

The controversial case of Cosimo I de' Medici (1519-1574): reflections on the interaction between anatomy and art (iconodiagnosis vs misdiagnosis)

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Abstract

A recent study maintains to have identified a case of severe Graves' disease in the bronze statue of Cosimo I de' Medici forged by Benevenuto Cellini (between 1545 and 1547). We carefully examined the artistic sources, the medical primary sources and the paleopathological findings with the aim of showing that Cosimo I de' Medici (1519-1574) was not affected by severe Graves' disease. The artistic analysis of different statues and portraits of the Grand-Duke of Tuscany confirms the medical interpretation. Cosimo I was thick-necked with a well-developed laryngeal prominence of the thyroid cartilage (Adam's Apple) and slightly bulging eyes. Plagued by obesity, Cosimo I was affected by DISH (diffuse idiopathic skeletal hyperostosis), chronic malaria, and severe osteoarthritis. The Grand Duke had a stroke on February 18th 1568, aged 49, and suffered from the sequelae for six years. Previous scholars proposed chronic cerebral vasculopathy as a possible diagnosis. We surmise that, as in modern day obese patients with DISH, he had increased risk for cardiovascular morbidity. The presence of a familiar thick-neck and a well-developed Adam's Apple can be observed in several other members of the Medici family such Giovanni dalle Bande Nere, Cosimo I de' Medici's father. The same features can also be found in several other predecessors of Cosimo I such as Piero the Gouty and his sons Lorenzo the Magnificent and Giuliano de' Medici, Pope Leo X, Giuliano de' Medici, Duke of Nemours and Lorenzo de' Medici, Duke of Urbino. This paper shows that the combination of literary, artistic, paleopathological sources is fundamental to correctly assess disease manifestation. A constant interaction between anatomy and art is recommended so to avoid over-interpretation of pathologic conditions in personages of the past.

Keywords

endocrinology; Graves' disease; art; history of medicine; iconodiagnosis; pitfalls.

Introduction

In a recent contribution (Pozzilli & Nicolai, 2021) it has been postulated that Cosimo I de' Medici (1519-1574), the second Duke of Florence, was affected by an endo-

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crinological condition (Pozzilli & Nicolai, 2021); the authors maintain to have identified a case of severe Graves' disease (untreated hyperthyroidism, atrial fibrillation and thyroid eye disease) in the bronze statue of Cosimo I de' Medici forged by Benvenuto Cellini in between 1545 and 1547. The statue is currently held by the *Museo Nazionale del Bargello* (Florence). Following the Authors' interpretation, the severe Graves' disease represented a considerable risk factor for the thromboembolic stroke which severely affected Cosimo I's last months of his life (Pozzilli & Nicolai, 2021).

Materials and Methods

A careful examination of the artistic sources, the medical primary sources and the paleopathological findings was performed with the aim of assessing the likelihood of Cosimo I de' Medici's diagnosis of severe Graves' disease, following recent guidelines on the integration of non-osteological sources in retrospective paleopathological analyses (Rühli et al., 2016; Mitchell, 2017; Nerlich et al., 2021; Varotto et al., 2022).

Results

By resorting to primary sources previous scholars have reconstructed the medical history of Cosimo I and the course of his 6 years progressive illness (Pieraccini, 1986; Arba et al., 2014). An obese man affected by DISH (diffuse idiopathic skeletal hyperostosis) and chronic malaria, the Grand Duke also suffered of diffuse and severe osteoarthritis affecting the lower portion of the dorsal and on lumbar spine; numerous Schmorl's nodes were identified on the vertebral plates of T8, L2 and L3 (the lumbar vertebrae L2-L3 were merged by a bony bridge on the left side) (Pieraccini, 1986; Fornaciari et al., 2007).

Studies on modern patients with DISH diagnosed at an age between 46 and 51 (Mader et al., 2021) have shown that these were significantly more affected by pain in the thoracic spine and in the lumbar spine (Mader et al., 2021) compared to patients with similar age and gender not affected by DISH. Patients with DISH also suffered bouts of pain around joints in the arms and legs due to the bony growths affecting those tendons and ligaments; this condition was also described in the case of Cosimo I who constantly lamented pain in the legs, knees and feet (Pieraccini, 1986). Patients with DISH also had a significant higher prevalence of obesity (Mader et al., 2021) and increased risk for cardiovascular morbidity (Bahn, 2010).

