

Cannon ball appearance on radiology in a middle-aged diabetic female

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ABSTRACT

Pulmonary tuberculosis is commonly presented as cavitory lesion and infiltrations. It commonly involves upper lobe. Lower lobe involvement is less common. Various atypical presentations of tuberculosis on radiology are reported like mass, solitary nodule, multi lobar involvement including lower lobes. Atypical presentations are more common in patients with immunocompromised conditions like Diabetes Mellitus, anemia, renal failure, liver diseases, HIV infection, malignancy, patients on immunosuppressive therapy. Cannon ball presentation of pulmonary tuberculosis is extremely rare and not so common. Common causes of cannon ball presentation in lung are metastasis, fungal infections, Wegener's granulomatosis, sarcoidosis, etc. We report here a case of middle year female with diabetes mellitus presented with atypical symptoms with cannon ball appearance on radiology and found to be of tuberculosis in origin. Thus any patients with immunocompromised condition can present with atypical manifestation of tuberculosis either clinically or radiologically in high endemic countries for tuberculosis.

KEY WORDS: Cannon ball appearance, diabetes, pulmonary tuberculosis

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PRESENTATION OF CASE

Dr. Ravish Kshatriya (Respiratory Medicine): A 43-year-old female, homemaker, vegetarian, presented with chief complaints of cough which was dry in nature since 2 months, abdominal pain, low-grade fever, decreased appetite, and weight loss since 15–20 days. She did not have any chest pain, hemoptysis, breathing difficulty, nausea, vomiting, or urinary complaints.

She is having diabetes mellitus for last 2 years for which she is on regular treatment with oral hypoglycemic drugs with good glycemic control. She is a homemaker, with no occupational exposure and no history of any addiction and even not exposed to biomass fuel consumption.

Her general examination was normal. There was no pallor, clubbing, cyanosis, icterus, peripheral lymphadenopathy, and edema feet, etc., On examining vital parameters, her pulse rate was 90/min, respiratory rate was 20/min, and blood pressure was 110/70 mmHg. In systemic examination on respiratory examination, breath sounds were heard equally bilaterally in all fields of the lung with bilateral fine crepitations were heard in all regions of the lung during auscultation. Abdominal examination was also unremarkable with no organomegaly, distension of abdomen, tenderness, guarding, or rigidity. Rest systemic examination was normal including cardiovascular system, urogenital system, and even breast examination.

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Laboratory investigations of blood: hemoglobin - 13 g % with total leukocyte count: 8700/mm³ in which polymorphonuclear cells were 56% and lymphocytes were 40%. Erythrocyte sedimentation rate (ESR) was 120 mm/h. Urine analysis, stool examination, and other biochemical parameters including renal and liver profile were within normal limits. Tumor markers were advised which were also within the normal range (carcinoembryonic antigen 19-9: 18.07 U/ml, carcinoembryonic antigen A-125 <600.0 U/ml, and alpha-fetoprotein 0.962 IU/ml). Her rheumatoid arthritis (RA factor), antinuclear antibody profile, cytoplasmic antineutrophil cytoplasmic antibodies (cytoplasmic ANCA [c-ANCA]), perinuclear ANCA (p-ANCA), and serum lactate dehydrogenase were also normal.

Microbiological examination of sputum for acid-fast bacilli (AFB) staining and Gram-staining with culture for other microorganisms, as well as fungal culture, were also negative.

RADIOLOGICAL PRESENTATION

Dr. Viral Patel: Radiograph with posteroanterior view showed multiple rounded opacities giving nodular appearance in bilateral lower zones [Figure 1]. Ultrasonography of abdomen and pelvis did not show any abnormality except fatty changes in the liver with mild hepatomegaly. Hence, a computerized tomographic (CT) scan of the thorax was performed which showed multiple, varying sized, round to oval, mildly enhancing, and nodular lesions scattered in lower lobes of both lungs with few lesions in the right middle lobe giving cannon ball appearance [Figure 2].

