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Case Report

A Rare Presentation of Hiccups Caused by Lung Abscess: A Case Report

Amal Raj[1,*], Anjana Chathambath[2], Bilha Baby[2], Sobha Subramaniam[1], Kunal Waghray[1], Goutham Seema Ajith[3], Selin C Joy[2]

[1]Department of Pulmonary Medicine, Amrita Institute of Medical Sciences, Amrita Vishwa Vidyapeetham, Kochi, Kerala, INDIA.
[2]Department of Pharmacy Practice, Amrita School of Pharmacy, Amrita Vishwa Vidyapeetham, Kochi, Kerala, INDIA.
[3]Amrita School of Medicine, Amrita Institute of Medical Sciences, Amrita Vishwa Vidyapeetham, Kochi, Kerala, INDIA.

ABSTRACT

Background: A lung abscess is a pus-filled microbial infection of the lung that results in necrosis of the pulmonary parenchyma, which may compress the vagal and phrenic nerves, leading to hiccups. Hiccups are usually harmless and self-limiting. They can become persistent if they last longer than 48 hr and they can become intractable if they last longer than two months. Despite the various non-medical conditions; metabolic issues, central nervous tissue disorders and nerve damage contribute to the etiology of hiccups. **Aim:** Several case reports suggest that vagus nerve irritation can lead to various cardiac, pulmonary and digestive problems. We aim to report a unique case of hiccups induced by phrenic nerve irritation caused by lung abscess. **Clinical Details:** A 59-year-old male patient who presented with right-sided chest pain and persistent hiccups induced by lung abscess for 4 days. The patient had a prior history of sputum-positive pulmonary Tuberculosis (treated and cured in 2002). **Outcomes:** The patient was managed with IV antibiotics and Tablet Baclofen and was discharged once the patient was stable. **Conclusion:** The unusual presentation of hiccups induced by phrenic nerve irritation has been less noted in clinical practice. This case report gives a thorough picture of the problems brought on by compression of the phrenic nerve due to a lung abscess.

Keywords: Lung abscess, Hiccups, Intractable, Vagus nerve irritation.

Correspondence:
Dr. Amal Raj
Department of Pulmonary Medicine, Amrita Institute of Medical Science,Amrita Vishwa Vidyapeetham, Kochi, Kerala, INDIA.
Email: amalraj444@gmail.com

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INTRODUCTION

A lung abscess is characterized by a confined region of pus or necrotic debris in the lung parenchyma which eventually leads to a cavity filled with fluid or necrotic debris brought on by a microbial infection.[1] 15 to 20% morbidity due to lung abscess has been reported in adults.[2] Moreira, José da Silva, *et al*., stated that the apical segment of the lower lobe in both lungs or the posterior segment of the right upper lobe are predominantly major sites where lung abscesses tend to occur.[3]

Hiccups are triggered by a rapid, spasmodic diaphragmatic contraction that involves the inspiratory muscles of the chest and abdomen causing the instant closure glottis. A variety of thoracic-pulmonary conditions, including bronchitis, aortic aneurysm, pulmonary embolism, pneumonia, malignancy and chest trauma can also contribute to the development of hiccups which usually last for more than 48 hr.[4] The real pathophysiology behind hiccups primarily involves the hiccup reflex arc which is composed of chiefly three parts: the central processing unit in the midbrain, the efferent limb that makes it in motor fibers of phrenic nerves reaching the accessory nerves and diaphragm to the intercostal muscles and the afferent limb that includes phrenic, vagus and sympathetic nerves that transmit somatic and visceral sensory signals.[5] The sympathetic, vagus and phrenic nerves, which transmit visceral and somatic sensory information, make up the afferent limb. The efferent portion of the arc consists of the accessory nerves providing the intercostal muscles and the motor fibers of the phrenic nerve that supplies the diaphragm.[6] The diaphragm and intercostal muscles contract as a result of phrenic, vagal, sympathetic afferent and efferent nerve fiber activation resulting in hiccups.[7]

We report an unusual presentation in a 59-year-old man with a previous history of, sputum-positive pulmonary tuberculosis (treated and cured in 2002), right upper lobe fibrosis-post tuberculosis sequel, Dyslipidemia and Type 2 Diabetes Mellitus. The individual presented with complaints of hiccups and right-sided chest pain for 4 days. He also reported multiple fever episodes within the same duration.

