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A Case Report on Round Pneumonia in a Geriatric Patient

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Abstract

Round pneumonia is a rare clinical entity in adults and may radiographically resemble malignant lung lesions, often leading to diagnostic uncertainty. We present the case of a geriatric patient with a background of diabetes mellitus, hypertension and lichen sclerosis who arrived with a five-day history of fever, generalised body ache, right ear pain, fatigue and decreased appetite. She was febrile with mild tachycardia, and her investigations revealed leukocytosis, significantly raised C-reactive protein and procalcitonin levels, indicating systemic bacterial infection. Chest X-ray demonstrated a well-circumscribed, rounded opacity in the left lung, while CT imaging showed a corresponding wedge-shaped ground-glass consolidation. Differential diagnoses included bronchogenic carcinoma, however, malignancy was considered less likely owing to the absence of weight loss, hemoptysis and the rapid improvement of radiological and inflammatory markers following treatment. She received intravenous broad-spectrum antibiotics, bronchodilators, nebulisation, proton-pump inhibitors and supportive therapy, with antivirals discontinued after bacterial infection was confirmed. Her symptoms resolved progressively, inflammatory markers normalised, and imaging showed regression of the lesion. She was discharged with oral medications and follow-up advice. This case reinforces the importance of considering round pneumonia in adults to prevent misdiagnosis and avoid unnecessary invasive investigations.

Subject Areas

Pulmonology, Geriatric Medicine, Clinical Pharmacy, Diagnostic Imaging, Infectious Diseases

Keywords

Round pneumonia, Pulmonary infection, Adults

1. Introduction

Round pneumonia is an uncommon form of lung infection that typically affects children, with adults accounting for only about 1% of reported cases, which is mentioned in the radiology literature in 1954 [1]. After that, only sporadic cases in adults have been reported [2]. Rounded and well-defined opacities represent the infected area. The main causative agents of round pneumonias are Haemophilus influenzae and *Streptococcus pneumoniae* [3]. Round pneumonia is usually seen in the lower lobes and illustrates air bronchograms [4]. This radiological feature should be supposed to be ruled out from bronchogenic carcinoma and other factors causing rounded pulmonary opacities. This potential and rare condition in adults must gain awareness to make correct identification and management.

2. Case Report

A 78-year-old female patient was admitted to a tertiary healthcare hospital presented with chief complaints of fever for the past 5 days, body ache, right ear pain, decreased appetite, and generalized fatigue. She had a past medical history of Type 2 Diabetes Mellitus, Hypertension, and lichen sclerosis. The patient has no history of smoking and denied alcohol consumption. She had no significant family history of respiratory illness, malignancy, or hereditary disorders. She reported no prior hospitalisations or major surgical interventions. There were no previous pulmonary infections or similar respiratory episodes in the past.

Medical staff evaluated her vitals during admission. She was febrile, blood pressure was 120/60 mmHg, pulse rate was 102 BPM, and SPO_2 was 96% on room air. Though she was conscious, her symptoms present indicate acute infection. To confirm the infection and find out the cause, a few diagnostic tests were done. Through the analysis, an increased white blood count of 18,161 cells/mm^3 was identified. Also, her procalcitonin and C-reactive protein levels were elevated with values of 3.56 ng/ml and 156 mg/L, respectively. These values represent the presence of systemic infection. On chest X-ray, a left-sided circular homogeneous opacity "**Figure 1**", which was usually present in round pneumonia, was identified. Round pneumonia is a variant of pneumonia where it is present as a round-shaped infiltration. The chest X-ray demonstrated a round homogeneous opacity suggestive of round pneumonia, while the CT described a wedge-shaped ground-glass area. This apparent difference likely reflects differences in imaging versus cross-sectional imaging. CT characterises the same lesion with higher resolution, and both findings were interpreted as consistent with an infectious consolidation. Further treatment was planned after getting opinions from nephrology, pulmonology, and infectious disease spe-

cialists. Children are more likely to get round pneumonia. Compared to adolescents and adults, children have smaller alveoli and frequently apposed connective tissue septa, resulting in poorly set-up collateral ventilation pathways.

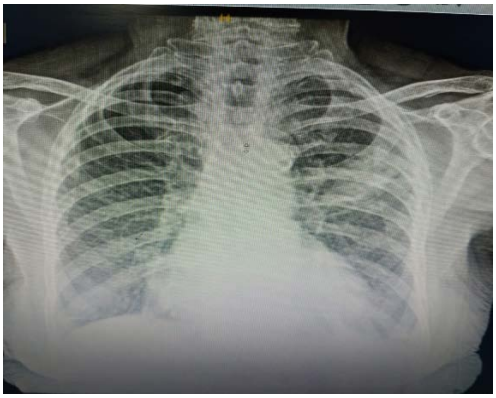

Figure 1. Chest X-ray of the round pneumonia patient showing left rounded homogenous opacity.