CLINICAL DISCUSSION INCLUDING DIFFERENTIAL DIAGNOSIS

Dr. Kshatriya: From the above clinical presentation, laboratory and radiological investigations following three categories of

differential diagnosis have been kept under considerations:

- Malignancy with metastasis
- Infective diseases
- Others (vasculitis, autoimmune disorders, and sarcoidosis).

Malignant diseases

As the patient is having chronic cough, weight loss, abdominal pain with X-ray chest, and CT scan of thorax suggestive of cannon ball appearance, malignancy with metastasis has to be rule out first. Being female, breast examination and genitourinary system examination were also done, but it was unremarkable. Lung is one of the most common sites of metastasis. Common tumors that metastasize to the lungs include breast cancer, colon cancer, prostate cancer, sarcoma, bladder cancer, neuroblastoma, and Wilm's tumor. However, almost any type of cancer has the capacity to spread to the lungs. Metastases with cannon ball appearance are classically from renal cell carcinoma or choriocarcinoma, and less commonly from an alternative primary tumor, such as prostate malignancy, synovial sarcoma, or endometrial carcinoma. Though best-required workup was done to rule out other primary site including imaging and tumor markers in this case but everything was not conclusive.

Infective disorders

As this patient is diabetic, which makes her immunocompromised and makes her susceptible to acquire various respiratory infections such as tuberculosis (TB), fungal infections, nocardiosis, and atypical infections, it is essential to rule out them as much as possible. Following thoughts and discussions highlighted on various infections which can be relevant to this case.

Pulmonary tuberculosis

Pulmonary TB is caused by mycobacterium TB bacilli which are AFB. It is highly endemic in developing countries like India. It is transmitted through inhalation site, and lung is the most susceptible to acquire infection. Pulmonary TB can present with chronic cough, hemoptysis,

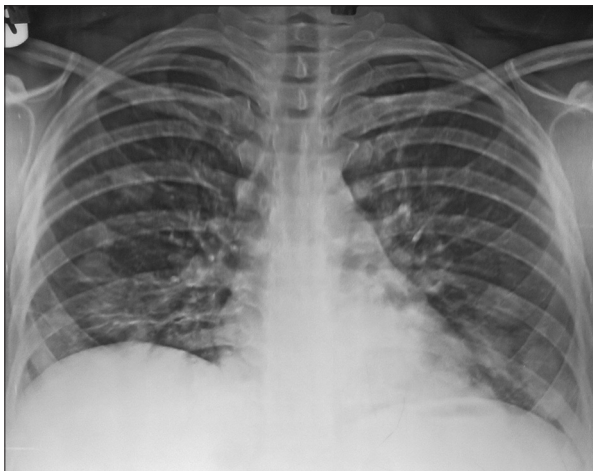


Figure 1: X-ray chest s/o multiple nodular opacities in bilateral middle and lower zones

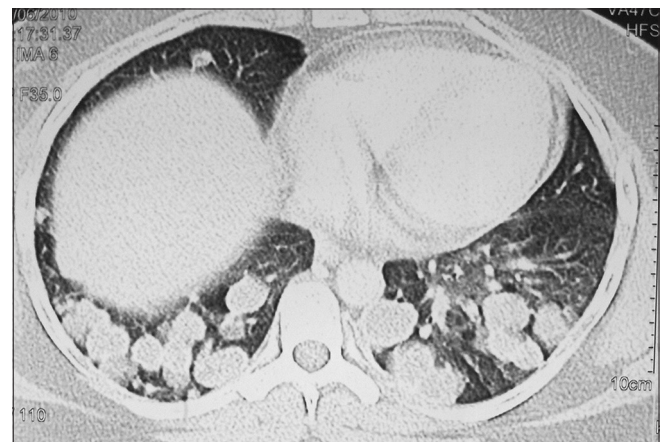


Figure 2: Computerized tomographic scan s/o multiple nodules in lower lobes with cannon ball appearance

