement with prednisolone treatment and avoiding exposure to the antigen.

A history of exposure to birds, especially in non-smoking females, should alert the treating physician to the possibility of BFLD. This case illustrates how HP is being misdiagnosed as asthma and how a wheeze can mislead the physician into diagnosing asthma in a patient with significant history of exposure to birds.

Bahrain Med Bull 2019; 41(4): 271 - 274

Bird fancier's lung disease (BFLD) is a common form of hypersensitivity pneumonitis (HP) resulting from exposure to avian antigen. Chronic bronchitis and rhinitis may be part of the clinical presentation, which may lead to misdiagnosis of this condition into asthma. It presents as acute, sub-acute and chronic with symptoms of dyspnea and cough associated with inspiratory crackles on auscultation. The characteristic findings on high-resolution CT (HRCT) chest include centrilobular nodules, ground-glass attenuation, and mosaicism which indicates air trapping.

The aim of this study is to evaluate the features of Bird fancier's lung disease, management and complications.

THE CASE

A fifty-seven-year-old, non-smoking female presented with persistent non-productive cough associated with progressive dyspnea. She was previously diagnosed with hypertension for which she took Co-Diovan (valsartan/hydrochlorothiazide) 160/12.5 mg once a day. She was labeled as asthmatic and was on fluticasone/salmeterol inhaler twice daily and salbutamol inhaler as needed. She denied chest pain, palpitation or hemoptysis. She reported having intermittent wheezing in the past. However, her dyspnea had worsened even on minimal exertion. She had no fever or weight loss.

She is a housewife who had a hobby of breeding different types of pigeons, such as Old German Owl, Rock Pigeon, and hen pigeon in their home yard, see figure 1.

Figure 1: Old German Owl (Altdeutsches Mövchen)

On examination, she had peripheral and central cyanosis, and hypoxic on room air with oxygen saturation of 88%. She had no signs of clubbing or lymphadenopathy. On chest auscultation, bilateral inspiratory crackles were audible. Her cardiovascular examination was unremarkable except she had an elevated jugular venous pressure (JVP) and bilateral lower limb edema.

The patient was admitted to the hospital. Her dyspnea resolved significantly after being kept on a course of intravenous Methylprednisolone 500mg once per day for three days and then on daily oral Prednisolone 50mg. The patient resumed a course of Ceftriaxone and Clarithromycin. She maintained her oxygen saturation at 95% on 3L of oxygen via nasal cannula.

* Resident
Department of Internal Medicine
** Associate Professor of Medicine
Royal College of Surgeons in Ireland - Medical University of Bahrain
*** Consultant Radiologist
Department of Radiology
Bahrain Defence Force Hospital
Kingdom of Bahrain
E-mail: drqarata@hotmail.com

She was nebulized with ipratropium bromide/albuterol sulfate of 2.5ml with 3ml normal saline. Diuresis with intravenous furosemide 40MG administered for treatment of lower limb edema.

Laboratory investigations revealed elevated levels of the serum immunoglobulins IgA 2.32, IgG 21.25, IgM 0.83 and IgE 180.6, erythrocyte sedimentation rate (ESR) of 41 and C-reactive protein (CRP) of 10.76. PH was 7.433, PO2 47.1, PCO2 39.9, CHCO3-26 on room air. The pulmonary function test (PFT) revealed restrictive impairment with decreased diffusing capacity, see table 1. The chest radiograph demonstrated ground-glass opacities, see figure 2. Autoimmune workup revealed negative for all of the following markers: rheumatoid factor II (13.6), anti-neutrophil cytoplasmic antibodies (ANCAs) Screen: PANCA, CANCA, and dsDNA Abs.