Based on the preliminary assessments, the team commenced an extensive therapy regimen to regulate her respiratory illness and enhance her general well-being. Since all of her inflammatory signs indicated a serious condition, intravenous (IV) antibiotics had been selected as the preliminary line of treatment to cover a broad spectrum of possible bacterial pathogens. For respiratory involvement, bronchodilators and nebulizers were administered to the patient to help the progress of breathing and enhance lung function. Proton pump inhibitors (PPIs) were administered to reduce the risk of gastrointestinal detrimental effects from antibiotics, so they might be considered as a precaution for elderly individuals who are more liable to suffer from gastrointestinal issues. Antivirals were administered empirically at admission, but discontinued once bacterial infection was confirmed. Oxygen therapy was administered frequently to stabilize saturation levels, though her condition needs constant respiratory monitoring. The physicians continuously examined her renal and pulmonary status, as it might be necessary to modify drug doses to prevent complications like nephrotoxicity, which has an impact on extended IV use of antibiotics on renal impairment in geriatric patients. It is mandatory to evaluate her clinical status during her bed stay. Given the known suggestion of renal strain or dysfunction, which is common in elderly individuals with infection, her renal functions were regularly monitored due to her increased blood urea levels (68 mg/dL). Her pulse and rhythm were frequently monitored due to mild tachycardia, and appropriate SpO_2 levels were maintained by oxygen therapy. The healthcare team scrupulously permitted her to improve her condition, which is as challenging as an elderly individual with many comorbidities. Her medication plan minimizes many adverse outcomes with continuous monitoring of her reaction to medication. The laboratory test reports information to aid in a better treatment strategy. The patient developed neutrophilia and leukocytosis with increased CRP, indicat-

ing infection, which is shown in the complete blood count (CBC) level. Anaemia and thrombocytopenia should be monitored periodically with the help of haemoglobin and platelet levels in plasma, which are to be diagnosed.

It is also important to monitor for drug-induced anaemia or thrombocytopenia conditions. Electrolyte levels are measured to ensure their balance, which may lead to arrhythmias. A liver function test (LFT) shows patient enzyme levels are increased slightly, which may be because of infection or due to multiple drug usage. Bilirubin and alkaline phosphatase levels are increased; total protein and albumin levels are decreased. The aerobic culture and sensitivity test showed only occasional pus cells. The DENGUE IgG test was positive, indicating past exposure; however, this was considered incidental, as the patient had no clinical or laboratory features suggestive of acute dengue infection. The markedly elevated procalcitonin level supported the presence of a severe systemic bacterial infection. Accordingly, broad-spectrum antibiotics were initiated to control the infection.

After the treatment for the prescribed day with proper monitoring, the infection is reduced. Patient's CRP level was reduced, and leukocytopenia was normalised. Hence, the fever got controlled, and the patien's level of well-being improved. Hence, the patient was decided to get discharged with a proper plan to continue her treatment from home. Her discharge medication includes pantoprazole 20 mg, which should be taken before meals to improve gastrointestinal tract irritation. Augmentin, which is the combination of amoxicillin and clavulanate prescribed to eradicate bacterial infections. Also, multivitamin capsules were suggested. Since she is an elderly patient, cremaffin syrup was given to prevent constipation.

Additionally, topical treatment with Pimecrolimus cream was planned since she has lichen sclerosis. During discharge patient was advised with the following instructions, which include monitoring for signs and symptoms and reporting immediately in case of serious signs such as high fever, elevated pain and breathing difficulty. Regarding lifestyle modification, the patient was advised to take a protein-rich diet advised to maintain good hydration, which helps in boosting the immune system and helps in health improvement. Since she has been discharged from the hospital recently, she must do mild physical exercises, exposure to sunlight is important, and also breathing exercises were suggested. Patient was advised to attend review checkups regularly to complete recovery from her health condition "Table 1".

Table 1. Timeline summarising the patient's symptom onset, diagnostic workup, treatment course, clinical progress, and outcome.

