



Valsalva manoeuvre: A confusing dichotomous misnomer



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ABSTRACT

Objectives: The aim of this study is to try to understand the origin of the definition of the Valsalva manoeuvre by going back to original documents and finding out at which moment, the eponym was given to these two different manoeuvres, and their congruence to reality.

Methods: Historical study of selected textbooks and articles about the Valsalva manoeuvre.

Results: Valsalva effectively described the manoeuvre against closed nostrils and mouth at the beginning of the 18th century, but he was not the first. On the contrary, Valsalva did not describe the manoeuvre against a closed glottis. This was a mid-20th century creation.

Conclusions: Two questions remain: 1. What should be done with the eponymous appellation of the manoeuvre with closed mouth and nostrils? Certainly to keep it, even if Valsalva was not the first to clearly describe it. 2. What to do with the eponymous appellation of the manoeuvre with a closed glottis? It would be ideal to change it, as it is misnamed, confusing, and only recently formulated.

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1. Introduction

In standard medical dictionaries, such as the 2012 *Dorland's Illustrated Medical Dictionary*, the Valsalva manoeuvre is defined as: 1. “Forcible exhalation effort against a closed glottis” with increases of the intrathoracic pressure interfering with venous return to the heart, also called “Valsalva’s experiment”, and 2. “Forcible exhalation effort against occluded nostrils and a closed mouth causes increased pressure in the Eustachian tube and middle ear”, with an open glottis, also called “Valsalva’s method or test” [1]. These two different definitions have a point in common, a forced expiration against a closed airway, but at different levels, the former being the glottis, and the latter the mouth and nostrils. Accordingly they have two different effects, the first one on a cervico-thoracic-abdominal level and the second one in the ears and head. In fact they are two different manoeuvres with a common name.

The aim of this study is to try to understand the origin of this divergent definition by going back to original documents, and finding out at which moment, the eponym was given to these two different manoeuvres, with their congruence to reality. Different aspects were studied: 1. Valsalva’s and Morgagni’s original related writings. 2. Selected writings before Valsalva. 3. Selected writings after Valsalva and the moment when the eponymous appellations

were introduced. 4. The evolution of the definitions in the different editions of the referenced and largely diffused *Dorland's Illustrated Medical Dictionary*. Limitations to this study are related to the improbable existence of unindexed texts written by Valsalva, and the selection of writings before and after Valsalva.

2. Original Valsalva descriptions

In 1704, Antonio Maria Valsalva (1666–1723; Fig. 1) described his manoeuvre [2,3] of the insufflation of the middle ear in two different places in his treatise on the human ear (Fig. 2). Firstly in the treatment of an ulcer growing in the ear. Valsalva remarks that “pus continuously flowed out from his ear, with which lumpy blood had meanwhile admixed [...] I therefore saw the tympanic membrane moistened by a portion of superior liquid, and at a specific locus; from this place in like manner, I sighted a diseased fluid rushing out simultaneously along with air, whenever an ailing person held back breath by force, as I ordered, with nostrils and mouth closed” [4]. A few chapters later: “I will explain about the expurgation of praeternatural cranial matters: he who has inflated his mouth and nose allows air to reach as far as the dura mater. It is clear that these apertures permit relief by extruding pus in penetrating head injuries from the cranial cavity through the wound when air is forced inwards with occluded mouth and nostril. In fact by the same effort air is forced through the Eustachian tube to the tympanic cavity and backwards through the apertures against the brain [...] To propose here in front of everybody a thing that I indicated elsewhere, if someone having on

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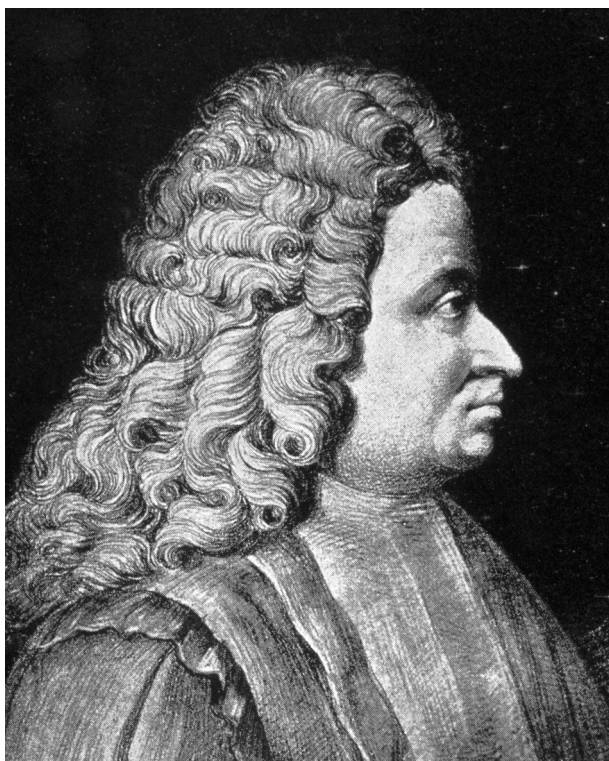


Fig. 1. portrait of Valsalva (from Politzer's *Geschichte der Ohrenheilkunde*, 1907).

the tympanic membrane or in a surrounding ulcer, a lesion from which fluid flows continually in the external auditory canal, if, I say, this person, in closing mouth and nostrils, tries hard to compress the air inside, by this action, some pus is pushed in profusion into the external auditory canal to the point that for the cleaning of the lesion I recommend no remedy prompter and more effective than the averagely frequent practice of this effort". In his writings, Valsalva did not describe another such manoeuvre against closed glottis.