Table 1: The Pulmonary Function Test Results of the Patient at the Time of the Diagnosis and after One Month on Prednisolone Treatment and Avoidance of the Antigens

Pulmonary Function Test	Pre-Treatment		1 Months after Starting Prednisolone	
	Pre Bronchodilator (% Predicted)	Post Bronchodilator (% Predicted)	Pre Bronchodilator (% Predicted)	Post Bronchodilator (% Predicted)
FEV1/FVC	95.57	99.03	95.57	99.03
FEV1	97.1	96.2	97.1	96.2
FVC	84.3	80.6	84.3	80.6

The Avian Precipitants Test is a simple and non-invasive test used to measure the antibodies to avian antigen. The results in our patient were significantly elevated, see table 2. This test plays a pivotal role in diagnosis of bird breeder's disease (BBD).

Table 2: The Avian Precipitants Test Results

Avian Precipitants Test	Results	Normal Range
Budgerigar droppings (CAP-IgG e77)	99+ mg/l	up to 9
Chicken feathers (CAP-IgG e85)	55+ mg/l	up to 14
Canary bird feathers (CAP-IgG e201)	148+ mg/l	up to 11
Parrot feathers (CAP-IgG e213)	134+ mg/l	up to 26
Pigeon feathers (CAP-IgG e215)	>200+ mg/l	up to 5
Pigeon droppings (CAP-IgG e7)	>200+ mg/l	up to 50
Budgerigar feathers (CAP-IgG e78)	129+ mg/l	up to 8
Dove serum proteins (CAP-IgG e93)	>200+ mg/l	up to 10
Parrot serum proteins, feathers, feces (CAP-IgG e92)	192+ mg/l	up to 10
Duck feathers (CAP-IgG e86)	54+ mg/l	up to 10

The patient underwent Bronchofibroscopy; excessive mucopurulent Secretion with dynamic Collapse was found. No masses, Cobblestone, and ulcers were seen, see figure 3. Bronchoalveolar Lavage (BAL) and Brushings cytology revealed inflammatory cells and were negative for malignant cells. Gram staining showed occult gram-positive cocci with leukocytosis +2 and culture revealed Candida Albicans, negative for AFB and TB PCR.

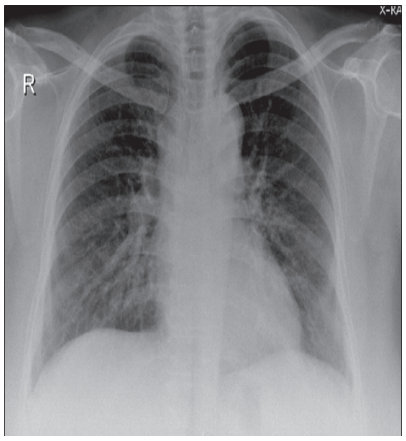
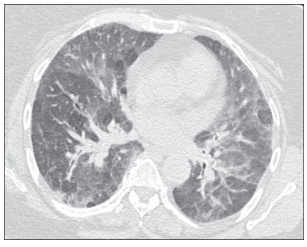
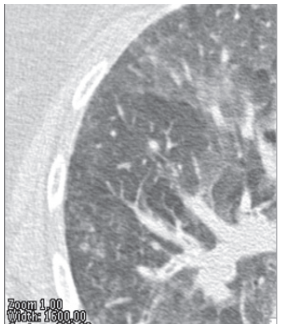


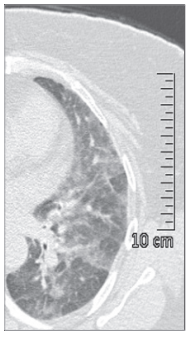
Figure 2: PA Chest Radiograph showing Ground Glass Opacities in the Left Lower Zone



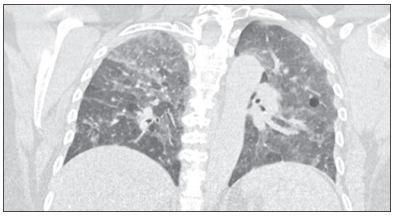
3 (A)



3 (B)



3 (C)



3 (D)

Figure 3: (A-C) Axial HRCT (D) Coronal HRCT Showing Patchy Ground Glass Opacities with Mosaic Pattern Predominately in the Middle Zones and Upper Lobes. Patchy Centrilobular Nodules are seen in the Posterior Segment of the Right Upper Lobe

DISCUSSION

Bird fancier's lung disease (PFLD) is a common form of hypersensitivity pneumonitis (HP)1. Reed et al reported the first case in 1965. The prevalence rate was 1−10% in individuals exposed to pigeons[2].

