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A Case of Pickwickian Syndrome presented with CO2 Narcosis with multiple uncontrolled co-morbidities

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ABSTRACT

The symptoms of obesity hypoventilation syndrome (OHS), often called "Pickwickian syndrome," include hypercapnia during the day, sleep-disordered breathing, and obesity overall. An exclusionary diagnosis. A worsening of or a persistent condition of increasing dyspnea might be observed in patients. This case study details the symptoms and management of a 61-year-old female patient who arrived with shortness of breath with physical exercise and was diagnosed with severe obesity (BMI: 51.9 kg/m2). Very high levels of carbon monoxide were detected in the arterial blood gas (ABG) study. Hypertension, diabetes, obesity, dyslipidemia, and hypothyroidism were all present in this patient. After the patient was stabilised, they were quickly treated with non-invasive ventilatory (NIV) support and supportive care. The patient was prescribed NIV to use overnight and was discharged.

Key Words: *Metabolic X syndrome; non-invasive ventilatory support; obesity; obstructive sleep apnoea; obesity hypoventilation syndrome.*

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Case Presentation:

A 61-year-old female, who is a known case of hypertension, diabetes, dyslipidaemia, obesity and hypothyroidism came with chief complaints of breathlessness on exertion (dyspnoea on exertion class III) with no history of fever, cough, cold, diarrhoea and vomitingat a multi-speciality health centre in May 2023 since 15 days.

The patient's vitals were as follows upon arrival: oxygen saturation at 80%, pulse rate of 100/76 mm Hg, respiratory rate of 27 cycles/min, and heart rate of 90 beats/min. Measurements: 120 kg in weight and 152 cm in height. The individual's body mass index was 51.9 kg/m². No abnormalities were found during the comprehensive assessment of the respiratory system. Electrocardiogram (ECG) findings indicated right bundle branch block, which was examined by a cardiologist (RBBB). (Fig.1) The doctor ordered a thoracic HRCT while the patient was in the exam room. Main pulmonary artery diameter: 33.7 mm, right pulmonary artery diameter: 24.2 mm, and left pulmonary artery diameter: 19.2 mm; these measurements pointed to an enlarged pulmonary trunk and cardiomegaly (Fig. 2). Dilated right ventricle and right atrium, mild tricuspid regurgitation, left ventricle ejection fraction of 60%, right ventricular shunting pressure of 68 mmHg, and severe pulmonary arterial hypertension were among the anomalies detected by the 2D echocardiography. While doing the work up, the following values were calculated: complete blood count 9,850, platelet count 300,000, C-reactive protein level 1.06, haemoglobin A1c level 7.3, and thyroid stimulating hormone level 8.3. After analysing the arterial blood gas (ABG), the following parameters were found: There are a number of important parameters to consider, including pH 7.2, pCO2 81.80 mm Hg, pO2 122 mm Hg, HCO3 36.5 mmol/L, and lactate 0.50 mmol/L. The serum electrolytes showed a sodium concentration of 134 mmol/L, a potassium level of 4.76 mmol/L, and a chloride concentration of 97 mmol/L. The patient made a full recovery following admission to the intensive care unit with the support of bi-level positive airway pressure (Bi-PAP) and further therapies for symptoms.

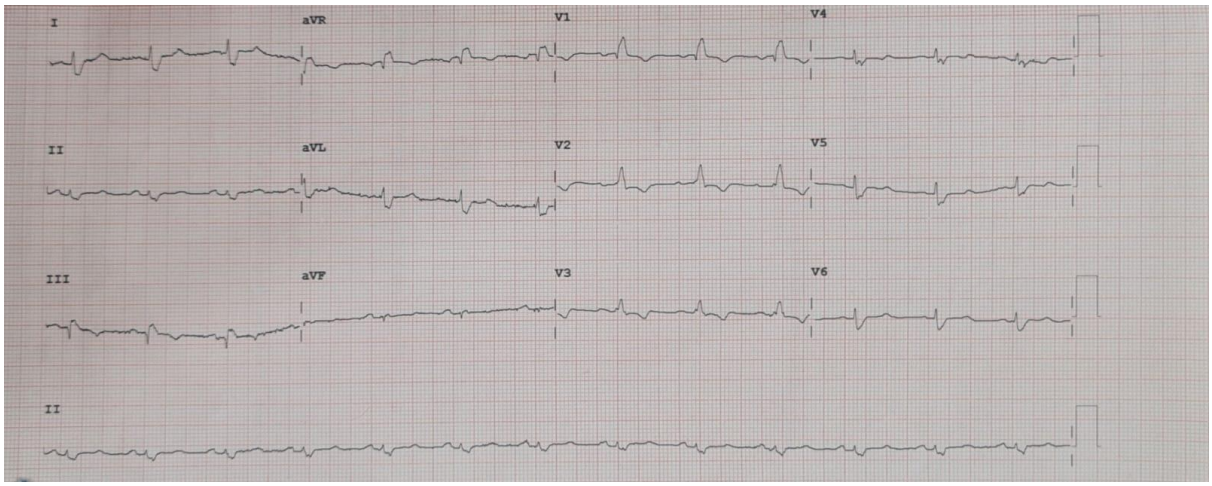

Fig.1: ECG showing RBBB (Right Bundle Branch Block)

