

ORIGINAL ARTICLE: EPIDEMIOLOGY,
CLINICAL PRACTICE AND HEALTH

Dementia on the Byzantine throne (AD 330–1453)

Effie Poulakou-Rebelakou,¹ George Kalantzis,¹ Costas Tsiamis¹ and
Dimitris Ploumpidis²¹History of Medicine, and ²1st Psychiatric Clinic, Athens University Medical School, Athens, Greece

Aim: To present the consequences of the prolonged age of the emperors, especially if combined with symptoms of dementia, during the Byzantine period (AD 330–1453).

Methods: A review of the original historical and literal sources referring to the life and political course of all the aged Byzantine emperors (a range of 87 total persons who ascended the throne).

Results: Seven Byzantine emperors out of 87 reached older age and showed symptoms that are attributed to dementia, as well as other manifestations of prolonged life. Most of the Byzantine medical authors attempted to connect dementia with certain multifactor agents and some of them interpreted the symptoms as being influenced by the brain's pathogenic humor or focused on the role of vascular diseases. However, an elderly leader afflicts his personal destiny, as well as the succession of the throne and the history of the whole nation. Sometimes, a delay in diagnosis and recognition of the loss of the somatic and mental ability of the emperor made scientific intervention useless and the patient's behavior was dangerous for the citizens of the state.

Conclusion: Even in contemporary societies, extended life expectancy results in leaders of older age, suffering from various diseases connected with gerontology. Loss of mental skills is considered dangerous and remains a problem from antiquity to the modern day. Byzantium handled all these cases with diplomacy. **Geriatr Gerontol Int 2012; 12: 405–412.**

Keywords: Byzantine emperors, Byzantine gerontology, dementia, prolonged age.

Introduction

Gerontology seems to have been a well-developed branch of Byzantine medicine and was of high importance in relation to the care of the elderly. A frequent manifestation of old age has always been dementia, which was easily diagnosed and described in the medical treatises of the era, which also contained theories about the degeneration of physical and mental function. Behavioral changes and gradual loss of motor and mental capacities of an aged person cannot escape attention, especially if the affected individual happens to be the emperor. Royal diseases have always been a point

of public curiosity and a topic of general interest in chroniclers' narratives. The failure of a state leader to deal with the serious matters of his empire, as a result of his own dementia, have caused several occasions of political instability and have led to dangerous situations. Some of the most likely dementia cases among the Byzantine emperors are presented in this paper.

Byzantine emperors: Dynasties and succession to the throne

The Byzantine Empire (AD 330–1453) was the continuation of the Roman *imperium*; the first Emperor, Constantine I The Great, rebuilt the old Greek colony of Byzantium on the Bosphorus and transferred the capital from Rome to the new city renamed Constantinople (AD 330), which remained the most significant urban center during medieval times until its conquest by the Ottomans (AD 1453) (Figs 1,2). The Byzantine emperor was

Accepted for publication 6 October 2011.

Correspondence: Dr Effie Poulakou-Rebelakou MD PhD, 51, Themidos St, Athens 15124, Greece. Email: efpoulrebel@med.uoa.gr; efpoulrebel@yahoo.gr



Figure 1 Map of the Byzantine Empire in the sixth century AD.



Figure 2 Map of the Byzantine Empire in the 11th century AD.

not only the highest military commander, the supreme judge and the only legislator, but also the protector of the Christian church. The senate of Constantinople, although subordinate to the imperial will, acted as an advisory body in legislation. As long as there was an emperor on the throne, the senate had little influence, but played a significant role when the imperial throne was vacant. As the succession to the throne was hereditary and the power of a dynasty was respected through all the Byzantine centuries, the senators' views were not necessarily decisive for the election of the new emperor. The last emperor might already have designated his successor or had him crowned as co-emperor and then the senatorial ratification was a simple formality. If the throne fell empty without any successor having been appointed or after sterile imperial couples without close relatives, then the final decision lay with the senate and the military generals.¹ The power of the throne was

extremely important and the final decision was influenced by the dynastic bonds, allowing the coronation of women (wives, daughters and sisters) and minors (with their mothers taking over the regency for them).

