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KING ARIARATHES IV OF CAPPADOCIA'S IMPOTENCE IN THE LIGHT OF THYROID DISEASE: A MULTIDISCIPLINARY PALAEOPATHOLOGICAL ANALYSIS

ABSTRACT: *For a long time historical research dismissed the account about King Ariarathes IV of Cappadocia's (reigned 220–163 BC) wife being unable to produce an offspring just as a defamatory explanation concocted by later writers to cover subtler political moves. Having palaeopathologically re-examined the biographical record of King Ariarathes IV in the light of a recently proposed diagnosis of thyroid goiter, by multidisciplinarily combining literary and artistic evidence with biomedical knowledge and rationale, this article proposes an endocrinologically originated sexual dysfunction in King Ariarathes IV and offers a new reading of the subsequent shaming of his spouse.*

KEY WORDS: *Endocrinology – Thyroid – Sterility – Erectile dysfunction – History of medicine – Palaeopathology*

INTRODUCTION AND AIM

King Ariarathes IV (reigned 220–163 BC, known as Εὐσεβής, *Eusebés*, "The Pious"), son of King Ariarathes III (reigned c. 255–220 BC) and his spouse the Syrian princess Stratonice, ruled the Hellenistic Kingdom of Cappadocia (Central Anatolia, modern-day Turkey) for about 58 years, having ascended to the throne in 220 BC, when he was still a boy. Originally

an ally of the Seleucid King Antiochus III The Great (242–187 BC) in his war against the Romans, following a major defeat at the Battle of Magnesia (190 BC) and the subsequent Treaty of Apamea (188 BC), he obtained favourable peace terms with the Roman Republic. As part of his previous anti-Roman alliance with the Seleucid Empire, in 192 BC he had married Antiochus III's daughter and his own cousin, Princess Antiochis (Clinton 1884, Toepffer 1894).

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Limited information is available from the extant historical sources concerning Princess Antiochis' life. Most accounts focus on the fact that at the beginning of marriage she was not able to produce any offspring for her husband. Eventually she managed at a subsequent stage to give Ariarathes IV daughters and a male heir. Following her husband's death around the beginning of 163 BC, Antiochis and one of her daughters were executed at the order of the Seleucid Chancellor Lysias (died 162 BC), who believed them to be a threat to his authority (Gera 1997). Antiochis' son and successor to Ariarathes IV's throne, Ariarathes V (reigned c. 163–130/131 BC) obtained from Lysias the return of her mother's and sister's mortal remains so that he could have them buried in the royal family grave (Gera 1997).

In this article we aim to historico-medically assess the truthfulness of the story of Antiochis' alleged sterility offering palaeopathological insights into a controversial historical juncture.

MATERIALS AND METHODS

To this end we have scrutinized classical sources in order to identify passages relevantly mentioning key details of Ariarathes IV's life with a particular focus on all available information of his wife Antiochis. For this investigation, the principles and methodologies of multidisciplinary retrospective diagnostics have been implemented and a palaeopathographical analysis of original sources has been employed. The sources have been examined in their original language and the retrieved data have been processed through the lens of modern medicine and palaeopathological knowledge (Toscano *et al.* 2016, Mitchell 2017).

RESULTS

Ancient sources mentioning key details of Ariarathes IV's life have been narrowed down to $n = 6$: Polybius' *The Histories* (2nd century BC), Livy's *History of Rome* (27–9 BC), Diodorus of Sicily's *Library of History* (1st century BC), Appian of Alexandria's *History of Rome* (2nd century AD), Justin's *Epitome of the Philippic History of Pompeius Trogus* (2–3rd century AD). Of these only one, Diodorus of Sicily, was confirmed to extensively and directly address Antiochis' failure to bear children. The Greek-language author wrote his account about one century after the

enarrated events but could rely on now lost coeval literature.

