



### **Case Report:**

## **Himalayan P waves in COPD - A Rare Feature.**

### **Authors**

**Satish Kumar**, Senior Resident  
**Sharath Babu NM**, Junior Resident,  
**Sanjay K Mahajan**, Assistant Professor,  
**Madan Kaushik**, Assistant Professor,  
**Balbir S Verma**, Associate professor,  
**SS Kaushal**, Professor,  
**Department of Medicine, Indira Gandhi Medical College, Shimla, India.**

### **Address for Correspondence**

**Dr. Sharath Babu NM**,  
Junior Resident, Dept. of Medicine,  
Indira Gandhi Medical College,  
Shimla, India.  
**E-mail:** nmsbabu18@yahoo.com

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**Abstract:** Himalayan or giant P-waves (amplitude =5 mm) are often known to be classically associated with congenital heart diseases with right to left shunt like tricuspid atresia, Ebstein anomaly, combined tricuspid and pulmonic stenosis, etc, where they indicate a dilated right atrium and tend to be persistent. These type P waves are rarely seen in chronic obstructive pulmonary disease (COPD) and in this condition it may be due to structural right atrial changes or hypoxemia or combination of both. Here we report a case of COPD with Himalayan P waves which is a rare entity.

**Key Words:** Himalayan P waves; Giant; Chronic obstructive pulmonary disease

### **Introduction:**

COPD is a well known disease process in chronic smokers. This disease process can lead to various complications both functionally and structurally affecting basically through involvement of lung and heart. Electrocardiography has been well studied in COPD patients till date. Himalayan P waves are being reported commonly in congenital heart diseases (1-3) which is a very rare entity in COPD. So, here is an attempt to report one of such rare kind.

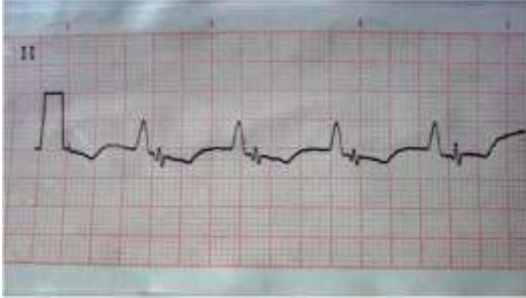
### **Case Report:**

A 54 years male patient was admitted with complaints of cough and fever from one week. He had no history of dyspnea, chest pain, pedal edema. He had history of similar complaints in the past in the form of frequent episodes of cough with expectoration. He was a chronic smoker with 15 pack years of smoking. On general physical examination, there was mild cyanosis. There was no clubbing, pedal edema, lymphadenopathy. On systemic examination, respiratory system showed barrel shaped chest with anteroposterior and transverse diameter ratio of 1, widely spaced ribs, increased resonance to percussion and breath

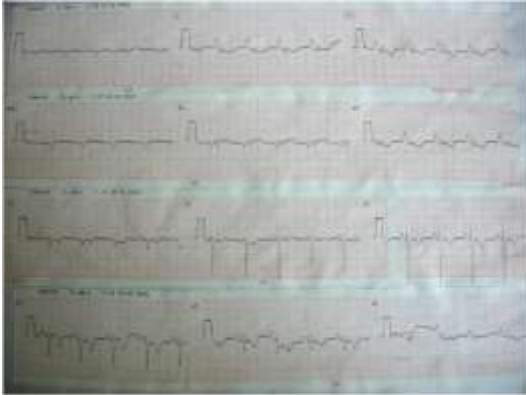
sounds decreased in intensity symmetrically with prolonged expiration. Cardiovascular examination did not reveal significant findings except disappearance of normal cardiac dullness. Abdominal examination showed mild visceropertosis of liver. Rest of the examination was normal.

On investigations, Total leukocytes 13060/cmm, polymorphs 73%, lymphocytes 20%, monocytes 4%, eosinophils 3%, hemoglobin 15.8g%, platelets 185000/cmm, ESR 10mm 1st hour and random blood sugar was 84mg%. Liver and renal function tests, electrolytes were normal. Blood culture was sterile. Sputum culture showed streptococcus pneumonia sensitive to amoxicillin and patient was treated accordingly. On chest radiography, there were emphysematous lung fields with cardiomegaly suggestive of right atrial enlargement and right ventricular dilatation. Arterial blood gas analysis showed hypoxemia with hypercarbia with normal pH, suggestive of chronic obstructive pulmonary disease (COPD), which was also confirmed on pulmonary function test after settling of his exacerbation.

Electrocardiography showed regular rhythm with heart rate of 94 and right axis deviation. In lead II, P waves of amplitude 5mm and larger than QRS complex were seen (Fig. 1). In leads III and AVF P waves were larger than QRS complexes. These were referred to as Himalayan P waves. This was suggestive of right atrial enlargement. Precordial leads showed slow R wave progression with right ventricular strain pattern (Fig. 2). Patient's echocardiography was done for cardiac status and to rule out congenital heart disease in view of Himalayan P waves. It showed enlarged right atrium and right ventricle with moderate tricuspid regurgitation and pulmonary arterial hypertension. So these findings were consistent with sequelae of chronic obstructive pulmonary disease.



**Fig. 1: ECG lead II showing giant P waves of 5 mm.**



**Fig. 2: ECG showing right axis, poor (slow) R wave progression and giant P waves.**

**Discussion:**

Himalayan or giant P-waves (amplitude =5 mm) are often known to be classically associated with congenital heart diseases with right to left shunt like tricuspid atresia(1), Ebstein anomaly(2), combined tricuspid and pulmonic stenosis(3), etc., where they indicate a dilated right atrium and tend to be persistent. In Ebstein anomaly, P waves are characteristically tall and broad (termed Himalayan) because of prolonged conduction in the enlarged right atrium.(2) In our case it was Himalayan P waves of 5 mm seen in a case of COPD which is a rare entity. It was also described in a case of emphysema by Chhabra et al(4) recently.

The main reason underlying Himalayan P waves in many condition is right atrial enlargement. But COPD also have other reasons, the possible explanations for the giant P-waves formation are severely hyperinflated lungs from long-standing emphysema (causing diaphragmatic depression) (5,6), severe right atrial hypoxia (caused by decreased oxygen saturation) resulting from severe bronchospasm(7) in emphysema exacerbation, and also the transient mechanical/hemodynamic load on the right atrium directly related to the bronchospasm. The arterial desaturation tends to increase the amplitude and peaking of P-wave.(8) So, it was COPD with atrial enlargement along with chronic hypoxemia was the cause of the rare variety of Himalayan P waves.

**Learning points:**

- Himalayan P waves (=5 mm) can be seen in any condition causing right atrial enlargement.
- These types of waves can be effect of hypoxemia in absence of structural changes.

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