chest pain, anorexia, weight loss, and low-grade fever. It is more common in immunocompromised hosts. As this patient is having chronic cough with low-grade fever, weight loss, decreased appetite, and normal hemogram with raised ESR (120), TB can be a possibility especially in high endemic areas of developing countries. The common presentation of pulmonary TB on radiology is upper zone involvement with cavitory lesions with or without infiltrations.^[1,2] Lower zone involvement, multiple nodular patterns like cannon ball appearances in normal individual are rare and found frequently in patients with immunocompromised conditions such as diabetes, anemia, chronic liver disease, renal diseases, and in patients on immunosuppressive drugs. Diabetes is one of the major risk factors for TB. It can increase the susceptibility to acquire TB infection and potentiates conversion it into the active form of the disease.^[3,4] In diabetes, bacillary load may be less and that may not be picked up in routine AFB staining of sputum me. Symptoms may be not classical due to immune suppression. Thus, it may delay in diagnosis and better management. Treatment requires antituberculous therapy for minimum 6 months inclusive of rifampicin, isoniazid, ethambutol, and pyrazinamide. Patients with good glycemic control have a better response of therapy.

Fungal infections

Histoplasmosis

Infection with *Histoplasma capsulatum* occurs commonly in areas in the Midwestern United States and Central America, and it is rare in Indian population. The extent of the disease depends on the number of conidia inhaled and the function of the host's cellular immune system.^[5] Infection with *H. capsulatum* occurs during day-to-day activities in areas where *H. capsulatum* is highly endemic or in the course of occupational and recreational activities that disrupt the soil or accumulated dirt and guano in old buildings, on bridges, and in caves where bats have roosted.^[5] Pulmonary infection is the primary manifestation of histoplasmosis which varies from mild pneumonitis to severe acute respiratory distress syndrome (ARDS). Various forms of pulmonary histoplasmosis are acute pulmonary and chronic cavitory pulmonary histoplasmosis, granulomatous mediastinitis with fibrosis, and disseminated histoplasmosis. Patients with immunocompromised conditions have more disseminated form of histoplasmosis. The epidemiologic history, influenza-like symptoms, and bilateral pulmonary nodules with hilar prominence with calcification may consider for diagnosis which was absent in this case except bilateral nodular opacities. Histoplasmosis may mimic metastatic lesions by having similar radiographic findings when presenting the tendency to be peripheral on the lower lobes.

Pulmonary cryptococcosis

refers to lung involvement from cryptococcosis, a fungal infection caused by *Cryptococcus neoformans* spores. The respiratory tract is the principal route of entry for infection by inhalation of fungal spores.^[6] Cryptococcosis

predominantly occurs in immunocompromised patients but can also be found in the normal individual. The spectrum and presentation of pulmonary cryptococcosis depends on the host's defenses. The presentation of pulmonary cryptococcosis can range from asymptomatic nodular disease to severe ARDS. In the immunocompetent host, the pulmonary infections normally remain asymptomatic; however in immunocompromised patient, it can cause symptomatic infections. In symptomatic individuals, symptoms may range from mild cough and low-grade fever to acute presentation with high fever and severe shortness of breath. Various radiological presentations on CT scan are mentioned and they are like clustered nodular pattern-most prevalent, solitary pulmonary nodular, scattered nodular, bronchopneumonic, and single mass (rare). The most common CT findings in immunocompetent patients with pulmonary cryptococcosis are pulmonary nodule. The nodules are most often multiple, smaller than 10 mm in diameter, and well-defined with smooth margins. The nodules usually involve <10% of the parenchyma and tend to be distributed peripherally in the middle and upper zones. Where there are multiple nodules, they are usually bilateral. Associated cavitation may be seen in up to 40% of cases.

