IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 8 Ser.6 (August. 2023), PP 04-07
www.iosrjournals.org

Case Series On Cavitating Lung Diseases

Srishankar Bairy[1], Don Gregory Muscarahnus[2], Carishma[3],Archana Bhat[4]

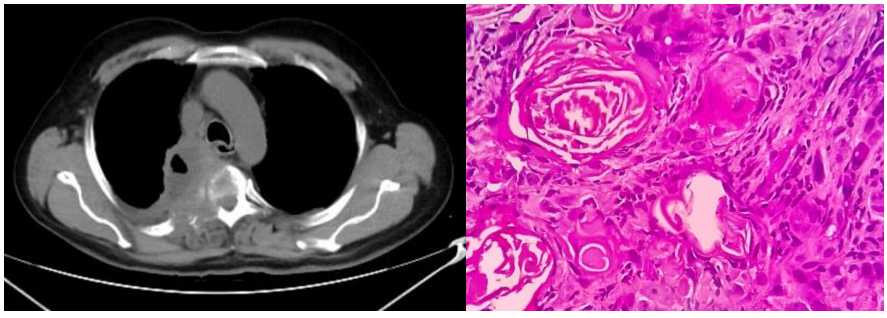
Date of Submission: 10-08-2023 Date of Acceptance: 20-08-2023

I. INTRODUCTION:

A lung cavity is a gas-filled area of the lung in the center of a nodule or area of consolidation which may be observed clinically by use of plain chest radiography or computed tomography [1]. Several pathological processes may results in cavitary lung disease, such as necrotic process which can be suppurative, caseous and ischemic necrosis, vasculitis, cystic dilatation of lung structures, displacement of lung tissue by cystic structures and high-pressure traumas [2]. Some diseases are more commonly associated with cavities than others, hence presence of a cavity helps the clinician to focus and evaluate particular disease associated with it. Here we report the case series of lung cavities which look alike with similar clinical and radiological features but with different pathological causes identifying which helps in the specific treatment towards the cavitating lung diseases.