Medical aspects of old age by ancient Greek and Byzantine authors

The social environment of the Byzantine Empire greatly favored care of the elderly. Religious concepts dictated the establishment of welfare institutions scheduled for the needs of old age.² It seems probable that some physicians were specialized in geriatrics, as Aetius of Amida (6th century) mentioned the term "physician of the aged."³ Byzantine medical authors connected old age with "dry and cold crasis" of the body according to the Hippocratic theory of the four humors. All of them classified dementia in seniors as a mental disease. This was considered an inevitable consequence of aging. The Byzantine physician and monk, Meletius the Iatrosophist (8th century AD), attempted to classify the ages of a man: young, man at his peak, middle-aged and old.⁴ These four ages constitute an ideal number corresponding to the four Hippocratic humors: blood, yellow bile, black bile and phlegm, respectively. Furthermore, the four ages correspond to the four seasons: spring, summer, autumn and winter. Among the various symptoms accompanying the third and fourth age, the Byzantine physicians included sphincteric incontinence, the whitening of the hair, the trembling, the weakening of eyesight, the presbyopia, the proneness to bone fractures and the loss of hearing. They also mentioned the diseases of old age: arthritis, gout and stone disease, intestinal obstruction (ileus), cataract, and strokes.⁵

Returning to Greek antiquity and examining various ancient texts, it becomes apparent that cognitive decline in aged individuals has long been a well-recognized condition. One of the earliest references to the division of life into five distinct stages, commencing respectively at ages 7, 21, 49, 63 and 81 years, is attributed to the philosopher, Pythagoras (seventh century BC). The last two of these stages were designated to *old age*, a period of decline and decay of the human body, and regression of mental capacities.⁶ The Greek knowledge of dementia dictated the Legislation of Solon from Athens (one of the Seven Wise Men of Antiquity) regarding the making of wills.⁷ The two greatest philosophers of ancient Greece, Plato and Aristotle, supported that old age is inseparable from mental failure. According to their writings, dementia was inevitable just as the passage of time is inevitable.⁶ During the Greco-Roman times, Galen (second century AD) systematized all the existing medical knowledge and he included *morosis* (his term for dementia from the Greek word *moros* meaning silly or stupid) in his list of mental diseases. Showing his

Hippocratic roots, he agreed that mental deterioration was an obligatory condition of the senile period.

Byzantine theories on memory loss

The influence of ancient Greek medicine is apparent in the extended compilations of the Byzantine physicians, enriched by their personal observations. Oribasius of Pergamum (fourth century AD) was the first to deal with neurological and psychiatric diseases and mentioned memory disorders among them.⁸ Nemesius (fourth century AD), the archbishop of Emesa, in his work entitled *On the Nature of Man*, supported the belief that memory loss occurred in cases of brain damage focused on the posterior part of the brain.⁹ Two centuries later, Aetius of Amida referred to *morosis* based on the texts of the physicians Galen and Rufus, a situation similar to dementia, defined as prolonged memory loss combined with lack of rational thought.³ He also attributed memory disorders to damage of the posterior occipital part of the brain. Furthermore, Aetius mentioned lethargy, infections and old age as causative agents affecting mental stability and he added that some cases of dementia were noticed among the patients of the Athenian plague (431 BC) during the Peloponnesian War, as described by the historian, Thucydides. Both the physician, Alexander of Tralles, and the historian, Procopius, mentioned patients showing lethargy and memory loss among the victims of another plague, the Justinian plague (AD 542). Paul of Aegina (seventh century AD) considered the loss of memory as a result of the effect of an accumulation of harmful humors on the substances of the brain, according to the Hippocratic theory.¹⁰ He also expressed the noteworthy opinion that this symptom might be caused by a defect of the blood vessels. Leo the Iatrosophist (ninth century AD), monk and physician, attributed the memory loss of the aged to extreme coldness and dryness of the posterior ventricle of the brain.¹¹ Finally, a theory similar to Aetius' was mentioned by Ioannes Actuarius (13th century AD), the last famous physician of Byzantium, influenced by the ancient Greek physician Posidonius, who stressed that logical thought is the most significant mental function and its affection means memory and imagination loss.¹²

Byzantine emperors with suspected dementia

Although life expectancy during the medieval centuries was short, several of the 87 Byzantine emperors managed to reach 70 years-of-age, and were therefore considered as "very old." Many of them had a long reign and their health status and behavior are well known, from historical sources. Consequently, those surrounding them could easily notice any early change in physical and psychological health, and suspect senile dementia.