Nocardiosis

Pulmonary nocardiosis is a respiratory infection which may be of subacute or chronic and is caused by aerobic actinomycetes of genus *Nocardia*.^[7,8] *Nocardia* infections are rare among healthy individuals, most infections occurring in immunocompromised patients. Nocardiosis occurs commonly with debilitating diseases such as lymphoreticular neoplasms, alveolar proteinosis, diseases, patients requiring long-term steroid therapy, renal transplant subjects, and patients with AIDS. Most infections are acquired due to exposure to contaminated soil.^[7,8] *Nocardia* is occasional skin contaminants or respiratory saprophytes but recovery of these species from immune-suppressed patients should be regarded as proof of active infection.^[8] It mimics TB both clinically and radiologically and can be misdiagnosed as pulmonary TB for many of times. The chest radiographic manifestations are variable, pleomorphic, and nonspecific. Consolidations and large irregular nodules, often cavitory, are most common; nodules, masses, and interstitial patterns also occur. Upper lobes are more commonly involved but in our case, lower zone involvement with only nodular opacities resembling cannon ball was present, and there was no cavitory lesions was present. Sometimes nocardiosis can be found in acid fast staining but in this case it was also absent.

Parasitic diseases like hydatidosis

Hydatidosis is caused by *Echinococcus granulosus*. Humans may be infected incidentally as intermediate host by accidental consumption of soil, water, or food contaminated by fecal matter of an infected animal. Hydatidosis is one of the most symptomatic parasitic infections in various livestock-raising countries.^[9] Lung is the 2nd most

commonly affected organ following liver. The symptoms depend on the size and site of the lesion. It can present as asymptomatic pulmonary lesion to hemoptysis, chest pain, coughing anaphylaxis, and shock. For hydatidosis, serology and imaging are diagnostic tools. Radiologically, it may present as multiple cystic lesions with air crescent sign or water-lily sign, multiple rounded nodules, or masses with well-defined margins more commonly in lower lobes of lung.^[9] In our case, patient did not have exposure to animals, nor even had nonvegetarian diet and her liver was also found normal on ultrasonography except fatty changes though there is possibility of isolated pulmonary involvement but is very rare.

Others (vasculitis, autoimmune disorders such as rheumatoid nodule and sarcoidosis)

Vasculitis

Wegener's granulomatosis^[10] - Wegener granulomatosis is a necrotizing vasculitis that classically manifests as a clinical triad comprising of upper and lower airway involvement with glomerulonephritis. Patients with Wegener's granulomatosis can be of any age although the mean age at diagnosis is 50 years. Males and females are affected equally. Patient presentation varies and depends on the organ system affected. Some patients present with chronic nasal obstruction, which may be misdiagnosed as chronic sinusitis; others may present with overt acute renal or respiratory failure. Patients with pulmonary involvement often complain of cough with or without hemoptysis, dyspnea, fever, and chest pain. The diagnosis is based on a combination of clinical and laboratory findings. Multiple laboratory values may be abnormal. Anemia with decreased serum iron and ferritin levels may be profound in the setting of diffuse alveolar hemorrhage and indicate blood loss. Inflammatory markers are often elevated and can be used to assess treatment response. Elevated serum creatinine levels reflect renal failure from vasculitic involvement of the kidneys. Elevation of serum cytoplasmic ANCA (c-ANCA) titers, usually directed toward proteinase 3 and myeloperoxidase (found in neutrophils), occurs in up to 90% of patients with active Wegener granulomatosis. Although c-ANCA testing can aid in the diagnosis, positivity is not conclusive. Negative c-ANCA test results are not enough to exclude the diagnosis, and biopsy remains the gold standard means of diagnosis. Common pulmonary radiologic findings include waxing and waning nodules, masses, ground-glass opacities, and consolidation. Airway involvement is usually characterized by circumferential tracheobronchial thickening, which can be smooth or nodular. CT is the imaging modality of choice for diagnosis, surveillance, and follow-up in patients with Wegener granulomatosis. c-ANCA is positive in 80% of cases. Our patient did not have any symptoms of upper airway involvement and renal involvement. Even her c-ANCA was also negative.