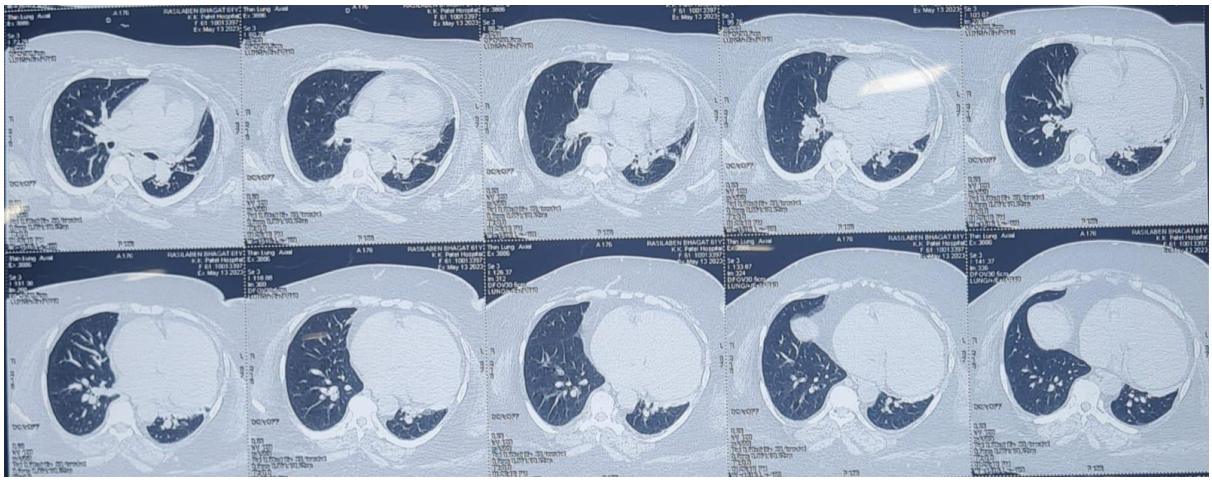
Fig.2: HRCT thorax showing enlarged pulmonary trunk (main pulmonary artery diameter: 33.7 mm, right pulmonary artery 24.2 mm, left pulmonary artery 19.2 mm)

At time of discharge, the patient was advised for weight reduction, dietary and lifestyle modifications, polysomnography was suggested.

Discussion:

Obesity hypoventilation syndrome is characterised by a high body mass index (BMI) of 30 kg·m-2 or more, elevated arterial carbon dioxide tension (arterial CO2) during the day (45 mmHg or higher), and sleep disordered breathing (OHS). No other medical conditions that might cause alveolar hypoventilation should be present in an OHS patient's medical history. Approximately 0.4% of people are thought to suffer from OHS. Diagnosis is often diagnosed in stable individuals after an episode of acute or chronic hypercapnic respiratory failure or when symptoms are causing pulmonary or sleep consultation. A sleep study and arterial blood gas analysis are necessary for the diagnosis of OHS. (1,2)

Clinical symptoms are alleviated by both invasive ventilation (NIV) and continuous positive airway pressure (CPAP). Those who suffer from both obstructive sleep apnea and obstructive hypoventilation while sleeping should ideally use CPAP, whereas those who have milder cases of obstructive sleep apnea might undergo nasal inflation therapy (NIV). As seen in our example, NIV is used to treat acute-on-chronic hypercapnic respiratory failure. Improving prognosis is dependent on the care of co-morbidities, which includes rehabilitation programmes and drugs. (3)

Obesity cardiomyopathy, a disorder known to cause neurohormonal and metabolic alterations which predisposes to left and right heart failure which is facilitated by co-morbidities like hypertension and dyslipidaemia.(4)

According to a case report super obesity is mostly associated with multi organ failure which is termed as malignant obesity hypoventilation syndrome which in most cases is fatal which can be prevented with early diagnosis and treatment. (8)

Although obesity hypoventilation syndrome is not that uncommon but in our case there was atypical presentation of Diabetes Mellitus with borderline HBA1c, severe Type 1 respiratory failure with excess pCO2 yet patient was conscious,

no evidence of DVT,heart functions well preserved despite many comorbidities, rhythm disturbances after the period of stabilisation and no thyroid storm despite having such high TSH. However, one case report mentioned the Gastaut syndrome, which is mostly defined by hypersomnia and sleep apnoea, and Auchincloss syndrome, which is right heart failure with respiratory acidosis in awake obese people.(10)

According to one study,age greater than 75 years with OHS and other co-morbidities has better response with non-invasive ventilation.(12) But in our case the patient was 61 years but responded well to non-invasive ventilation.Also non-invasive ventilation is a boon to patients of OHS and chronic obstructive pulmonary disease as it can resume the normal breathing and improve the quality of sleep.(5,7)

It was found in one study that 5 and 10 year unadjusted survival rates were found to be more in patients with OHS as compared to those having OSA. (6) It states that the mortality ratio of OHS is on higher side when accompanied with other co-morbidities.

Also, as there are many researches done on OHS and malignant OHS but thepatient's of these disease are the common occupants of ICU's but many of them go undiagnosed due to lack of acknowledging the symptoms and late arrival resulting to complications and sometimes even costing life.

Conclusion:

As obesity prevalence have been increased worldwide leading to increase in cases of Obesity hypoventilation syndrome and its mortality.Clinical judgement and examination and early decision of such patients will help in better outcome. Non- invasive ventilation therapy have markedly reduced mortality and benevolent in treating such patients. An adequately equipped clinical team is necessary in every hospital setup to diagnose and handle such cases.

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