Concerning the few cases of emperors who came to the throne in advanced age, without significant information about their previous life, the suspicion of dementia had been spread with considerable, but excused, delay.¹³ The evidence of seven dementia cases presented in the present paper is mainly derived from literary and historical sources, and their suspicious symptoms have been discussed after a careful review of the last years of all those who ascended to the Byzantine throne and lived a long life. [Table 1]

(1) Justin I (AD 518–527)

Justin I died at the age of 75 or 77 years, after 9 years on the throne. The historian, Procopius, focused on the last period of Justin's reign, when his nephew and successor to the throne, Justinian I, (Fig. 3) carried out the duties of the co-emperor. Procopius observed that Justin had a deteriorated ability to understand serious issues and his citizens were laughing at his decisions: "the Emperor, as an idiot and advanced in age, caused the laugh of the environment, and was also accused of delays in decisions and inability for his duties."¹⁴ Justin showed a certain loss of intellectual function, as he had previously been a very capable military leader who spent many years of his life on campaigns and battlefields.¹³ His progressive cognitive and behavioral decline was recognized even by the people of the Byzantine capital.

(2) Justinian I (AD 527–565)

Information about the possibility of dementia during the last period of Justinian's reign is not evident from his contemporary historians, considering that such a reference could influence the image of the most glamorous Byzantine emperor.¹⁵ Indeed, Justinian died at the unusual, for that period, age of 83 years, manifesting curious behavior towards the end of his life,¹⁶ so that his wife, Theodora, undertook his duties for some time.¹⁷ Some authors referred either to his gout or his possible prostate benign hyperplasia, both considered to be diseases of older people, but the exact cause of his death is not clear,¹⁸ as the sources simply focus on his prolonged life.¹⁹ The contradictory interpretations of his behavioral changes can be explained by an insidious onset of primary symptoms that nobody from the imperial environment could date the exact time of. The only certain evidence of an increasing loss of memory and intellectual function is the temporary replacement of his duties by the Empress Theodora.¹³

(3) Constantine VIII (AD 1025–1028)

Constantine VIII succeeded his brother, Basil II (named the Slayer of Bulgarians), to the throne after having been his co-emperor for almost half a century. Standing in

Table 1 Symptoms and attitudes of the seven emperors suffering dementia

Emperors	Age of death (years)	Postsymptomatic characteristics	Presymptomatic characteristics	Imperial court's reactions	Political events
Justin I (518–527) Uncle	75 or 77	<ul style="list-style-type: none"> – Deteriorated ability to understand state matters – Delay in critical decisions – Inability to carry out his duties 	<ul style="list-style-type: none"> – A capable military leader on the campaigns and the battlefields 	<ul style="list-style-type: none"> – Citizens laughing at the emperor's decisions 	<ul style="list-style-type: none"> – His nephew Justinian carried out his duties at the end of his life
Justinian I (527–565) Nephew	83	<ul style="list-style-type: none"> – The most intelligent and active emperor 	<ul style="list-style-type: none"> – Insidious onset of primary symptoms that nobody could date the onset 	<ul style="list-style-type: none"> – His wife, the Empress Theodora, carried out his duties for some time 	
Constantine VIII (1025–1028) Father	73	<ul style="list-style-type: none"> – All historians refer to his “degeneration of all systems” or “natural degeneration” – He married his daughter to a married officer 	<ul style="list-style-type: none"> – Co-emperor for 49 years 		
Zoe (1042) Daughter	Over 70	<ul style="list-style-type: none"> – Passionate about poison making, neglecting sleep – Lack of stability – Ignorant of public affairs – Neglecting her office obligations – Abandoned her personal care (dressing and bathing) – Apathy – Hand tremor – Deafness 	<ul style="list-style-type: none"> – Hobbies: preparing fragrances, cosmetics and medicines in her private laboratory – Poison making – Very appearance – Three marriages – Greatly admired for her spiritual power 	<ul style="list-style-type: none"> – Changed character and her behavior 	
Michael VI <i>the Military</i> (1056–1057) Called “the Old”	Called “very old”	<ul style="list-style-type: none"> – Ignorant of state affairs – Degenerated physical ability – Apathy – Motor problems – Laziness 	<ul style="list-style-type: none"> – Minister of the Military Affairs Office – Expert in the military affairs 	<ul style="list-style-type: none"> – Lazy, boring and monotonous 	<ul style="list-style-type: none"> – He abandoned the throne and become a monk
Nicephorus Botaneiates (1078–1081)	80	<ul style="list-style-type: none"> – Not caring about state affairs – Impairment of mental functions 	<ul style="list-style-type: none"> – Expert in the war campaigns 		
Andronicus II Palaeologus (1282–1328)	74	<ul style="list-style-type: none"> – Indifferent and unconcerned 	<ul style="list-style-type: none"> – Reign for half a century 		