Sarcoidosis

Sarcoidosis is a multisystem disorder that is characterized by noncaseous epithelioid cell granulomas, which may affect

almost any organ. Thoracic involvement is common and accounts for most of the morbidity and mortality associated with the disease.^[11] The most common clinical features at presentation are respiratory symptoms (e.g., cough, dyspnea, and bronchial hyperreactivity), fatigue, night sweats, weight loss, and erythema nodosum and arthralgia. However, as many as 50% of cases of sarcoidosis are asymptomatic, with abnormalities detected incidentally on chest radiography. Thoracic radiologic abnormalities are seen at some stage in approximately 90% of patients with sarcoidosis, and an estimated 20% develop chronic lung disease leading to pulmonary fibrosis.^[11] Pulmonary sarcoidosis may manifest with various radiologic patterns: Bilateral hilar lymph node enlargement is the most common finding, followed by interstitial lung disease. At high-resolution CT, the most typical findings of pulmonary involvement are micronodules with a perilymphatic distribution, fibrotic changes, and bilateral perihilar opacities. Macronodular form of sarcoidosis can present as cannon ball appearance though very rare but have favorable outcome atypical manifestations, such as mass-like or alveolar opacities, honeycomb-like cysts, miliary opacities, mosaic attenuation, trachea-bronchial involvement, and pleural disease, and complications such as aspergillomas, also may be seen.^[11,12] Although chest radiography is often the first diagnostic imaging study in patients with pulmonary involvement, CT is more sensitive for the detection of adenopathy and subtle parenchymal disease. To achieve a timely diagnosis and to reduce associated morbidity and mortality, it is essential to recognize both the typical and the atypical radiologic manifestations of the disease, correlate imaging features with pathologic findings to help narrow the differential diagnosis and rule out other possible diagnosis which may mimic sarcoidosis-like TB.^[11]

Rheumatoid nodule

Rheumatoid nodules are a rare manifestation of lung disease associated with RA. Their emergence and evolution in the course of the disease are variable. They are immune-mediated granulomas frequently with necrotic centers and are almost always associated with long, standing active RA.^[13] They are found more frequently in males and smokers with high titers for rheumatoid factor than in females. Clinical presentations include asymptomatic for many years, cough with hemoptysis, and chest pain. Imaging findings comprise rounded, multiple, nodules located subpleurally rarely solitary presentation with predominantly middle and upper lung zones involvement, except with Caplan syndrome (with pneumoconiosis).^[13,14] Up to 50% of nodular lesions may cavitate are found frequently in apical lesions, and usually having thick-walled with smooth inner margins. Cavities may then harbor aspergillosis and also associated with pleural effusion and/or pneumothorax and bronchopleural fistula. They might undergo calcifications rarely. However, in our case, there was no history favoring of joint pain, or other signs of RA including negative rheumatoid factor in blood.