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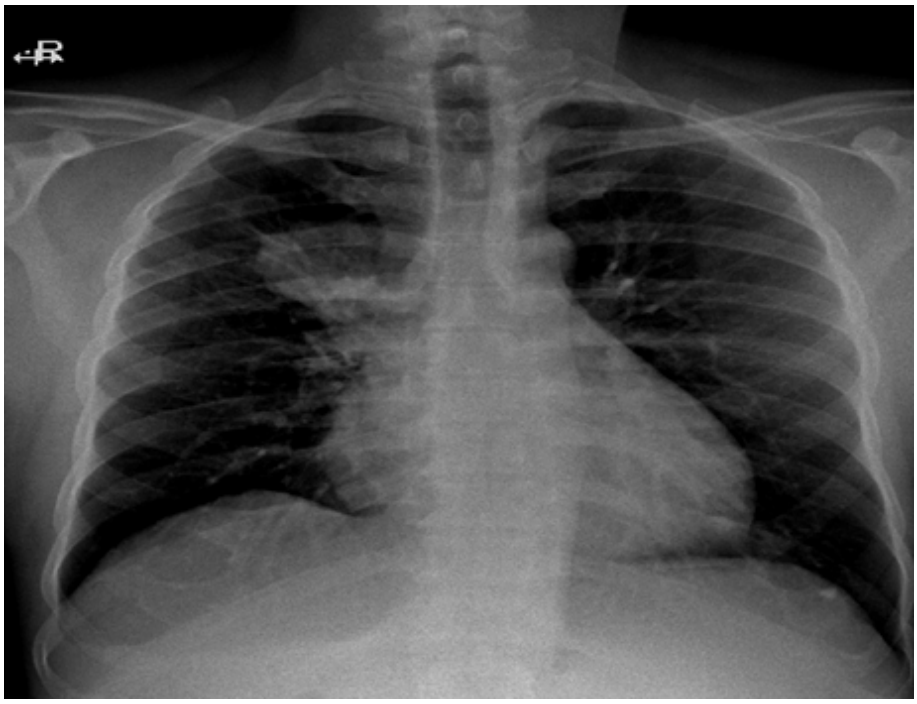

Figure 1: Initial chest X-ray. The X-ray shows right para tracheal opacity.