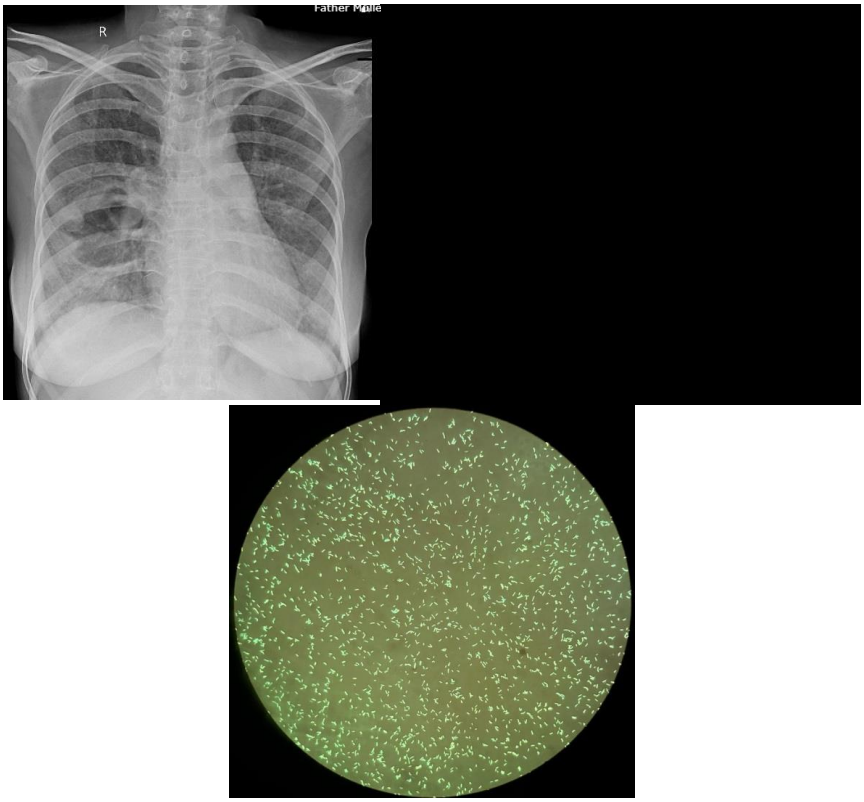
CASE 1

55 year old male who is a smoker with 40 pack year and known case of type 2 diabetes mellitus presented with complaints of right sided chest pain since 4 months, insidious in onset, slowly progressive in nature. It was associated with dry cough, increases more on lying down and at night, no expectoration. Also complains of breathlessness on exertion since 2 months, no history of orthopnoea or PND. Complains fever with chills and rigors since 2 days. No h/o central chest pain, pain abdomen, vomiting, nausea, palpitation. On examination vitals were stable and reduced breath sound in right infraclavicular area. Serology and other routine blood investigations were within normal limits, sputum evaluation was normal. He was Anti tuberculosis treatment since 2 months started on clinicoradiological basis by local doctor. CT chest showed enlarged subcarinal lymph node, bilateral emphysematous changes and irregular spiculated lesion with cavitation involving apico posterior segment of right lung upper lobe with destruction of the right 3rd, 4th and 5th ribs posteriorly. Bronchoscopy was done lavage was negative for all infective panel and cryobiopsy from the wall of the cavity was taken using radial EBUS guidance. Histopath from the biopsy specimen showed infiltrative tumor composed of tumor cells arranged in cords, sheets, nests, individual tumor cells are polygonal with high N: C ratio, pleomorphic hyperchromatic nucleus, with keratinization and keratin pearls. All these features were suggested diagnosing of Well-differentiated Squamous cell carcinoma. Patient was started on chemotherapy.



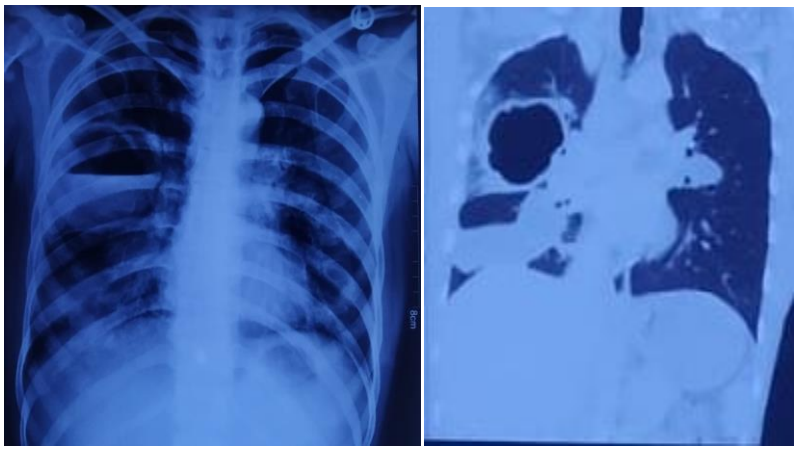
CASE 2

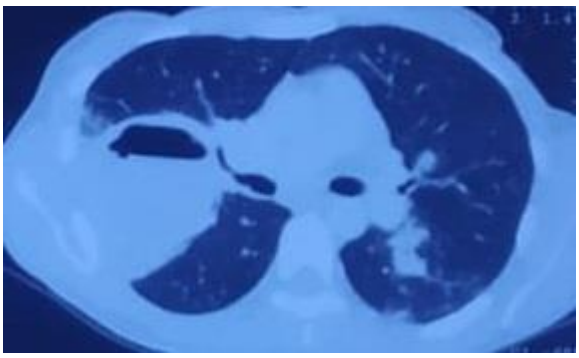
37 year old female with k/c/o hypothyroidism came with complaints of non productive cough since 1 month, low grade fever associated with myalgia and generalized weakness since 15 days and reduced appetite associated significant weight loss. She denied history of hemoptysis, breathlessness. She was diagnosed with mixed connective tissue disorder and was on steroid since 1 year. Examination revealed crepitation over right mammary and axillary areas. Routine blood investigation showed anemia (HB=9.5gm/dl), raised CRP (231mg/l). RFT, LFT, Serology were within normal limits. Chest x-ray showed cavity in the right mid zone and CT showed cavitatory lesion in superior segment of right lower lobe, multiple centrilobular nodules diffusely scattered in both lungs, patchy consolidatory changes in posterobasal segment of right lower lobe. Sputum examination revealed AFB 3+ and Gene Xpert detected MTB and Rifampicin resistance was not detected. Hence patient was diagnosed as Sputum positive New Pulmonary TB and started on ATT as per NTEP guidelines.