On February 18th 1568, aged 49, Cosimo I had a stroke. He died of bronco-pneumonia, six years later, at the age of 55 (April 21st 1574) (Pieraccini, 1986). His initial recovery from the 1568 cerebrovascular event was exceptionally good from a functional point of view (in October 1568 he could walk without a sticks, read, sign, play board games and hunt) (Pieraccini, 1986; Arba et al., 2014). However, from the autumn of 1572 onwards, the signs and symptoms of his slow but progressive illness (escalating loss of autonomy, hypophonia, dysarthria, pathological laughing and crying, gait impairment and dragging feet, urinary incontinence, mood swings and apathy) manifested. Chronic cerebral vasculopathy, also known as cerebral small vessel disease, was proposed as a possible diagnosis (Arba et al., 2014).



Figure 1. Artworks- statues and paintings- indicate that the members of the Medici family were thick-necks and had bulging eyes which, however, do not imply the presence of severe Greave's disease; **a.** Benvenuto Cellini, *Cosimo I de' Medici*. Bronze with partial silvering. 1545-47. Florence, Museo Nazionale del Bargello; **b.** Baccio Bandinelli, *Cosimo I de' Medici*. Marble. 1544. Florence, Museo Nazionale del Bargello; **c.** Giambologna, *Cosimo I de' Medici*. Bronze. 1565-74 c. Florence, Galleria degli Uffizi; **d.** Agnolo Bronzino, *Cosimo I de' Medici in armour*. Oil on panel. 1543. Florence, Galleria degli Uffizi; **e.** Giovan Pietro Naldini, *Cosimo I de' Medici*. Oil on panel. 1585. Florence, Galleria degli Uffizi; **f.** Agnolo Bronzino, *Cosimo I de' Medici*. Oil on panel. Before 1566. Turin, Galleria Sabauda ©MiC - Musei Reali, Galleria Sabauda; **g.** Mino da Fiesole, *Piero de' Medici*. Marble. 1453. Florence, Museo Nazionale del Bargello; **h.** Benozzo Gozzoli, Detail of *The Journey of the Magi* with the portrait of Piero de' Medici. Fresco. Since 1459. Florence, Palazzo Medici Riccardi, Chapel of the Magi; **i.** Florentine 16th century artist, after a model by Andrea del Verrocchio and Orsino Benintendi, *Lorenzo de' Medici*. Painted terracotta. 1513-20 c. Washington, D. C., National Gallery of Art, Samuel H. Kress Collection; **j.** Domenico Ghirlandaio, Detail of *The Confirmation of the Franciscan Rule* with the portrait of Lorenzo de' Medici. Fresco. 14. Florence, Santa Trinità, Sassetti Chapel 1483-1485; **k.** Workshop of Agnolo Bronzino, *Lorenzo de' Medici*. Oil on tin. 1565-69 c. Florence, Galleria degli Uffizi, Vasari Corridor; **l.** Sandro Botticelli, *Giuliano de' Medici*. Tempera on panel. 1478-80 c. Washington, D. C., National Gallery of Art, Samuel H. Kress Collection; **m.** Andrea del Verrocchio, *Giuliano de' Medici*. Terracotta. 1475-78 c. Washington, D. C., National Gallery of Art, Andrew W. Mellon Collection; **n.** Raphael or Giulio Romano, *Leo X as Clement I*, 1520 ca., black and white chalk drawing, Chatsworth, Devonshire Collection; **o.** Workshop of Raphael (?), *Giuliano de' Medici duke of Nemours*. Tempera and oil on canvas. 16th century. New York, The Metropolitan Museum of Art; **p.** Raphael, *Lorenzo de' Medici duke of Urbino*. Oil on canvas. 1518. Private collection. Reproduced with permission. For the Florentine Museums: Images reproduced with permission of the Italian Ministry of Culture.

Discussion

From a medical point of view, it shall be underlined that Cosimo I's adult life was plagued by obesity (Arba et al., 2014); this condition is incompatible with a diagnosis of Graves' disease since severe hyperthyroidism accelerates the body's metabolism and causes an unintentional weight loss independently from the food intake. The medical history of Cosimo I excludes both pathological slimming and Graves' ophthalmology (Pieraccini, 1986; Arba et al., 2014; Bahn, 2010). Cosimo I was thick-necked with a well-developed laryngeal prominence of the thyroid cartilage (Adam's Apple) (Fitzpatrick & Siccardi, 2021) and slightly bulging eyes (Figures 1a-f) (Fitzpatrick & Siccardi, 2021); he never suffered of inflammatory disorders of the orbit and periorbital tissues, as attested both by the primary sources (Pieraccini, 1986) and by several portraits of the Grand Duke over the decades (Figures 1d-f). In Giambologna's bust (Figure 1c), the signs of the stroke occurred in 1568 are clearly evident; Cosimo I's shows a facial asymmetry: the left nasolabial fold is deeper than the left one, the right upper and lower lids are sagging and the right corner of the mouth is turned down. The evidence of post-stroke facial features allows dating the bust between 1568 and 1574.