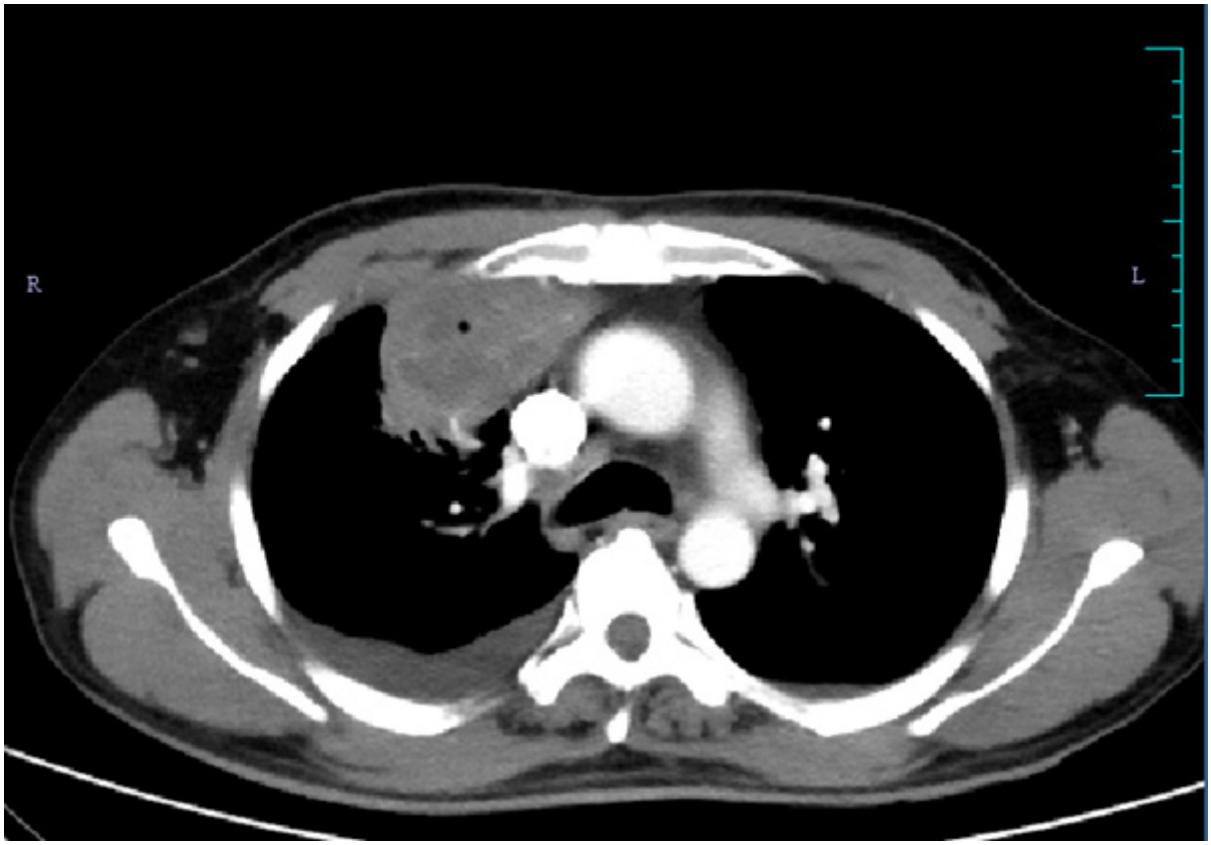

Figure 2: MDCT showing a heterogeneously enhancing soft tissue lesion measuring 5*5.2 cm at the anterior segment of right upper lobe causing anterior bronchus cutoff.