CASE 3

31 year old female came with the history of dyspnea , productive cough without blood tinged, fever with chills and right sided chest pain since 4 days. Patient denied history of malena, vomiting, sinusitis, abdominal pain . She was on Anti tuberculosis treatment since 3 months which was started based on clinicoradiological basis by the local doctor. She underwent colonoscopy a year back and diagnosed as biopsy proved chronic distal colitis and on medication for the same. Serology and routine blood investigation , urine examination were within normal limits.CT chest showed multiple cavitations. Bronchoscopy and lavage was taken , Gene Xpert for MTB came negative, culture showed no growth for bacteria or fungal pathogens. Serum C- ANCA came positive with titre of 1:20 and diagnosis of Wegener's Granulomatosis was done and started on immunosuppressants.





II. DISCUSSION:

Pathologically a cavity can be defined as "a gas-filled space within a zone of pulmonary consolidation or within a mass or nodule, produced by the expulsion of a necrotic part of the lesion via the bronchial tree". Radiographically it can be defined as "a lucency within a zone of pulmonary consolidation, a mass, or a nodule [3].

A cavity is the result of any of a number of pathological processes including suppurative necrosis seen in pyogenic lung abscess, caseous necrosis common in tuberculosis, pulmonary infarction which involves ischemic necrosis, cystic dilatation of lung structures seen in and *Pneumocystis* pneumonia ball valve obstruction, or displacement of lung tissue by cystic structures which is common in *Echinococcus* [4]. In addition, internal desquamation of tumor cells with subsequent liquefaction or internal cyst formation or because of treatment-related necrosis there can be formation of cavity in the malignant lesion[5]. Both host factors and the nature of the underlying pathogenic process determines the likelihood that a given process will cavitate or not.

Mycobacterium tuberculosis remains the commonest infective etiology of cavity formation in the lung, because this pathogen causes extensive caseous necrosis. Reduced immunity in a person who is born in Tb endemic region increase the risk of progression from latent to active tuberculosis, human immunodeficiency virus infection is by far the common risk, in adddition to HIV other risk factors such as diabetes , hematologic and head and neck malignancies , organ transplantation, corticosteroid use, and tumor necrosis factor antagonist use couses immunosuppresion leads to reactivation of latent TB infection [6]. Pulmonary tuberculosis generally presents with weeks to months of productive cough, fever, night sweats, weight loss, and, occasionally, hemoptysis. The chest radiograph typically reveals pulmonary infiltrates in the apical region often associated with cavitation. Host factors play a significant role in the prevalence of cavitation. Cavitation is highly prevalent among diabetic patients with tuberculosis , whereas cavities have been less frequently observed in the elderly [7] and persons with advanced human immunodeficiency virus infection. Cavities contain large numbers of organisms, which can then be efficiently aerosolized and transmitted to other susceptible hosts leads to rapid spread of the pathogen to susceptable host. Other pathogens which forms cavity are NTM, Klebsiella pneumoniae, Streptococcus pneumoniae,Haemophilus influenzae ,S.aureus, Actinomyces ,nocardia and various fungal and viral pathogens.

Distinction between malignant and non malignant cavitory lesion becomes utmost important and sometimes difficult too because both the diseases share common clinical features. Primary lung cancer is a common disease leads to cavitation and more frequently found among cases of squamous cell carcinomas than other histological types[8] Furthermore, a worse prognosis is seen in the presence of cavitation in a lung tumor [9]. Common mechanisms of cavitary lung cancer formation are tumor necrosis or abscess due to ischemia involving the feeding vessels and obstruction of bronchioles. Other mechanisms include destruction of the alveolar wall by the protease or mucin produced by the tumor,carcinogenesis of the cavitary wall and the check-valve mechanism due to the infiltration of the cancer into the bronchiole [10].

Wegener's granulomatosis is a systemic necrotizing vasculitis that primarily affects the lungs and kidneys. Wegener's granulomatosis can occur at any age but mean age of diagnosis is 40 years.Up to 90% of patients with Wegener's granulomatosis pulmonary involment is seen (11). Respiratory symptoms includes cough, hemoptysis, and dyspnea. Lung biopsy usually shows a granulomatous small-vessel necrotizing vasculitis (11). Up to 80% of patients have renal involment in the form of nonspecific glomerulonephritis . The most common manifestation of lung involvement is bilateral , multiple, varying sized lung nodules (12).Cavitation of the nodules is common. Other imaging manifestations include lung consolidation and ground-glass opacities mainly due to alveolar hemorrhage, mosaic attenuation due to arteriolar involvement, tree-in-bud opacities, and interlobular septal thickening[13].Disease activity is confirmed by serum analysis for C-antineutrophil antibodies against protease 3 in cytoplasmic granules (c-ANCA). Immunosuppressant therapy, such as systemic steroids and cyclophosphamide remains the mainstay of treatment.