If Cosimo I's busts by Baccio Bandinelli (Figure 1a) and by Benvenuto Cellini are compared (Figure 1b) striking differences emerge. Both portraits are inspired by Roman imperial portraits dating to different centuries. Bandinelli's bust (circa 1544, Florence, Museo del Bargello) was based on a portrait of Hadrian (Uffizi, Florence). Bandinelli's shows the same accuracy observable in the portraits of Cosimo I over the years (Figure 1d-f). In these artworks, Cosimo I displays a quiet expression; his eyes are slightly bulging, but not protruding, and a thick-neck with an Adam's Apple can be appreciated.

Benvenuto Cellini's bust shows a personal artistic interpretation of the features of the duke: Cosimo I's countenance overflows with a vitality enhanced by the richly decorated cuirass and by the cloak falling over the Duke's left shoulder and caught up in his right arm. The tousled hair, knitted eyebrows, drilled pupils and tightened lips give an effect of intense concentration and military strength, together with the rapid turn of the head on the powerful neck. This effect was emphasized by the silvering of the eyes (retrieved through restoration) and the original gilding of the surface (Langedijk, 1981; Pope-Hennessy, 1985; Pope-Hennessy, 2002).

Cellini's bust may have been inspired to a cuirassed portrait of Julius Caesar (Musei Capitolini, Rome); according to one of the authors (EZ), the winged gorgon at the centre of the cuirass and the wide eyes both recall the portrait of Septimius Severus (Museo Nazionale Romano, Palazzo Massimo, Rome). The sharp, furious turn of the neck, the musculature of which is accentuated through the pose to suggest power, might have been modelled on Caracalla's portraits (Musei Capitolini, Rome, and Museo Pio - Clementino (Vatican Museums) (Gardner Coates, 2004).

The artistic analysis confirms the medical interpretation: Cosimo's eyes and neck are not consistent with severe hyperthyroidism; they rather represent a stylistic choice inspired by 3rd century CE Roman sculpture whose main characteristic was the unnatural enlargement of the eyes coupled with the indomitable vitality (Bianchi Bandinelli, 2002) [11].

The presence of the familiar thick-neck can be observed also in the statue of Ludovico di Giovanni de' Medici (1498-1526), also known as Giovanni dalle Bande

Nere, Cosimo I de' Medici's father. Cosimo I had slightly bulging eyes, a facial feature which can be found in the statues and paintings of several of his predecessor such as Piero the Gouty (1416-1469) (Figure 1g-h) and his sons Lorenzo the Magnificent (1449-1492) (Figure 1i-k) and Giuliano de' Medici (1453-1478) (Figure 1l-m).

Piero the Gouty, Lorenzo and his brother Giuliano all had thick-necks and an Adam's Apple; these can be appreciated both in Lorenzo the Magnificent's life-like terracotta by Verrocchio and Benintendi (ca. 1478, National Museum of Art, Washington, USA) (Figure 1i), in his portrait in *The Confirmation of the Franciscan Rule*, one of Domenico Ghirlandaio's frescoes in the Sassetti Chapel in S. Trinita (Florence)) (Figure 1j) and by his posthumous portrait by Agnolo Bronzino (Uffizi Gallery, Florence) (Figure 1k). Similarly, Giovanni de' Medici, the son of Lorenzo the Magnificent and future Pope Leo X (1475-1521), had bulging eyes vividly depicted by Raphael (Figure 1n). The posthumous statue of Giuliano de' Medici, Duke of Nemours (1479-1516), carved by Michelangelo between 1519 and 1534, shows no evidence of goitre but the rapid turn of the head on the powerful neck. The copy of Raphael's portrait of Giuliano de' Medici, Duke of Nemours (1479-1516), originally painted around 1515, does not show any evidence of goitre (Figure 1o). The same is for the portrait of Lorenzo de' Medici (1492-1519) Duke of Urbino by Raphael (1518); the duke shows a short and thick-neck and slightly bulging eyes (Figure 1p).

Conclusions

Cosimo I de' Medici is highly unlikely to have suffered from Graves' disease. Making a more general point, as underlined in the context of studies of the auricular anatomy of members of the Medici family (Bianucci et al., 2021), it should be stressed how a virtuous combination of literary, artistic – and, whenever possible, mummy or osteological sources – should be implemented; this in order to correctly assess disease manifestation in the past, both at population and individual levels. Following the rheumatologist Jan Dequeker, paintings – and one may well add statuary – can teach medical scholars very much about disease presentation (Dequeker, 2006), with a particular focus on soft tissue analysis, but one should never forget that sometimes they can also lead to pitfalls.

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