



Short communication

The role of Caspar Bartholin the Elder in the evolution of the terminology of the cranial nerves

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ARTICLE INFO

Article history:

Received 28 December 2011
 Received in revised form 23 April 2012
 Accepted 25 April 2012

Keywords:

History of anatomy
 Cranial nerves
 Caspar Bartholin the Elder
 Vesling
 Terminology

ABSTRACT

In the 17th century, the Bartholin family contributed greatly to the advancement of anatomical and medical science. Caspar Bartholin the Elder (1585–1629) introduced the terms *nervus olfactorius* and *nervus vagus* in 1611 in the *Institutiones Anatomicae*. Thomas Bartholin (1616–1680) extended their use to figures added to later revised editions of *Institutiones Anatomicae*.

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In the 17th century, three generations of the Bartholin family contributed greatly to the advancement of anatomical and medical science. Caspar Bartholin the Elder (1585–1629) studied in Padua under the guidance of Hieronymus Fabricius ab Aquapendente (1537–1619) and Iulius Casserius (1561–1616). He then took a position as professor of medicine in Copenhagen in 1613. Caspar's sons, Thomas (1616–1680) and Rasmus (1625–1698), also made contributions to medicine. In particular, Thomas, who also studied in Padua, was the first to publish a description of the peripheral lymphatic vessels in 1652. He also introduced the term *Ossa Wormiana* (Wormian bones) in honour of his uncle Ole Worm (1588–1654), who had made contributions to osteology. Caspar Bartholin the Younger (1655–1738), Thomas' son, is mainly known for his description of the greater vestibular glands and the major duct of the sublingual salivary gland, which are known by his name (e.g., Hill, 2007). The aim of this short communication is to detail the respective roles of Caspar Bartholin the Elder and Thomas Bartholin in the evolution of the terminology of the cranial nerves.

Simon et al. (2011) state that the term *olfactorius* “was found for the first time as a specification of one of the cranial nerves in the work of the Danish anatomist Bartholin (1651) in a collocation of the words *primum par olfactorium*, i.e., first pair (sc. of nerves) olfactory, although it concerned olfactory tract”. They also state

that the adjective *vagus* was noted as being used slightly earlier than Rolfinck (1656) by Bartholin in 1651 (“*Nonum Par alijs sextum & vagum, quia plurimis hinc inde partibus prospicit etiam omnibus internis in medio Ventre & infimo sitis . . .*”). In the Table of the paper, the year 1651 appears as the time of emergence of both terms, and in the reference list the work cited is *Anatomia* by Bartholin T.

Instead, in 1651 Thomas Bartholin (1616–1680) published the third revised and improved edition of *Institutiones Anatomicae* by his father Caspar Bartholin the Elder (1585–1629), which had first been published in 1611, but the specific references to the olfactory and vagal nerves quoted above had already been present in the original version by Caspar the Elder, who introduced them before his son (Fig. 1).

Particularly interesting is the discussion of the opportunity to call the olfactory tracts nerves also. In *De humani corporis fabrica* (1543), Vesalius discussed the nature of the olfactory tracts and whether they were to be called nerves in *Liber IV, caput III, De olfactus organo nonnulla* and *Liber VII, caput XIII, De olfactus organo*. Most interesting for the question of terminology is *Liber IV*, which states: “[. . .] *A fede uerò ubi uentriculorum angustos terminos definire dicebam, olfactus organa, aut saltem cerebri processus animalem spiritum praecipuo olfactus instrumento deferentes, ac ipsi etiam uisorii nerui enascuntur. [. . .] Hi processus cerebri ductu, colore, formaque neruis correspondent. quamuis interim longè neruis ipsis molliores sint, paulòque (quod ad teretem spectat formam) latiores, quàm profundiores. Verùm quia hi reliquorum neruorum ritu extra caluarie, ut neque etiam extra magnam durae membranae amplitudinem, non prociidunt, nerui nomine eos Herophilus haud dignatus est: ut neque etiam*

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Fig. 1. Frontispieces of original version of *Institutiones anatomicae* by Caspar Bartholin the Elder (1611) and of version revised by his son Thomas (1645).

Marinus, neque Galenus. licet Anatomicorum nonnulli hos in nervorum habuerint numero, ipsos primum nervorum par recesentes. [...] Modò autè sat sùisse uidetur, processus illos cerebri comemorasse, quos aliqui etià mamillares et papillares nuncupasse colliguntur [...]. (From the area where, as just described, the narrow ends of the ventricles terminate, the olfactory organs, or at least the cerebral processes that convey animal spirit to the principal olfactory organ, grow out along with the optic nerves. [...] These processes of the brain resemble nerves in course, color and form, but are much softer than true nerves; they are of rounded shape and slightly broader than they are deep. Unlike the other nerves they never go outside the skull cavity or the large cavity of the hard membrane, and that is why Herophilus did not consider them worthy of being called nerves. Marinus and Galen took the same view. Some anatomists, however, did number them among the nerves, describing them as the first pair of nerves. [...] For the moment it suffices to have mentioned the processes of the brain that are called by some the mammillary or papillary processes [...].) (Translation by Richardson and Carman, 2002).

The olfactory tracts are also represented in some woodcuts in *De humani corporis fabrica* and, in the corresponding legends, are always called *olfactus organum* and never *nervus olfactorius*: for instance, “*olfactus organo subseruientes processus neruis similes, at calvariae amplitudinem qua cerebrum continetur, notatu digna portione non egredientes*” (Figs. 1 and 2 in Book IV) (Nervelike processes serving the olfactory organ. No significant portion of them goes outside the skull cavity containing the brain) or “*Sinister cerebri processus, organo olfactus subministrans*” (Table XX in Book IV) (Left

process of cerebrum, serving the olfactory organ) (Translation by Richardson and Carman, 2002).

Instead, in *Libellus III* of the first edition of *Institutiones Anatomicae* (1611), Caspar Bartholin the Elder considered the olfactory tracts to be the first pair of cranial nerves (Fig. 2): “*Primum par olfactorium facimus, cuius processus mamillares dicuntur. Hi verò processus satis cogniti fuere ab omnibus: at nervi, quibus illigantur ponè, & fermè continuantur; nemini aut paucissimis. Nervi hi circa sellam sphenoidis ex medulla elabuntur, & ductum, colorem, usum nervorum habent, quamobrem pro nervis numeramus. Nervorum enim nomen ideo eis detrahi non debet, quòd extra calvariam non egredientur, & crassam meningem; eaque postea non investiantur: alioquin omnes reliqui nervi quàm diu intra cranium sunt, no essent nervi dicendi, quod absurdum. Nervis his adjunctae sunt duae crassiusculae portiones vel Processus dicti, Mammillares, papillares numero duo, albi, molles, lati, oblongi in hominibus tenuiores & minores, in brutis majores, praecipuè in canibus, & animalibus olfactu exquisito praeditis Nam usus horum processuum est, ut sint olfactus vera organa, non nasus aut eius tunica. Hi processus in anteriore cerebri parte locantur, post os colatorium, huicque dura meninge vestito faciem apponunt.*” (We consider the first pair of olfactory nerves, the processes of which are called mammillary. These processes are in fact well-known to everybody, whereas the nerves, which are connected and continue posteriorly, are known by nobody or only by very few. These nerves arise from the medulla near the sphenoidal sella and have the course, colour and function of nerves, which is why we number them among the nerves. In fact, the name ‘nerves’ cannot be taken away from them by arguing that they do not leave

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