HP is either related to the workplace (farmer's lung) or to a hobby (pigeon breeder's disease)[5]. It has been found that

symptoms may diminish or disappear if the patient avoids the risk factor; however, symptoms reappear as soon as the patient returns to the exposure site[2].

Our patient was mistakenly labeled as asthmatic because of not emphasizing the history of exposure. Performing a full physical examination and correlating the clinical presentation with radiographic imaging findings and laboratory investigations are essential in establishing a diagnosis. Kumar reported 15 patients diagnosed with PFL over a two-year period; the majority were females and had variable degrees of exposure and radiological features from pneumonitis to fibrosis with honeycombing and traction bronchiectasis[8].

PFLD etiology is due inhalation of a wide range of pigeon antigens; the avian antigen activates the immune response system and initiates immune complex formation, thus, triggers the inflammatory reaction cascade.

Measurements of IgG and IgA antibody levels against pigeons and budgerigars that were obtained by the ImmunoCAP system were positive in both sera and BAL fluid, further confirming the diagnosis of PFLD in our patient. One of the techniques is The ImmunoCAP system which is used to evaluate the presence of pigeon antibodies by examining avian dropping extracts. Several studies concluded that measurement of levels of antibodies against pigeons and budgerigars are helpful for the diagnosis of BRHP[3].

HRCT of our patient revealed patchy ground-glass opacities with mosaic patterns predominately in the middle zones and upper lobes. Patchy centrilobular nodules were seen in the posterior segment of the right upper lobe which is similar to the finding of the study by Kumar et al8. Chronic PFLD in non-smokers could be rarely associated with lung cysts[9]. A study reported a case which presented with multiple lung cysts and recurrent pneumothoraces due to chronic BFLD[10].

Examination of BAL fluid revealed an increase in lymphocytes. A study found BAL cellular and cytokine profile changes with chronic exposure[7]. The results showed a fall in lymphocytes, and an increased ratio of CD4+/CD8+ lymphocytes, IL-6 and TNF-alpha. The study concluded the significant role of CD4+ lymphocytes, IL-6 and TNF-alpha in the pathogenesis of pulmonary fibrosis[7].

Death from chronic lung disease was reported; the children of the deceased were misdiagnosed initially and were treated for asthma and were eventually found to have features of HP secondary to wild pigeons roaming the city[6].

An insidious form of PFLD sometimes occurs and can be confused with idiopathic pulmonary fibrosis (IPF) if careful history is not taken[11].

Avoiding repeated exposure to avian antigens is important in the management. Exposure to an avian antigen can be indirect, such as featherbedding including duvets, pillows, and cushions. These can be associated with chronic PFLD; the amount of avian antigen in household dust predicts the prognosis[12].

A study classified the patients into a stable and non-stable. The amount of household avian antigens in the non-stable group was significantly higher[15]. A study was conducted on 47 individuals labeled as allergic rhinitis who had continuous exposure to pigeons. Responses varied from late nasal response (LNR), isolated (nasal response), dual nasal response, and skin reactions[13].

A study revealed that avoidance of pigeon antigen resulted in all the parameters of immune reaction to return to near-normal range. The study concluded that careful evaluation of patients with bird fancier's lung, even after avoidance of antigen, is vital[14].

A study was conducted to identify the symptomatology among pigeon breeders that had a varying intensity of contact with pigeons. Those who presented with cough, sputum, and rhinitis underwent spirometry test, arterial and venous hematological evaluation, radiological evaluation and immunological evaluation[15].

CONCLUSION

Our patient developed chronic HP due to exposure to wild pigeons roosting in her farm, which progressed to fibrosis. Avoidance of pigeons and corticosteroid therapy significantly led to improvement in the patient's condition.

