



A bone in the heart: the strange case of Pope Urban VIII

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Dear Editor,

The autopsies of the popes have been systematically performed since the sixteenth century. Their reports contain some interesting information not only for historians, but also for modern physicians. In this letter, we want to describe a cardiac anomaly found during the autopsy of Pope Urban VIII, one of the most famous and influential popes in the history of the Catholic Church.

Urban VIII (Maffeo Barberini, 1568–1644) reigned from 1623 to his death in 1644, expanding the papal territory and influencing politics of Europe. He also contributed to the artistic renovation of Rome, commissioning artistic works by the greatest sculptors, architects, and painters of that time, such as Gian Lorenzo Bernini (1598–1680) and Francesco Borromini (1599–1667). Nowadays, modern tourists can admire the Barberini coat of arms with three bees on several buildings and fountains in Rome.

The young age of Urban VIII, he was aged 55 years when the cardinals elected him in 1623, initially guaranteed good health. He only suffered from a gout attack in 1637 manifested as podagra and other joint pains, probably related to gout [1]. Moreover, Urban VIII reached 76 years of age without severe health problems. Suddenly, in June 1644, his health worsened in a few weeks, and he died, probably due to a cerebrovascular event [1].

At Urban VIII's death, Giovanni Trullio (1598–1661) performed an autopsy. At that time, Trullio was surgeon at the Hospital of Santo Spirito and Professor of Surgery at the University La Sapienza in Rome. Trained for years in Lyon (France), he was one of the first doctors to support the theories of William Harvey (1578–1657) on the circulation of the blood in Italy. Trullio rapidly developed a high reputation as surgeon in Rome, and for this reason, Pier Battista Borghi,

friend of Galileo Galilei (1564–1642), asked a medical consultation from him on the blindness of the Italian scientist. In this case, he excluded a senile cataract, and stated that Galileo's blindness was the result of a uveitis. Trullio also specialized in treating kidney stones, and in dissecting and embalming rich and famous people, including princes, cardinals, and popes.

During the autopsy of Urban VIII, the surgeon found a bone-like formation of triangular shape, similar to the letter "T" (*literam T referens*), which he was not able to explain with the medical knowledge of that period. Trullio also evidenced the presence of five gallstones (*quinque calculi in vesica fellea*) about the size of a hazelnut each (*singuli magnitudine nucis avellanæ*), together with several kidney stones (*in renibus multi lapilli exigui*) [2].

In the following centuries, anatomists and physicians have debated about the anomaly found in the heart of Urban VIII. In detail, the Danish physician Thomas Bartholin (1616–1680) tried to give an explanation of the pope's heart bone, stating that "it often appears in old people through the supreme foresight of Nature, so that the blood, otherwise sluggish, is roused into rapid motion as if a pump had been installed," (*sed frequens id in senibus summa Naturae providentia, ut torpidus alioqui sanguis velut stimulo addito ad motum incitetur*," Cent. 2, Hist. Anat. 45) [2]. According to Bartholin, in the heart of old people, stones naturally develop to support the circulation. Giovan Battista Morgagni (1682–1771), the father of modern anatomical pathology, did not agree with the theory of the Danish anatomist. In Letter 27.19 of his masterpiece "De Sedibus et causis morborum per anatomen indagatis" (1761), Morgagni explained that the pope's heart bone was an aortic valve calcification, refuting Bartholin's explanation of its "natural" development [3]. Throughout the nineteenth century, this debate continued, especially sustained by German anatomist Adolf Wilhelm Otto (1786–1845), who believed that it was a fibrocartilaginous mass in the heart wall [4].

The analysis of symptoms of the pope and the findings in his autopsy may suggest some diagnoses to modern physicians. Mitral annular calcification seems to be the most

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obvious explanation; it is commonly associated with renal failure. An alternative diagnosis is that Urban VIII was affected by a severe hyperparathyroidism, a condition associated with bilious and kidney stones and intraventricular calcification. Actually, the gout, which affected Urban VIII as well as other members of the upper class in that period, could have been the cause of the kidney stones. Finally, other alternative diagnoses are intracavitary thrombus calcification and calcified amorphous tumor of the heart. The latter is generally associated with embolism and cerebrovascular events, which likely caused the death of pope.

Whatever the origin of the “bone” found in the heart of Pope Urban VIII, this particular finding may provide some insights. It is noteworthy that the subject of attention and debate in the academic world was a cardiac anomaly. It is no coincidence, indeed, that the renowned work of William Harvey on cardiac physiology (“*Exercitatio Anatomica De Motu Cordis et Sanguinis in Animalibus*”, 1628) was published in that period, nor that the surgeon Giovanni Trullio supported Harvey’s theory. In the seventeenth century, the transition from hepatocentrism to cardiocentrism led the heart to be considered as the seat of life and soul by the scientific world, and, therefore, needed to be carefully examined. The autopsy of Pope Urban VIII could be considered as an example of this attention towards the heart in medicine. There was another similar case: the “stone in the heart” found in the corpse of Saint Clare of Montefalco (c. 1268–1308), an Italian abbess who lived in Umbria during the thirteenth century [5]. After Clare’s death, a small

stone “cross” was found in her heart. At that time, the origin was not known, and in the Middle Ages, this anomaly was simply considered as a miraculous event. In the Modern Age, instead, physicians and anatomists tried to explain it scientifically, indicating a greater development of medical knowledge in that period.

Compliance with ethical standards

Conflict of interest All the authors declare that they have no conflict of interest.

Statement of human and animal rights This article does not contain any study with human and animals performed by any of the authors.

Informed consent Informed consent is not applicable.

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