The detailed study of the publications of Valsalva's student Giovanni Battista Morgagni (1682–1771), and notably the Letter XIX, published in 1761 (Fig. 3), does not demonstrate the description of a manoeuvre by Valsalva of forceful expiration against a closed glottis. On the other hand, it demonstrates that Valsalva knew the effect of expiration on the circulation of blood: "Valsalva, therefore, having cut open the skin in the neck, and laid bare the jugular veins, observed that these vessels, which were turgid with blood, became less turgid, when the dog inspired; but in expiration, that they again became turgid, especially when the respiration approached more closely to its natural state [...] The veins swell at the time of inspiration, and are depleted at the time of expiration" [5,6]. Furthermore, in studying the cause of death in hung people, he made a correlation between blocked respiration and blood circulation: "If respiration be totally impeded [...] for the air, that was lately drawn in by the lungs, dilates itself, and, because it cannot now return from that warm place, as it used to do, more strongly compresses the small vessels,

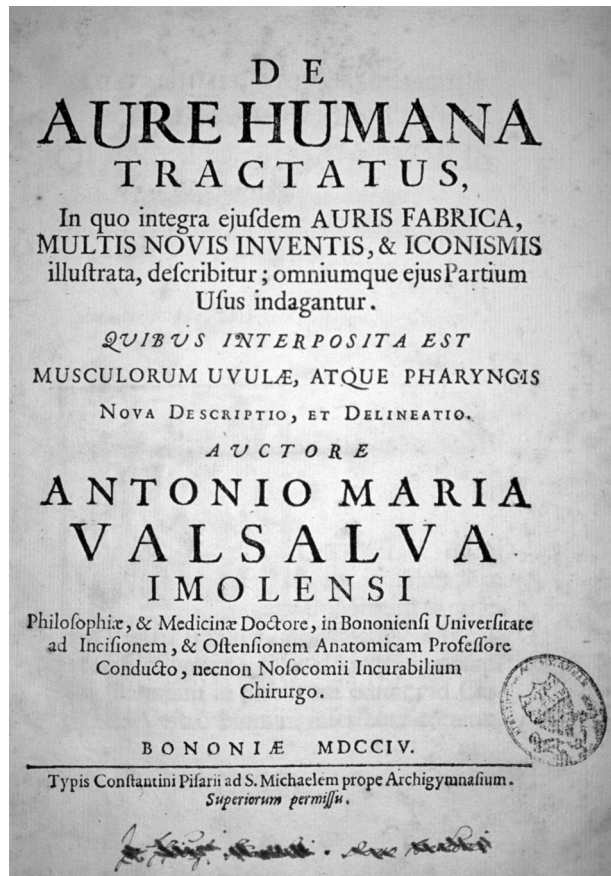


Fig. 2. Valsalva's title page *De aure humana tractatus*, 1704.

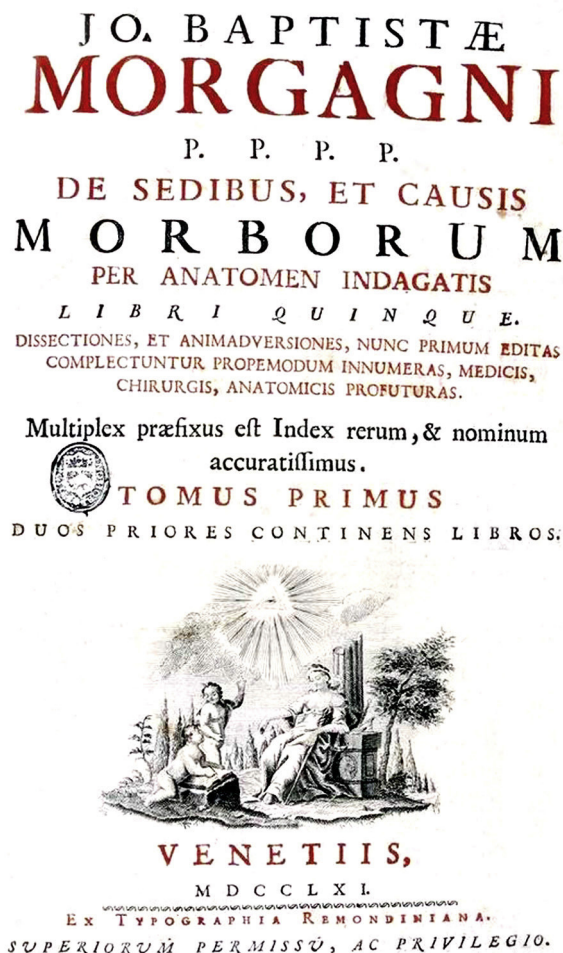


Fig. 3. Morgagni's title page *De sedibus et causis morborum*, 1761.

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