Day	Clinical Events	Findings/Interventions
Day-5	Symptom onset	Fever, body ache, right ear pain, decreased appetite, fatigue
Day-0 (Admission)	Clinical evaluation	Febrile, tachycardia, SpO_2 96%; leukocytosis, ↑CRP, ↑procalcitonin
	Imaging	Chest X-ray: round left-sided opacity
		CT: ground-glass wedge-shaped consolidation

Continued

Day 1 - 4	Treatment initiated	IV broad-spectrum antibiotics, nebulization, bronchodilators, PPIs, supportive care; antivirals stopped
	Monitoring	Renal profile, LFT, electrolytes, and vitals are continuously monitored.
Day 5 - 7	Clinical progress	Reduction in fever, normalization of leukocyte count, and decreasing CRP
Day-7	Radiological improvement	Opacity size reduced; consistent with resolving pneumonia
Day-8 (Discharge)	Discharge	Oral antibiotics, pantoprazole, multivitamins, cremaffin; lifestyle and follow-up advice
Follow-up	Review visit	No recurrence of symptoms; stable clinical status

3. Discussion

A possible cause is the fact that patients may be treated with antibiotics without having their chest radiographed. Since less than 1% of pneumonia cases have been identified and reported to be round pneumonia, the actual incidence is probably higher [5]. A surprisingly high incidence of round pneumonia, up to 29%, came to light in a Taiwanese case series study that examined the clinical course and radiological deterioration of the condition in patients with severe acute respiratory syndrome (SARS) [6]. Based on the high virulence and infectivity of the SARS coronavirus, it should be stipulated that each individual has a chest radiograph performed as part of close monitoring. The frequency and earliness of radiological examinations during the illness could influence the chance of detecting round pneumonia.

According to one study, the root cause of approximately 78 per cent of adult cases with round pneumonia was unidentified. It is unclear how round pneumonia originates. Clinical symptoms can turn out non-specific as round pneumonia initially shows up, and it might indicate an early sign of the infection [7]. The process of exudation and inflammation is primarily limited only by the alveolar spaces in its initial stages. Later, it spreads rapidly through the intra-alveolar channels, developing a lesion with smooth boundaries and a nonsegmental distribution. During centrifugal and peri bronchial spread, the lesion could grow segmental or lobar, and chest radiography may then exhibit the distinctive appearance of pneumonia.

Because of gravity, which concentrates infected fluids in especially dependent bronchi, round pneumonia tends to occur in the lower lobes. Neoplasms should be managed if they develop in an upper lobe, even if they display indications of infection, as in the present case. In addition, up to 69% of cases have an impact on the right lung. Predisposing factors have not been detected [8]. Patients experiencing round pneumonia usually demonstrate either acute or subacute pneumonia symptoms. They could come up with temporary signs that imitate bronchitis or viral infections. Though it is relatively rare, some individuals may even have no

signs or symptoms. In a single study, 32 adult cases of round pneumonia were identified, and only two of those affected had no symptoms [9].

When an adult patient appears with a spherical mass on chest radiography, round pneumonia needs to be put into discussion in the differential diagnosis, considering that lung cancer is the leading cause of respiratory masses in adults [10] [11]. Given that upper-lobe lesions in older adults may mimic neoplasms, malignancy was considered in this patient. It was ruled out based on the absence of red-flag symptoms such as weight loss or hemoptysis, the rapid radiological resolution of the lesion following antibiotic therapy, and the normalisation of inflammatory markers. These findings strongly supported an infectious rather than a malignant aetiology. This may be particularly relevant if the patient demonstrates signs of a respiratory tract infection. Early recognition and care might avoid unneeded diagnostic tests as well as the associated expenses, complications, and hospitalizations.

4. Patient Perspective

The patient reported that when she first learned of a rounded opacity in her lung report, she felt anxious, which was, of course, the fear of cancer. Upon explanation that the diagnosis was round pneumonia, she reported feeling relieved and also that the health care team did a great job in terms of clarity. Also, she reports steady improvement in her symptoms and was very satisfied with the total care and follow-up.

5. Conclusion

Round pneumonia is a rare adult clinical and radiological entity that has a tendency to very much resemble malignant pulmonary lesions, which in turn causes diagnostic issues. In the case of senior patients who are presenting with signs of an acute infection, their presentation warrants the evaluation of round pneumonia as a possible atypical case of pneumonia. The case presented emphasises the need for early diagnosis with appropriate imaging so that the antibiotic treatment can be started early and the patient can achieve rapid resolution of their symptoms and pulmonary opacity without having to undergo invasive procedures or studies to rule out an oncological process. The case presented emphasises the need to bring the clinician's attention to this unique presentation of pneumonia. The case presented is an example of the need for correct diagnosis and associated treatment so that the morbidity associated with a misdiagnosis can be avoided.

Authors' Contribution

TM and MK worked on the writing and revising portions of the paper equally. Case identification and summary, as well as consent obtained, were the duties of TM. The literature review and the polished summary of the case were the contributions of MK. SP, V, and Y provided comments and contributions on the manuscript through written discussion and interpretation of diagnostics. The final

version of the manuscript was approved by all the authors, and they are responsible for the work's correctness and completeness.

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Informed Consent

The authors obtained the written consent of the patient whose case report and clinical images are included.

Conflicts of Interest

There are no competing interests for any of the authors.

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