III. SUMMARY

In developing nations where prevalence of Mycobacterium Tuberculosis is very high ,it becomes commonest cause of lung cavity, however many other diseases which have clinical and radiological profiles similar to pulmonary tuberculosis should be kept as a important differencial diagnosis and should be evaluated ,even biopsy to be considered if needed before the initiation of ATT for lung cavity based on clinical decision when sputum comes negative for infective pathogens.

REFERENCES:

[1]. Gadkowski LB, Stout JE. Cavitary Pulmonary Disease. Clin Microbiol Rev. 2008 Apr;21(2):305-33, Table Of Contents. Doi: 10.1128/CMR.00060-07. PMID: 18400799; PMCID: PMC2292573.

[2]. Ware LB, Matthay MA. The Acute Respiratory Distress Syndrome. N Engl J Med. 2000;342(18):1334–49. Https://Doi.Org/10.1056/NEJM200005043421806.

[3]. Tuddenham, W. J. 1984. Glossary Of Terms For Thoracic Radiology: Recommendations Of The Nomenclature Committee Of The Fleischner Society. Am. J. Roentgenol. 143**:**509-517. [Pubmed] [Google Scholar] [Ref List]

[4]. Kumar, V., A. K. Abbas, N. Fausto, S. L. Robbins, And R. S. Cotran. 2005. Robbins And Cotran Pathologic Basis Of Disease. Elsevier Saunders, Philadelphia, PA. [Ref List]

[5]. Miura, H., O. Taira, S. Hiraguri, M. Hagiwara, And H. Kato. 1998. Cavitating Adenocarcinoma Of The Lung. Ann. Thorac. Cardiovasc. Surg. 4**:**154-158. [Pubmed] [Google Scholar] [Ref List]

[6]. Keane, J., S. Gershon, R. P. Wise, E. Mirabile-Levens, J. Kasznica, W. D. Schwieterman, J. N. Siegel, And M. M. Braun. 2001. Tuberculosis Associated With Infliximab, A Tumor Necrosis Factor Alpha-Neutralizing Agent. N. Engl. J. Med. 345**:**1098-1104. [Pubmed] [Google Scholar] [Ref List]

[7]. Wang, J. Y., L. N. Lee, And P. R. Hsueh. 2005. Factors Changing The Manifestation Of Pulmonary Tuberculosis. Int. J. Tuberc. Lung Dis. 9**:**777-783. [Pubmed] [Google Scholar] [Ref List]

[8]. Chiu, F. T. 1975. Caviation In Lung Cancers. Aust. N. Z. J. Med. 5**:**523-530. [Pubmed] [Google Scholar] [Ref List]

[9]. Kolodziejski, L. S., S. Dyczek, K. Duda, J. Goralczyk, W. M. Wysocki, And W. Lobaziewicz. 2003. Cavitated Tumor As A Clinical Subentity In Squamous Cell Lung Cancer Patients. Neoplasma 50**:**66-73. [Pubmed] [Google Scholar] [Ref List]

[10]. Chaudhuri MR. Primary Pulmonary Cavitating Carcinomas. Thorax. 1973;28:354–66.

[11]. Allen SD, Harvey CJ. Imaging Of Wegener's Granulomatosis. Br J Radiol. 2007;80(957):757–765. [Pubmed] [Google Scholar]

[12]. Pretorius ES, Stone JH, Hellman DB, Fishman EK. Wegener's Granulomatosis: CT Evolution Of Pulmonary Parenchymal Findings In Treated Disease. Crit Rev Comput Tomogr. 2004;45(1):67–85. [Pubmed] [Google Scholar]

[13]. Schucany WG. Wegener's Granulomatosis Presenting As A Large Solitary Cavitary Mass. Proc (Bayl Univ Med Cent). 2010 Apr;23(2):171-2. Doi: 10.1080/08998280.2010.11928612. PMID: 21240316; PMCID: PMC2848096.