



## A "Pickwickian" Syndrome

Recently an unusual clinical syndrome has become apparent. In a number of case reports<sup>1-4</sup> patients have been described who showed extreme obesity, polycythemia, cyanosis and cardiopulmonary failure. Because of the frequency of somnolence Burwell and associates<sup>1</sup> noted the similarity between this syndrome and "Mr. Wardle's boy Joe" in Dickens' "The Pickwick Papers."

In essence this syndrome consists of massive obesity (250 to 400 lb) and polycythemia secondary to a reduction in alveolar ventilation because of the excessive corpulence. The thoracic cavity is "crowded by fat,"<sup>2</sup> the total lung volume is reduced, the breathing is shallow and Cheyne-Stokes respiration and cyanosis may be present. Physiologically, the pathogenesis may be described as follows: mechanical restriction because of obesity results in inadequate alveolar ventilation. This leads to a low alveolar oxygen and a high carbon dioxide. This in turn leads to hypoxia and hypercapnia. These in turn produce periodic breathing, somnolence and the polycythemia resulting from anoxia.

The amount of work necessary to keep the CO<sub>2</sub> pressure continuously at normal levels is so great that the body compromises and allows the CO<sub>2</sub> to rise. A somewhat analogous situation occurs in patients with respiratory poliomyelitis, obstructive emphysema or kyphoscoliosis.<sup>3</sup>

The heart may fail under these circumstances. Carroll<sup>3</sup> has described three patients with right-sided congestive failure and right-axis deviation of the electrocardiogram: autopsy of one of these cases revealed no cardiac abnormality except dilation and hypertrophy of the right auricle and ventricle. The patient described by Burwell *et al.*<sup>1</sup> had peripheral

edema, increased venous pressure, a large liver and incomplete right bundle branch block.

The polycythemia is of variable degree. Weil and Prasad's<sup>2</sup> patients had initial hemoglobin values ranging from 18 to 21 g/100 ml and a hematocrit ranging from 53 to 73 per cent. The estimated blood volume in two patients was 6,400 and 9,900 ml before therapy. Unlike polycythemia vera, however, there are no changes in white cell or platelet counts. Bone marrow examination may reveal mild erythroid hyperplasia, although diffuse hyperplasia (involving the myeloid and megakaryocytic series) is not observed.

Of special interest is the improvement in the clinical picture on weight reduction. For example, one patient lost 40 pounds in three weeks on an 800 cal diet.<sup>1</sup> The total vital capacity increased from 1.6 to 4.2 liters, alveolar ventilation from 2.7 to 4.4 lit/min. The oxygen saturation of arterial blood rose from 80 to 98 per cent. There was evidence that, on admission, when the patient had a high arterial pCO<sub>2</sub>, the sensitivity of the respiratory center was far below normal. After weight reduction the patient responded in an essentially normal manner. In another patient a weight loss of 36 pounds led to a fall in hemoglobin from 18.6 to 12.9 g/100 ml and a fall in hematocrit from 60 to 40 per cent. In general, similar results were obtained in the other cases studied before and after weight reduction.

The syndrome is probably not at all rare. Since the condition seems to be promptly reversed by weight reduction it becomes even more a responsibility of the clinician to be aware of the ill effects of obesity,—here affecting the cardiopulmonary and hematologic systems.

S. O. WAIFE, M.D.

## REFERENCES

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### *The Spirit of Inquiry*

“The spirit of inquiry is admirable if it is really inquiry and not uncritical novelty worship. It is right that we should examine and consider every new thing that is presented to us, but not necessarily right that we should adopt it. Most new things turn out in the end to be wrong. When presented with a new project for acceptance, we should first ask: ‘Is it reasonable?’ Then, ‘Is it really new?’ Has it, or anything like it, been tried before? If so has it failed, and why? Was the failure due to some inherent defect, or to some circumstances that can now be remedied? If it is reasonable but yet untried, can it be tried without risk? If there is a risk, how can that risk be eliminated or minimised? Are we justified in a full-scale trial, or should we first try a pilot experiment? Can the experiment be done first on ourselves?’ ”

—Sir Heneage Ogilvie. *Lancet* 1: 115, 1956.

