

Obesity Hypoventilation Syndrome (Pickwickian syndrome) with Obstructive Sleep Apnoea

R Kushwaha, S Verma, V Mahajan, R Singh, R Prasad

Citation

R Kushwaha, S Verma, V Mahajan, R Singh, R Prasad. *Obesity Hypoventilation Syndrome (Pickwickian syndrome) with Obstructive Sleep Apnoea*. The Internet Journal of Pulmonary Medicine. 2006 Volume 9 Number 1.

Abstract

A 48 year old obese male with symptoms of obesity hypoventilation syndrome (Pickwickian syndrome) and obstructive sleep apnoea was admitted to our department. He was put on non invasive positive pressure ventilation and showed dramatic clinical response.

INTRODUCTION

Obesity Hypoventilation Syndrome (Pickwickian syndrome) is characterized by the combination of obesity (BMI > 30 Kg/ m², hypoventilation and daytime hypercapnoea (PaCO₂ > 45 mm of Hg). Obesity Hypoventilation Syndrome (Pickwickian syndrome) can coexist with Obstructive sleep apnoea. Here we are reporting a type of case in 54 year old male.

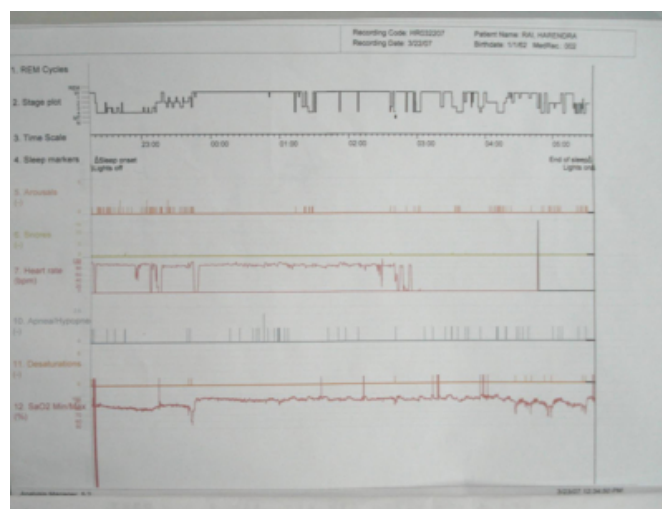
CASE REPORT

A 48 years old male, non smoker, shop holder by occupation, was admitted to our department with the complaints progressive increase in breathlessness, swelling over face and feet since the past 6 months. The patient had history of hypertension and diabetes mellitus for the last 5 years. He had no history suggestive of any chronic respiratory diseases. His resting pulse rate was 102/min, regular; respiratory rate was 38/ min and blood pressure was 144/94 mm Hg. His general examination revealed obesity with weight of 98 kg (Body Mass Index 34) and cynosis. The abdomen was fatty and pendulous. There was no pallor, lymphadenopathy, clubbing, or visible icterus. Examination of chest revealed harsh vesicular breath sounds. His Arterial Blood Gas revealed pH; 7.34 PO₂; 38 mm Hg, PCO₂; 65.8 mm Hg, O₂ saturation; 68 % (without oxygen). His blood biochemistry was within normal limits. His chest X-ray was within normal limits. His 2D Echo revealed dilated RA and RV with pulmonary hypertension of 46 mmHg with EF of 60 %. His central nervous system examination was within normal limits. During hospital stay his attendants also give history of loud snoring, nocturnal awakenings, morning headache and day time sleepiness. So to rule out obstructive

sleep apnea her polysomnography was done. His polysomnography revealed Apnoea Hypopnoea Index of 16.4 /hours (Fig: 1).

Figure 1

Figure 1: Polysomnography revealed Apnoea Hypopnoea Index of 16.4 /hours.



He had no other known cause of hypoventilation. Thus diagnosis of Obesity Hypoventilation Syndrome (Pickwickian syndrome) with obstructive sleep apnea was made. He was put on oxygen 1 litre/ min and nasal C-PAP at setting of 6mm of H₂O (5 hours/night). His daily assessment of ABG revealed dramatic clinical improvements (shown in table-1)

Figure 2

Table 1

S.R.	S.A.Vs	Arterial Blood Gas Parameters				
		pH	PO ₂ (mm Hg)	PCO ₂ (mm Hg)	HCO ₃ (mmol/L)	O ₂ Saturation (%)
Without C-PAP Ventilation	D-1	7.429	39	62.7	40.8	88
	D-2	7.336	48.3	76.6	41.1	74.5
With C-PAP Ventilation	D-3	7.36	49.2	49.7	38.1	77.2
	D-4	7.35	38.5	60.4	33	88.8
	D-5	7.405	61.5	39.4	39.1	91.5
	D-6	7.45	63.5	32.2	17.7	79.5
	D-7	7.346	39	46.1	22.2	88
	D-8	7.39	66	31.4	26.4	84
	D-9	7.36	64	37.2	21.4	88
	D-10	7.366	68	38.1	22.2	82

