

The History of Hypoventilation Syndromes



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KEYWORDS

• Sleep hypoventilation • History • Obesity • Sleep apnea

KEY POINTS

- An understanding of sleep hypoventilation requires some basic advancements in chemistry, physics, and physiology.
- It could not be studied until scientific discoveries led to tools that could measure sleep and ventilation.
- Before that, there were only impressive descriptions by observant historians, physicians, and novelists of the look and behavior of patients who hypoventilated during sleep.

FROM DIONYSIUS TO SERVETIUS

Although obstructive sleep apnea syndrome and obesity-hypoventilation syndrome were not discovered until the 1950s, striking descriptions of individuals likely to have had either are ancient. The oldest known is an account of Dionysius of Hereclea, a tyrant and:

I am informed that Dionysius the Heraclote, son of Clearchus the tyrant, through daily gluttony and intemperance, increased to an extraordinary degree of Corpulency and Fatness, by reason whereof he had much ado to take breath.¹

The voluptuous life he led made him grow so fat, that he did little but sleep, and his drowsiness was so great, that they could hardly awake him by running long needles into his flesh.²

The physicians who attended Dionysius, the son of Clearchus, who lived in continual fear of suffocation from fat, adopted a very curious

mode of keeping him awake: they appointed a person to prick his sides with very long and sharp needles, whenever he fell into a profound sleep, which was not interrupted by the operation, till the needle having passed through the fat, arrived at the sensible parts beneath.³

Such drastic measures to keep a man awake strongly imply his physicians were afraid he would be suffocated by fat in his sleep. He died at 55, perhaps later than one would expect.²

Other accounts in the ancient literature are mainly limited to the association of obesity with dyspnea. Caelius Aurelianus and Soranus noted that an obese person, after walking just a few steps, sweat, become short of breath, and “feel suffocated by his own body and cannot endure even light clothing.”⁴ Hippocrates noted an association between obesity, excessive daytime sleepiness, and sleep quality. He stated:

Others, when their diet bears too great a proportion to their exercise, not only sleep well at

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*night, but are likewise drowsy in the day; the repletion still increases, and their nights begin to grow restless...*⁵

Galen (Fig. 1), a Greek physician practicing in Rome around 150 AD and considered to be Hippocrates' successor, described a condition he called polysarkos, from poli (many) and sarka (flesh). He noted that in such patients, "the body deviates toward obesity to such a point that person cannot walk without sweating, cannot reach (when seated at) the table because of the mass of his stomach, cannot breath easily..."⁶

The Greeks, who readily recognized asthma, bronchitis, and pneumonia, also described hypoventilation from kyphoscoliosis. It was a Hippocratic aphorism that those with such "hump back" deformities die young.⁷ He recognized that the mechanism was hypoventilation:

And in those cases where the gibbosity is above the diaphragm, the ribs do not expand properly in width, but forward, and the chest becomes sharp-pointed and not broad, and they become affected with difficulty of breathing and hoarseness; for the cavities

*which inspire and expire the breath do not attain their proper capacity.*⁸

Hippocrates' and Galen's hypotheses on breathing and circulation remained unchallenged until the early 13th century. Ibn al-Nafis observed that there is no direct passage for blood between the right and left ventricles, as Galen had thought, that the substance of the heart is not porous, and that blood flowed from the right ventricle through the lung to reach the left ventricle.⁹

Around 1550, Vesalius revived the practice of cadaveric dissection. He also questioned Galen's idea of blood flow. Inspired by Vesalius, Servetus published a description of the true flow of blood, for which he and his books were burned at the stake¹⁰:

However, this communication is made not through the middle wall of the heart, as is commonly believed, but by a very ingenious arrangement, the refined blood is urged forward from the right ventricle of the heart over a long course through the lungs; it is treated by the lungs, becomes reddish-yellow, and is poured from the pulmonary artery to the pulmonary vein.

ΓΑΛΗΝΟΣ "The target (skopos) of medical science is health, its end (telos) is the achievement of it"

GALEN

health, its end (telos) is the achievement of it"



Θεραπευτής

Medical student



Αρχίατρος

Senior Roman court physician

Fig. 1. Galen father of modern medicine. (From Pasipoularides A. Galen, father of systematic medicine. An essay on the evolution of modern medicine and cardiology. Int J Cardiol 2014;172:48; with permission.)

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