RADIOLOGICAL PRESENTATION AND DIFFERENTIAL DIAGNOSIS

Dr. Viral Patel: Chest x-ray of this patient depicted multiple rounded opacities giving cannon ball appearance in bilateral lower zone [Figure 1] and CT scan also showed multiple, varying sized, round to oval, mildly enhancing, nodular lesions scattered in lower lobes of both lungs with few lesions in the right middle lobe as well-favoring cannon ball appearance. The characteristic radiographic finding of “cannon ball” is multiple, solid, well-circumscribed parenchymal masses of variable size,^[15] resembling cannon balls (a heavy metal or stone ball fired from an old-fashioned cannon). The most common appearance of lung being metastasis from a primary elsewhere. They are considered as metastatic lesion mainly.^[16-18] The multiple cannon ball lesions without any established primary site, though quite rare, present a diagnostic challenge as not only the other entities are rare but also the list is unlimited. On imaging, it is also important to note the size, distribution, presence of cavitation, and calcification within the lesions, which might help to narrow down the list of differentials. A few differential of cannon ball lesions includes fungal infection,^[13] histoplasmosis, coccidioidomycosis, nocardiosis,^[9] parasitic disorders, hydatid diseases,^[19] and paragonimiasis.^[10] Wegner granulomatosis,^[1] rheumatoid nodules,^[13] sarcoidosis,^[12] and pulmonary TB. Atypical presentation of TB on radiography are miliary TB, diffuse pattern, lower lung infiltrates, mass like opacity simulating carcinoma, and tuberculoma.^[2,3] Moreover, in nodular opacities, the solitary pulmonary nodule is more common than multinodular opacities. Diabetes can also affect the presentation of pulmonary TB as well-site of involvement and appearance of the radiological lesion.^[3,4]

Metastasis

Cannon ball lesions in lung fields are most commonly due to hematogenous spread of a primary malignancy elsewhere; the most common primaries are as follows:

- Breast carcinoma
- Colorectal carcinoma
- Renal cell carcinoma
- Uterine leiomyosarcoma
- Head and neck squamous cell carcinoma.

Pulmonary metastases have a wide spectrum of radiologic findings.^[20] The most common being peripherally located, multiple, round, variable-sized nodules (hematogenous spread, and diffuse thickening of interstitium (lymphangitic spread)).^[20,21] Although various diseases can present as multiple pulmonary nodules, the metastatic disease accounts for a high percentage. Gross *et al.* reported that 73% of cases with multiple pulmonary parenchymal nodules resulted from metastatic diseases.

Considering the clinical presentation and the common radiographic appearance, metastasis included as one of the top most differentials in our case. However, no

known primary malignancy and a predominant lower zone distribution required workup for other differentials.

Infections

TB is a common endemic infection in a developing country like India. The common presentation of pulmonary TB on radiology is upper zone involvement with cavitory lesions with or without infiltrations.^[22] Lower zone involvement, multiple nodular patterns like cannon ball appearances in a normal individual are rare and found frequently in patients with immunocompromised conditions such as diabetes, anemia, chronic liver disease, renal diseases, and in patients on immunosuppressive drugs. Shaikh *et al.* concluded in their study that patients with diabetes tend to have atypical radiological presentations of TB and they have increased frequency for lower lung zones.^[23] However, in their study, they found cavitation to be more common in the nodules. Our patient had lower zone lung involvement; however, cavitation was not appreciated. TB however should have topped the list of differentials in a country like India and in a patient who have no known primary site of malignancy.

Other infections with cannon ball lesions include the fungal infections most of which are found in endemic zones. They encompass a broad spectrum of infections and imaging patterns related to fungal sources. They can particularly affect immunocompromised individuals. Few of the common fungal infections which may show multiple nodular appearances are as follows: aspergillomas are the most common lung lesions in immunocompromised individuals. Pulmonary aspergillosis can be subdivided into five categories: (a) saprophytic aspergillosis (aspergilloma), (b) hypersensitivity reaction (allergic bronchopulmonary aspergillosis), (c) semi-invasive (chronic necrotizing) aspergillosis, (d) airway-invasive aspergillosis (acute tracheobronchitis, bronchiolitis, bronchopneumonia, obstructing bronchopulmonary aspergillosis), and (e) angioinvasive aspergillosis.

Cannon ball type lesions on radiograph are observed in semi-invasive and angioinvasive subtypes; however, there is the presence of halo sign in angioinvasive and unilateral or bilateral segmental areas of consolidation with or without cavitation or adjacent pleural thickening, and multiple nodular areas of increased opacity in semi-invasive type of infection.