He writes [31.19.7]:

"He in turn married a daughter of Antiochus (surnamed the Great), Antiochis by name, an utterly unscrupulous woman [ὀνομαζομένην Ἀντιοχίδα, πανοῦργον μάλιστα]. Failing to have children [μὴ γινομένων τέκνων], she palmed off on her unwitting husband two supposititious sons [δύο παῖδας], Ariarathes and Holophernes. After a certain time, however, she ceased to be barren [Μετὰ δέ τινα χρόνον τῆς φύσεως ἐπιδεξαμένης] and unexpectedly bore two daughters and a single son [ἀνελπίστως τεκεῖν αὐτὴν δύο μὲν θυγατέρας], named Mithridates. Thereupon, after revealing the truth to her husband, she arranged for the elder of the supposititious sons to be sent off to Rome [...], and the younger to Ionia, [...] to avoid any dispute with the legitimate son over the kingdom. He, they say, changed his name to Ariarathes (V) after he grew to manhood, received a Greek education, and won commendation as well for other merits."

(Diodorus Siculus 1957)

DISCUSSION AND CONCLUSIONS

Diodorus of Sicily's version of the facts represents the only available source for the story of Antiochis' failure to have children. However, the account may well have merely been reported by Diodorus who, according to Umberto Mago, is more likely to have read it in the work of others historians who, in turn, owed this piece of information to an official royal chronicle dating back to the reign of Ariarathes V, Ariarathes IV's first legitimate heir (Mago 1907–1908). Historical research has doubted altogether the truthfulness of this story by explaining it in purely political terms. The historian Édouard Will (1920–1997) classified the account as Ariarathes V's (dynastic name of Ariarathes IV's successor, his third son Mithridates) own propaganda meant to strengthen his position on the throne of Cappadocia against the ambitions of his brother, Orophernes (also spelt Holophernes, Will 1966). This position is also supported by the aforementioned Umberto Mago (Mago 1907–1908), who maintains that all of Ariarathes IV's sons were legitimate but the king chose to favour the third-born, Mithridates, over his elder sons (Ariarathes and Orophernes), hence breaking the old Cappadocian tradition of primogeniture by

blaming his own wife, Antiochis. Along similar lines but shifting the paternity of this mendacious account to Antiochis is Alex McAuley's stance. The scholar maintains that the princess, following a habit typical of the Seleucid Family, was merely working in the exclusive interest of her originary royal house through heavy interventions in the dynamics of Cappadocian succession and promoting her more malleable son Mithridates in lieu of her elder sons. He additionally suggests that her inability to procreate should be read as fictional and Diodorus' disparaging comments unsurprisingly falling within the spectrum of typical ancient Greek scorn for powerful, independent and intelligent women (McAuley 2017). Importantly, unlike Antiochis' case, the other instances presented by McAuley, namely Apama of Cyrene (c. 290–249 BC), Stratonice of Cappadocia (fl. 3rd century BC) and Antiochis of Armenia (fl. 3rd century BC), have purely political connotations and do not indulge in biological speculation (McAuley 2017).

For this reason, albeit acknowledging the potential distortions of the historical facts by Diodorus of Sicily and the manifestly eminent political factor involved in ancient succession matters, given the exquisitely biological remarks made by the ancient author, it seems reasonable enough to take a closer look at the ancient source from a biomedical perspective as well.

As a preliminary observation, it must be said that judging from the very general word choice used in the passage (literally: "children not being born"), it is not possible to confidently distinguish between infertility and sterility, although no mention is ever made of miscarriages, so, henceforth, the term "sterility" shall be used in this context both as a general all-encompassing word and a more likely interpretation of what Diodorus (or his sources) probably meant. He malevolently portrays Antiochis as a treacherous, wicked woman, ready to do anything to achieve her goals, in this case cheating on her husband and king by concealing her sterility with two illegitimate sons. It is by far clear whether this replacement offspring was really Antiochis', meaning that it was not she who was sterile, or, as the examined passage would seem to suggest, she really was, in which case such a stratagem would be completely understandable in order to preserve her status. This is particularly logical considering that female infertility was negatively commented upon in classical Greek medical treatises while male responsibility in procreative failure – albeit basically understood as witnessed by votive offerings and inscriptions – was not considered pathologic and

passed over, if one excludes some rare notable mentions such as Aristotle's in his work *History of Animals* [HA 10 633b.13–14] (Flemming 2013, Senkova 2015).