Author Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflicts of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 23 September 2019.

Ethical Approval: Approved by the Ethical Committee, Bahrain Defence Force Hospital, Bahrain.

REFERENCES

1. Ito T, Sugino K, Satoh D, et al. Bird Fancier's Lung which Developed in a Pigeon Breeder Presenting Organizing Pneumonia. Intern Med 2010; 49(23):2605-8.
2. King TE. Approach to the Adult with Interstitial Lung Disease: Clinical Evaluation. https://www.uptodate.com/contents/approach-to-the-adult-with-interstitial-lung-disease-clinical-evaluation. Accessed in June 2019.
3. Inase N, Unoura K, Miyazaki Y, et al. Measurement of Bird Specific Antibody in Bird-Related Hypersensitivity Pneumonitis. Nihon Kokyuki Gakkai Zasshi 2011; 49(10):717-22.
4. Muramatsu T, Miyazaki E, Sawabe T, et al. A Case of Chronic Hypersensitivity Pneumonitis due to Wild Pigeons. Nihon Kokyuki Gakkai Zasshi 2001; 39(3):220-5.
5. Ishiguro T, Takayanagi N, Yoneda K, et al. Case of Bird-Related Hypersensitivity Pneumonitis in a Farmer. Nihon Kokyuki Gakkai Zasshi 2010; 48(12):985-9.
6. du Marchie Sarvaas GJ, Merkus PJ, de Jongste JC. A Family with Extrinsic Allergic Alveolitis Caused by Wild City Pigeons: A Case Report. Pediatrics 2000; 105(5):E62.
7. Ohtani Y, Hisauchi K, Sumi Y, et al. Sequential Changes in Bronchoalveolar Lavage Cells and Cytokines in a Patient Progressing from Acute to Chronic Bird Fancier's Lung Disease. Intern Med 1999; 38(11):896-9.
8. Kumar R, Singh M. Bird Fancier's Lung: Clinical-Radiological Presentation in 15 Cases. Pneumonol Alergol Pol 2015; 83(1):39-44.

9. Hoshi S, Tamura A, Sasaki O, et al. Case of chronic Pigeon Breeder's Disease Accompanied by Pulmonary Cysts. Nihon Kokyuki Gakkai Zasshi 2007; 45(10):766-71.
10. Kurashima K, Takayanagi N, Ubukata M, et al. A Case of Chronic Pigeon Breeder's Disease Accompanied with Progressive Pulmonary Cysts and Recurrent Pneumothorax. Nihon Kokyuki Gakkai Zasshi 2003; 41(6):416-20.
11. Ohtani Y, Saiki S, Sumi Y, et al. Clinical Features of Recurrent and Insidious Chronic Bird Fancier's Lung. Ann Allergy Asthma Immunol 2003; 90(6):604-10.
12. Inase N, Ohtani Y, Endo J, et al. Feather Duvet Lung. Med Sci Monit 2003; 9(5):CS37-40.
13. Pelikan Z, Pelikan-Filipek M. A New Disease: A Nasal Form of Pigeon Breeder's Disease. Allergy 1983; 38(5):309-18.
14. Yoshizawa Y, Miyake S, Sumi Y, et al. A Follow-Up Study of Pulmonary Function Tests, Bronchoalveolar Lavage Cells, and Humoral and Cellular Immunity in Bird Fancier's Lung. J Allergy Clin Immunol 1995; 96(1):122-9.
15. Charitopoulos K, Gioulekas D, Sichletidis L, et al. Hypoxemia: An Early Indication of Pigeon Breeders' Disease. Clinical and Laboratory Findings among Pigeon Breeders in the Salonica Area. J Investig Allergol Clin Immunol 2005; 15(3):211-5.
16. Tsutsui T, Miyazaki Y, Kuramochi J, et al. The Amount of Avian Antigen in Household Dust Predicts the Prognosis of Chronic Bird-Related Hypersensitivity Pneumonitis. Annals of the American Thoracic Society 2015; 12(7):1013-21.