Histoplasmosis

Thoracic histoplasmosis manifests in five forms: Primary pneumonia, reinfection, chronic pulmonary infection, disseminated, and chronic mediastinal disease. On chest radiographs, a histoplasmoma usually manifests as a peripheral, solitary, spherical, smooth opacity, and measures 5 mm to 3 cm in diameter. Multiple histoplasmomas are a well-recognized occurrence and located in lower zones; however, the number of masses seldom exceeds four or five, and they often exhibit considerable variation in size most contain calcification, typically located centrally producing the “target” sign.

Sarcoidosis

Micronodular lesions in a perilymphatic distribution are the most common parenchymal pattern seen in pulmonary sarcoidosis, with or without nodal manifestations.^[12] Atypical presentations in the form of cannon ball appearance of the pulmonary nodules and masses are seen in 15–25% of patients which on CT appear as ill-defined irregular opacities measuring 1–4 cm in diameter that represents coalescent interstitial granulomas.^[12] These lesions tend to be multiple and bilateral, located predominantly in perihilar or peripheral regions of the upper and middle zones of the lungs. However, in our case, the lesions were predominantly in lower zones of both lung fields, and there were no abnormal mediastinal or hilar lymphadenopathy.

FURTHER PLAN OF MANAGEMENT

Thus, clinical history, laboratory parameters, and radiological presentation did not conclude the confirmation of diagnosis, so CT-guided biopsy was planned from the nodular lesion in the lung, and histopathological confirmation was warranted.

PATHOLOGICAL DISCUSSION

Dr. Sanjay Chaudhari

Histopathology of biopsied tissue revealed well-formed granuloma with a central area of caseous necrosis with the presence of Langhan's giant cells and epithelioid cells surrounded by mononuclear cells (lymphocytes) [Figure 3].

The differentials for given case as per histopathological perspectives are:

- TB
- Sarcoidosis
- Foreign body granuloma
- Fungal granuloma.

From histopathological perspective, biopsy suggested chronic granulomatous inflammation and excluded malignancy and vasculitis up to certain extent.

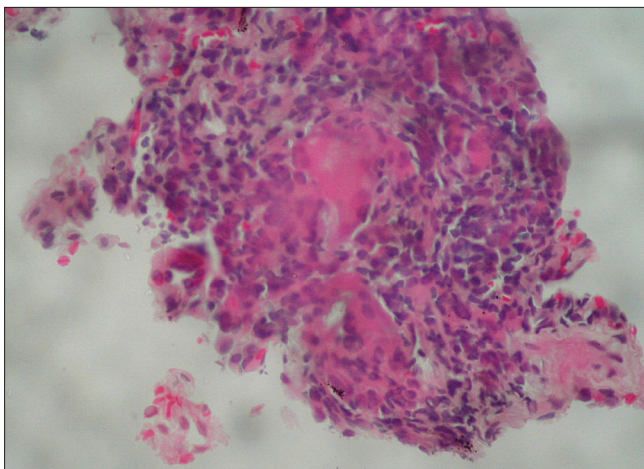


Figure 3: Histopathological evidence of granulomatous inflammation

The fungal granulomas will show the presence of fungal organism and infiltrate which is usually rich in eosinophils, which was not seen in this biopsy.

No foreign body was seen which excluded foreign body granuloma.

As the granulomas showed the presence of caseous necrosis which is seen in TB the diagnosis of pulmonary TB was most likely although confirmation of TB requires demonstration of mycobacteria (AFB) with Z. N. Stain or by culture examination.

Sarcoidosis will show granulomas without caseation and is usually a diagnosis by exclusion.

Clinical diagnosis

From all of the above discussion and conclusions, finally pulmonary TB with diabetes mellitus has been considered as most appropriate and relevant diagnosis and patient was prescribed anti-TB therapy for 6 months which included the intensive phase of 2 months comprising of rifampicin, isoniazid, pyrazinamide, ethambutol, and continuous phase of 4 months with rifampicin and isoniazid.

Follow-up

After receiving anti-TB therapy, patient improved both clinically and radiologically and it was confirmed on follow-up X-ray and CT scan which showed near total resolution [Figures 4 and 5].