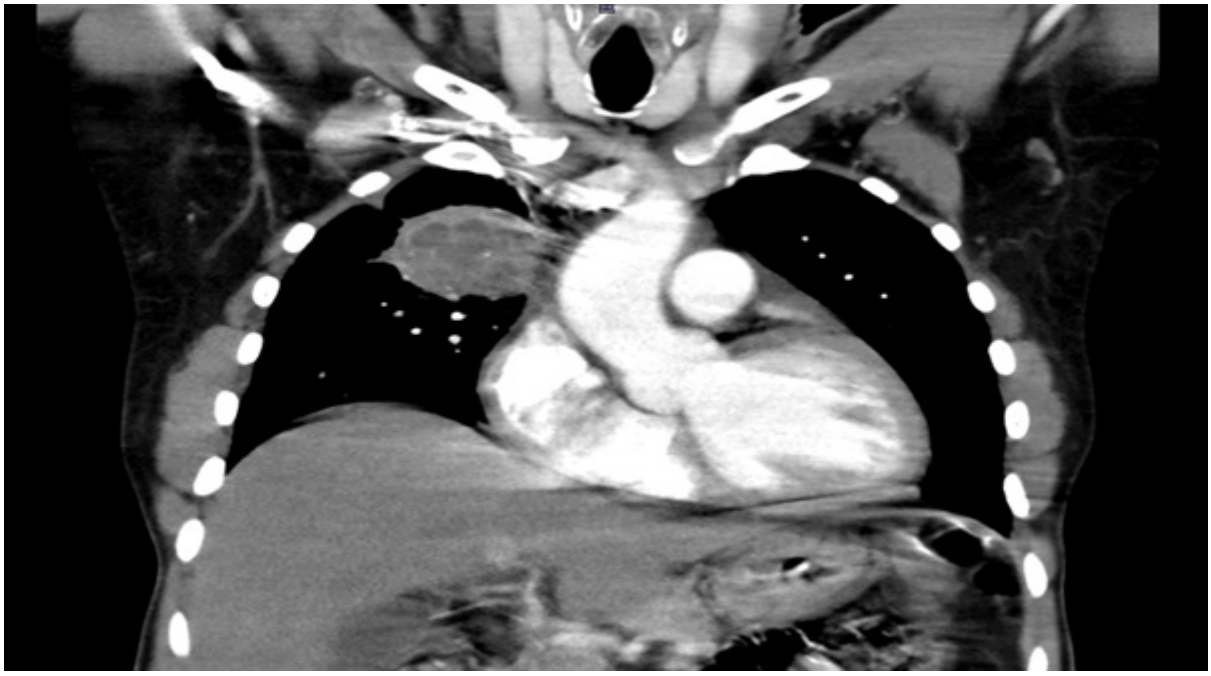

Figure 3: MDCT showing the heterogeneous mass lesion at the right upper lobe.