However, although not biologically impossible, on account of Antiochis' later many successful deliveries, the label of sterility upon her during the early stages of their marriage with Ariarathes IV appears little credible. On the contrary, her husband's role in the process is worthy of further analysis, particularly in the light of recent publications on his health status.

In 2015 Tekiner and colleagues, by medically analyzing Ariarathes IV's effigy present on the obverse of coins minted in the 33rd year of his reign (*Figure 1*), identified a large anterior cervical mass and proposed a diagnosis of hypothyroideal goiter justified by the mountainous location of the king's capital Mazaka (Tekiner *et al.* 2015). The diagnosis, despite certain methodological remarks mostly tackling the lack of information on the king's behaviour which may have helped formulate a stronger interpretative hypothesis, was nonetheless regarded as plausible (Galassi, Gelsi 2015). This retrospective diagnosis may now be re-examined in depth.



FIGURE 1: Obverse of the coin showing the profile of King Ariarathes IV of Cappadocia (220–163 BC) with an evident neck mass suggestive of a goiter. [Image in the public domain.

Source: http://wildwinds.com/coins/greece/cappadocia/kings/ariarathes_IV/t.html].

Due to its mountainous nature, Turkey (including Anatolia) has traditionally been an iodine-deficient region with women being particularly affected in modern times by the noxious combination of low iodine intake and smoke-derived thiocyanate and perchlorate exposure. While the latter risk factors emerged recently, iodine-deficiency started to be minimized thanks to policies making salt iodization mandatory only in 1998 (Erdoğan *et al.* 2002). In spite of such measures, some areas of Turkey are still iodine-deficient, including the city of Kayseri (Erdogan *et al.* 2009) (Figure 2) situated in central Anatolia (coordinates: 38°44'N 35°29'E). Its ancient names were Eusebeia, Caesarea and, before those, Mazaka, the capital of the Cappadocian Kingdom, presumably established by Ariarathes IV himself (although some have suggested Ariarathes III or Ariarathes V as its true founders) on the northern side of Mount Erciyes, *Mt. Argaeus* in classical antiquity, a 3,917-m-high volcano (Robert 1946, Cohen 1996, Güler 1994). This area is thought to have been chosen because of its special economic advantages, being rich in wood and pastures (Ghita 2010).

Similar morphologies of the anterior compartment of the neck can be appreciated in the coins portraying Ariarathes IV's father, Ariarathes III and in his son Ariarathes V (i.e. Mithridates). The endocrine interpretation of altered anatomical traits in ancient coins was proposed as a valid palaeopathological source of information by Gerald D. Hart but partially cautioned against by the medical historians Mirko D. Grmek (1924–2000) and Danielle Gourevitch, who underlined how certain features can be explained by style, rather than disease (Hart 1973, Grmek, Gourevitch 2000). In this case, the numismatic evidence appears strengthened by geographical location and similarities with the modern clinical scenario.

Dysthyroidism is known to be associated with sexual dysfunctions. In particular, hypothyroidism is linked to an array of matters including erectile dysfunction (ED), potentially through endothelial dysfunction, and alteration of sperm parameters (sperm count, motility, morphology; Nikoobakht *et al.* 2012). In modern-day Turkey, ED (linked to a number of comorbidities, including hypothyroidism) was reported in 2017 to have a prevalence of 33% in men of ≥40 years of age (Çayan *et al.* 2017). In younger individuals (<40 years of age), ED, once upon a time thought to be only psychogenic, has been shown to have a strong organic component, featuring a prominent role of endocrine dysfunctions

(Papagiannopoulos *et al.* 2015). Ariarathes IV was 28 years old when he married Antiochis and it can be assumed that problems generating an offspring began to occur in the early years of their marriage. The Cappadocian king's sexual dysfunction seems likely in the light of thyroid disease and would additionally corroborate the latter diagnosis.