Anatomical diagnosis

Bilateral pulmonary nodules due to TB with diabetes mellitus.

DISCUSSION AND CONCLUSION

The multiple, rounded well-defined homogeneous opacities of size from 2 to 5 cm are described as cannon ball opacities in radiology.^[15,16] Metastatic diseases are the most common cause.^[17] Cannon ball appearance in

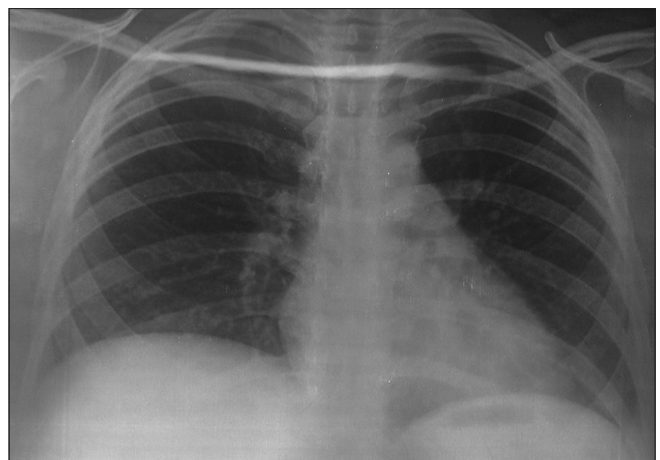


Figure 4: Follow-up X-ray showing resolution in opacities

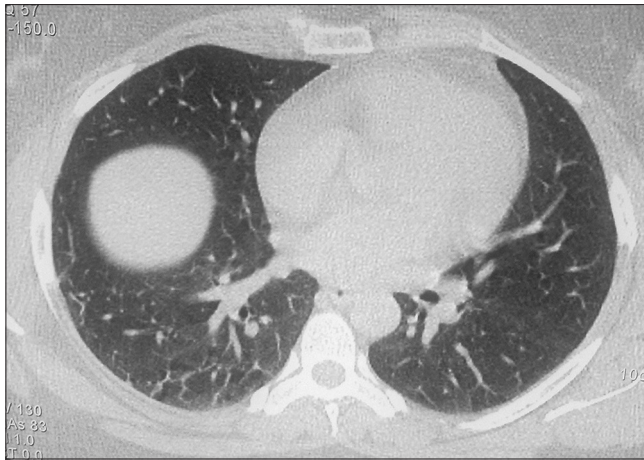


Figure 5: Follow-up computerized tomographic scan showed clearance in cannon ball opacity

radiology always demands thorough diagnostic workup including searching of the primary site of malignancy.^[24] Various other causes have also been reported such as fungal infections (histoplasmosis, coccidioidomycosis), nocardiosis, Wegener granulomatosis, vasculitis lesions, and parasitic diseases such as hydatidosis, and of course TB.^[1,9,10,13,19]

Our patient presented with atypical radiological findings involving predominantly the lower lobes of both lung fields and after ruling out all possibilities of malignancy and with confirmation of biopsy from lesion, antitubercular treatment was prescribed and the patient improved. It shows TB can present as cannon ball opacities as an atypical presentation with predisposing condition like diabetes mellitus and require thorough diagnostic workup like lung biopsy and prompt treatment. Moreover, the lower lung zones involvement and lack of predominant peripheral location in the lungs, and in a country like India where TB still remains a major health hazard with varied presentation, TB should top the list of differentials, where no known primary site of malignancy is there.

The radiological features greatly depend on the host immunity rather than the time after initial infection and therefore the classical imaging findings of primary and reactivation of TB are largely challenged in day-to-day practice. Even sometimes anti-tuberculous therapy trial becomes the best modality not for treatment only but also results in best diagnostic tool in highly endemic areas for TB.

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Conflicts of interest

There are no conflicts of interest.

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