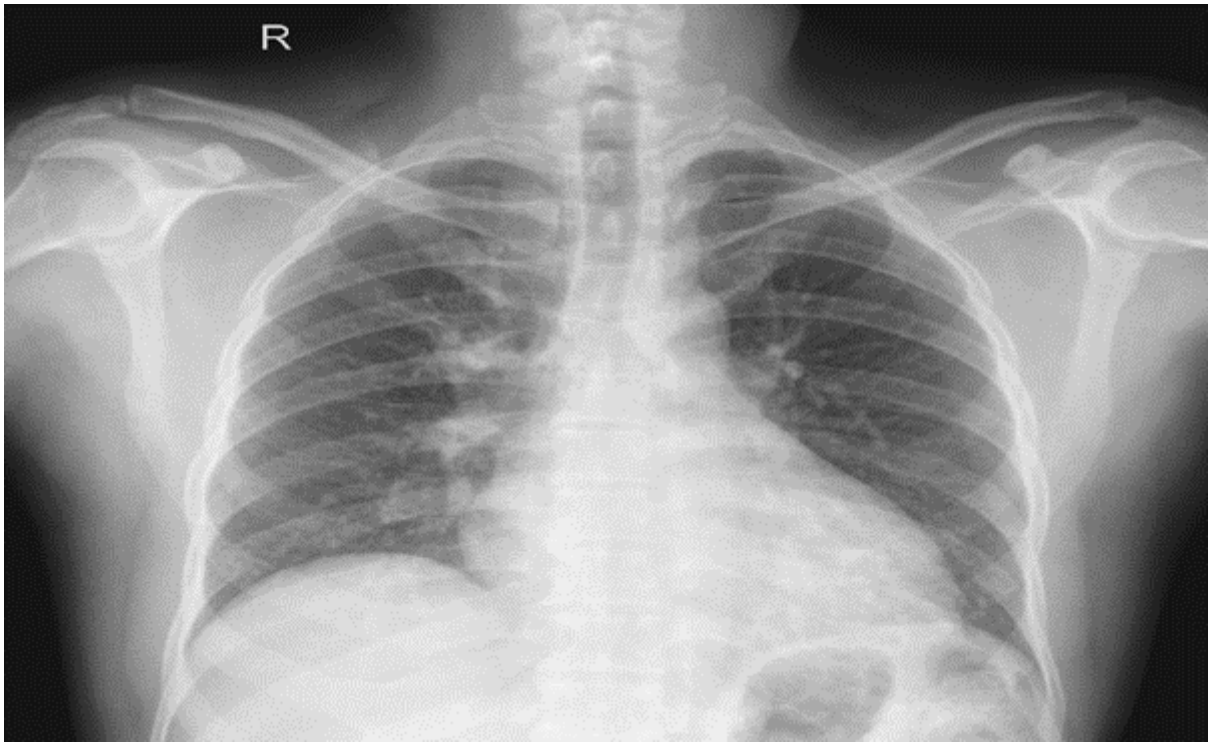

Figure 4: X-ray following antibiotic treatment.

CASE REPORT

A 59-year-old male visited the Pulmonary Medicine Department with a 4-day history of hiccups and chest pain. He had a past history of sputum-positive pulmonary tuberculosis managed with ATT in the year 2002 which subsequently resulted in right upper lobe fibrosis. Dyslipidemia and Type 2 Diabetes Mellitus were the other comorbidities. He presented with multiple fever episodes along with the complaints of hiccups and right-sided chest pain. Initially performed physical examination concluded that the patient was afebrile. Blood pressure was reported within the normal limits (130/70 mmHg) whereas a slight elevation was found in pulse rate which marked 122 per minute. Examination of both the nervous and cardiovascular systems showed no significant abnormalities. On examination of the respiratory system, bilateral normal vesicular breath sounds were heard

and saturation was maintained at 94% at room air. Further investigations of the patient were carried out based on clinical findings. Initial chest X-ray (Figure 1) showed evidence of right Para tracheal opacity which put forward a provisional diagnosis of community-acquired pneumonia. Correlating with the symptoms, a 2D-ECHO was performed to rule out any cardiac dysfunction. It showed mild concentric LVH, overall good LV and RV function, no definite RWMA and no clot or pericardial effusion or coarctation of the aorta. Thus, cardiac dysfunction was ruled out as the root cause of manifestations.

Then, MDCT Chest was done with contrast which suggested the absence of any significant mediastinal lymph nodes. A heterogeneously enhancing soft tissue lesion measuring 5*5.2 cm at the anterior segment of the right upper lobe causing anterior bronchus cutoff was detected from the test. It showed a speck of calcification around the periphery and a few necrosis at the center (Figures 2 and 3). Adjacent lung parenchyma showed features of ground glass opacity and interlobular septal thickening. The lesion additionally showed anterior mediastinal pleura and fat invasion. Hence it represented a possibility of lung carcinoma. Fibrobronchiectatic changes were noted in the anterior segment of the right upper lobe and the superior segment of the right lower lobe. Another soft tissue nodule and a calcified nodule of 8 mm and 6 mm size were evident in the posterobasal lung segment of the left lobe. Mild pleural effusion was reported on the right side.

Further, CT-guided Trucut Biopsy was carried out to examine the lesion. The biopsy was done from the lung mass lesion using 18G*10 cm BARD coaxial biopsy system under local anesthesia. 3 core tissue samples were collected following all the aseptic precautions. Pus aspirated from the lung mass lesion was also analyzed. Histopathological examination of the biopsy sample suggested the presence of extensive fibrinous exudate and mixed inflammatory infiltrate with neutrophil preponderance within the lung tissue. Only a few lymphocytes and carbon-laden pigments were reported. Fibroblastic proliferation was seen and some showed reactive changes in the form of nuclear enlargement. No intranuclear inclusions, granuloma, or malignant cells were evident in the sample. IHC examination was negative for both CMV and CD-30. The features showed were consistent with abscess. Pus samples collected were examined for AFB Smear and GeneXpert-MTB-RIF test which provided a negative report ruling out Tuberculosis. The bacterial and fungal cultures of pus samples were also negative.

The diagnostic approaches therefore provided solid proof that the patient's chronic hiccups were caused by the heterogeneous non-malignant lung mass lesion.