In the Greek world the thyroid gland was anatomically described by Hippocrates (c. 460–377 BC) and Plato (428–347 BC), but regarded to serve the function of lubricating the airways, while goiter was considered to be a herniation of the larynx rather than an enlargement of the thyroid gland, a stance still supported in the 2nd century AD by Galen (AD 129 – 200/216; Niazi *et al.* 2011). A better understanding of thyroid anatomy, pivotal to much later physiopathological awareness, would only take place during the Renaissance, a period in which several artistic representations of goiter can be found (Traversari *et al.* 2017, Lazzeri *et al.* 2016). Therapy in the Western world was not effective since even the medical writings of Dioscorides (1st century AD) *de facto* do not include any

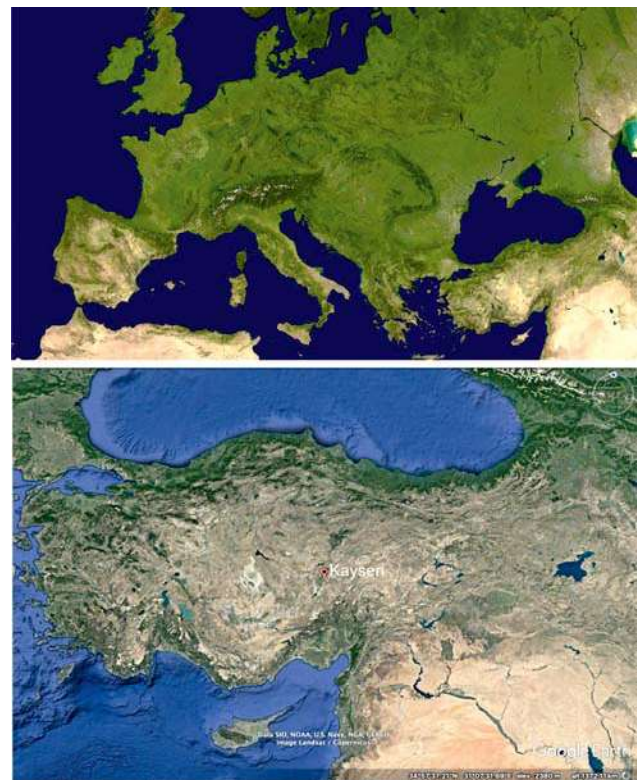


FIGURE 2: Geographical position of the city of Kayseri (Turkey) from Google Earth.

prescriptions of iodine-rich substances (Niazi *et al.* 2011). Ignorance of endocrine physiology and pathology and absence of an adequate medical treatment made it impossible to cure these dysfunctions.

DNA analysis of Cappadocian royal family members, as seen in other bioarchaeological studies (Habicht *et al.* 2016), could prove instrumental in shedding light on the intricacies of the lineages within the Anatolian ruling family, as well as a full anthropological study of Ariarathes IV's remains could highlight osteological traces left by hypothyroidism (Ortner, Hotz 2005). Nonetheless, archaeological research has not yet been able to demonstrate important points such as *i.* to what funerary rituals the royals' remains were subjected (e.g. inhumation vs cremation), *ii.* in what state of preservation and, above all, *iii.* where exactly they lie, it being equally possible that they already went missing in classical antiquity and may never be retrieved.

In conclusion, this multidisciplinary literary and artistic sources-based study suggests that, as is often the case in recorded history, women's infertility has been shamed and women's biology has been a preferential target. More generally, the retrospective biomedical examination of ancient history may also help scholars reconsider injustices and discrimination at the highest political level in our past and catalyze a reflection for modern medicine and society.

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