DISCUSSION

The causes of hypoventilation syndrome are central alveolar hypoventilation (drug induced, cerebrovascular accidents, trauma and neoplasm), chest wall deformity (kyphoscoliosis, fibrothorax and postthoracoplasty), neuromuscular disorder (myasthenia gravis, amyotrophic sclerosis, gullian baires syndrome and muscular dystrophy) and Obesity related hypoventilation syndrome. Obesity Hypoventilation Syndrome (OHS) is well known cause of hypoventilation^{2,3,4}. In 1956 association of obesity, somnolence and polycythemia, the name of pickwickian syndrome was given by Burwell, Robin and co-workers⁵. They defined the major features of the syndrome. They suggested that this association be named the pickwickian syndrome because they resembled the description of Joe, the fat boy, in Charles Dickens' book The Posthumous Papers of the Pickwick Club, commonly called the "Pickwick Papers"⁶. Increase in obesity leading to reduced compliance of the chest wall and reduction in functional residual capacity that causes hypoventilation. When the body mass index was > 50/m², hypoventilation was seen in 48 % obese subjects. Clinical features of Obesity Hypoventilation Syndrome (Pickwickian syndrome) are obesity, hypersonolence, cyanosis, periodic respiration, polycythemia, chronic day time hypercapnoea, hypoxaemia and right heart failure(as in present case also). The obstructive sleep apnea (OSA) syndrome is said to be present when apnoea hypopnoea index is greater than 15 events per hour⁷, (in present case it was 16.4/hour). The proportion of Obesity Hypoventilation Syndrome in whom obstructive sleep apnea (OSA) syndrome is present may range between 73.8 and 88.5. Risk

factors for OSA are obesity(as in present case), neck size (collar size >17 inches in males and 15 inches in females), in present case it was 16.1 inches, tonsillar hypertrophy, deviated nasal septum, retrognathia or micrognathia, specific genetic disorder (e.g. Treacher Collins, Downs Syndrome, Alpert syndrome), genetic predisposition, endocrine disorder(hypothyroidism, acromegaly), alcohol, sedatives or hypnotics⁸.

In Obesity Hypoventilation Syndrome weight loss of atleast 10 kg results in significant improvement in vital capacity and maximal voluntary ventilation and significant reduction in day time PaCO₂^{9,10}. Although data is limited, weight loss has been shown to significantly increase central ventilatory drive as measured by diaphragmatic electromyogram response to carbon dioxide inhalation. But optimal amount of weight loss has not been studied. At present treatment of choice for the patients with OHS and OSA is nasal CPAP¹¹. It reduces the number of apneic and hypoxic episodes during sleep and to reduce day time sleepiness and improved neuropsychiatric function. The optimal pressure of 5 to 20 cm H₂O is needed to abolish the apneic episodes, snoring and oxyhaemoglobin saturations in all positions and during REM sleep¹². But a subset of patients with OHS and OSA that donot respond to nasal C-PAP, requires mechanical ventilation.

In the conclusion, the case presented above had a many medical problems. The morbid obesity was the cause as well as the effect of his sleep disordered breathing. His sleep related breathing disorder remained undiagnosed and untreated for many years ultimately requiring non invasive ventilation.

CORRESPONDENCE TO

Dr.R.A.S. Kushwaha M.D. Associate Professor Department of Pulmonary Medicine C.S.M. Medical University, Lucknow(India)-226003 E-mail: kushwaharas_kgmu@rediffmail.com Phone: 0522-2255167 FAX: 0522-2255167

References

1. Achincloss JH, Cook E, Renzetti. Clinical and physiological aspects of a case of polycythemia and alveolar hypoventilation. J Clin Invest 1955;34:1537-45.
2. Sugerman HJ, Fairman RP, Sood RK. Long term effects of gastric surgery for treating respiratory insufficiency of obesity. Am J Clin Nutr 1992;55:597 s-601s.
3. Kessler R, Chaout A, Schinkewitch P. The obesity hypoventilation revitalised. A prospective study of 34 consecutive cases. Chest 2001;120:369-76.
4. Krachman S, Criner GJ: Hypoventilation syndromes. Clin Chest Med 1998 Mar; 19(1): 139-55.

5. Burwell CS, Robin ED, Whaley RD, et al: Extreme obesity associated with alveolar hypoventilation-Pickwickian syndrome. *Am J Med* 21:811-818, Nov 1956
6. Comroe JH: Frankenstein, Pickwick, and Ondine. *Am Rev Resp Dis* 111:689-692, Apr 1975
7. Gould GA, Whyte KF, RhindGB. The sleep hypopnoea syndrome. *Am Rev Respir Dis* 1988; 137:895-898.
8. Young T, Palta M, Dempsey J. The occurrence of sleep disordered breathing among middle aged adults. *New Engl J Med* 1993; 328:1230-1235.
9. Rochester DF. Obesity and pulmonary function. In :alpert MA,Alexander JK,editors. *The heart and lung in obesity*. Armonk, NY: future publishing company, inc;1998.p.109-131..
10. Koenig SM, Suratt PM. Obesity and sleep disordered breathing. In :alpert MA,Alexander JK,editors. *The heart and lung in obesity*. Armonk, NY: future publishing company, inc;1998.p.248-279.
11. Schwab RJ, Pack AI, Gupta KB: Upper airway and soft tissue structural changes induced by CPAP in normal subjects. *Am J Respir Crit Care Med* 1996; 154:1106-1116.
12. Kribbs NB, Pack AI, Kline LR. Obstructive measurement of patterns of nasal CPAP use by patients with obstructive sleep apnoea. *Am Rev Respir Dis* 1993; 147:887-895.

Author Information

RAS Kushwaha

Assistant Professor, Department of Pulmonary Medicine, C.S.M. Medical University

Sanjay Kumar Verma

Senior resident, Department of Pulmonary Medicine, C.S.M. Medical University

Vineet Mahajan

Junior resident, Department of Pulmonary Medicine, C.S.M. Medical University

Rajni Singh

Junior resident, Department of Pulmonary Medicine, C.S.M. Medical University

R. Prasad

Professor & Head, Department of Pulmonary Medicine, C.S.M. Medical University