Blood test reported high levels of Procalcitonin (0.66 ng/mL) and CRP (228.77 mg/L) which was managed with antibiotics (Twice daily dosing of both Injection Piperacillin-Tazobactum 4.5 g and Tablet Azithromycin 500 mg). Tablet Baclofen 10 mg every 8th hr, an analgesic was provided with other supportive care like nebulization in view of managing the persistent hiccups. Simultaneous administration of medications including Tablet Rosuvastatin and Insulin was carried out to manage the comorbidities. With this line of medical care, the patient showed gradual improvement and hiccups subsided (Figure 4). The patient was discharged in stable condition with the oral antibiotic Tablet Cefpodoxime XP (Cefpodoxime proxetil 200 mg+Clavulanic acid 125 mg) once daily for 5 days.

The patient has fully understood the content and given the consent for this information relating to himself.

DISCUSSION

The involuntary spasmodic contraction of inspiratory muscles like the diaphragm results in Hiccups, also called Singultus. Several etiologies including drugs (Dopamine, Azithromycin, Steroids, Propofol), gastric and esophageal diseases, cardiac disorders and pulmonary diseases contributes to causing hiccups.[8] Though hiccups have been linked to several disease entities, this case study focuses on hiccups and right-sided chest pain induced by a non-malignant lung mass lesion which produced an irritation at the phrenic nerve contributing to these manifestations.[9] The reflex arch is linked to the pathophysiology of hiccups including afferent limb with phrenic, vagus and sympathetic nerves at the level of T8, the right phrenic nerve descends via the vena cava gap in the diaphragmatic aperture, passing laterally through the right atrium and ventricle.[10] The reticular formation, brain stem respiratory center, phrenic nerve nuclei, hypothalamus and periaqueductal grey subthalamic nuclei are associated with the central component involved in causing hiccups. The medulla is home to the central component responsible for hiccups, totally distinct from the pathways connected to regular breathing. This central mechanism is also controlled by neurotransmitters such as dopamine, glutamate, glycine, serotonin and Gamma-Aminobutyric Acid (GABA). [9] So, these neurotransmitters are likewise linked to the therapeutic approach to treat hiccups.[4] Intractable hiccups can be effectively and safely treated with gabapentin, an alpha-2-delta ligand that has a similar structure to GABA. It works by blocking voltage-operated calcium channels, which reduces the release of neurotransmitters, such as glutamate and substance P and finally modifies diaphragmatic activity.[11] Olanzapine being a serotonergic antagonist is used to reduce the activity of phrenic motor neurons thereby mitigating the cause of hiccups.[12] Literature also suggests the use of Baclofen in treating hiccups despite adverse effects like ataxia, nephrotoxicity, confusion and sedation.[13] Baclofen works effectively for hiccups as a GABA analog as it suppresses the hiccup reflux and lowers excitability. This lowers synaptic transmission at the spinal cord by raising the threshold of excitation and providing an anti-spastic impact.

Lee, Ju Hwan, *et al*, supports the use of Baclofen as a first-line treatment and also when the patient does not show a response to any other medications. This case also followed a similar therapeutic approach. Tablet Baclofen 10 mg, every 8th hr was administered to the patient to manage hiccups. Antibiotics were used for the management of lung abscesses. After therapy, the lung abscess and hiccups resolved.[14]

CONCLUSION

Thus, to conclude, the main cause behind the manifestation of hiccups and right-sided chest pain was a rare non-malignant heterogeneous lung abscess lesion detected in the patient which is rare and of high medical concern.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

ATT: Antitubercular therapy; **LVH:** Left Ventricular Hypertrophy; **RWMA:** Regional wall motion abnormalities; **MDCT:** Multidetector computed tomography; **CMV:** Cytomegalovirus.

ETHICAL STATEMENT

The study was approved by Amrita Institute of Medical Sciences and Research centre, Institutional ethics committee, reference number IEC-AIMS-2024-PULMO-072.

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