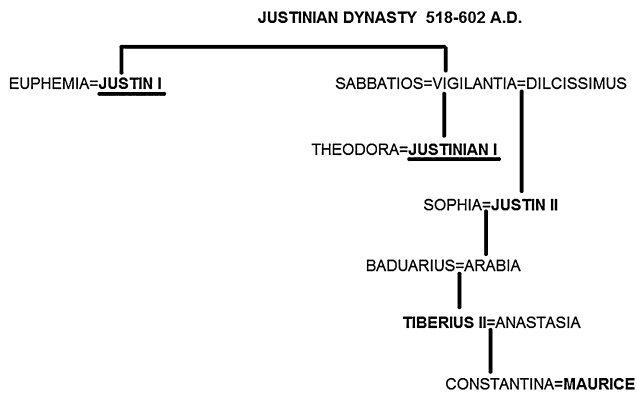


Figure 3 The Justinian Dynasty (AD 518–602).

the shadow of this famous emperor, he was considered as a negligible figure, lacking any sense of responsibility, leaving the state affairs to other persons and spending most of his time at the Hippodrome of Constantinople. He died at the age of 73 years, spending just 3 years on the throne, facing many health problems. The chronicler, Ephraem, stated: “he was much tortured by senility and diseases and he was looking forward to death.”²⁰ The historian, Ioannis Zonaras, attributed the degeneration of the physical and mental capacities to an unknown disease that eventually caused his death: “Having approached the senility and suffering from degeneration of all systems and a co-existing illness . . .”²¹ A similar opinion was expressed by the famous historian and philosopher, Michael Psellus: “senility had brought the obligatory natural degeneration.”²² All the sources considered his sudden decision to marry his 50-year-old daughter, Zoe, to a married officer (whom he divorced from his legal wife within 24 h), in order to arrange the matter of succession to the throne, as a result of a probable dementia that influenced his personality. Maybe the “degeneration of all systems” was denoting memory disorders, deterioration of verbal skills, apathy or motor problems¹³ and led to a fatal stroke.

(4) *The Empress Zoe (AD 1042)*

The Empress Zoe was one of the three daughters of the previous Constantine VIII and his heir to the throne, but had probably the same nosological heritage. At the end of her life, over 70 years, she presented physical problems related to her old age, as well as to her hobby of preparing fragrances, cosmetics and medicines in her private laboratory, neglecting her official duties. Legends and literature represent her as passionate with poison making, even abandoning sleep. According to Michael Psellus, her external features did not correspond to her old age, because the empress had blond hair, white skin without wrinkles and a youthful

appearance. However, he recognized symptoms of cognitive failure: “When she had grown old, she was somewhat lacking in stability. I do not wish to convey the impression that she was deranged or out of her right mind but she was absolutely ignorant of public affairs . . . Whatever intellectual advantages she may have enjoyed in the past, her character did not suffer her to preserve even them . . .”²²

Indeed, Zoe had considerable zest for life, marrying three times from between the ages of 50 years and 65 years. After then, she started to neglect her official obligations that were imposed by her public office and abandoned even her personal care (dressing and bathing), making her restlessness evident. In addition, she lost her spiritual power, for which she was greatly admired by people in the past, and started having lack of concern for social problems, emerging as an egocentric personality. Maybe her apathy that appeared with advancing age led her to the acceptance of her last husband’s mistress in the Imperial Court. Ioannis Zonaras excuses the lack of interest, because “the life of the empress was prolonged over 70 years.”²¹ Zoe also developed hand tremor, probably denoting an extrapyramidal lesion, and gradual deafness attributed to brain damage. The progressive deterioration of her symptoms that affected her character and personality, such as anorexia and sudden impulses, can be attributed to Parkinson’s syndrome, which causes generalized cerebral insufficiency. There is also a possibility that Zoe developed disturbances of the cerebral blood supply and subsequent signs of senile dementia. Some historians support that her personality, her marriages and her lack of responsibility brought the end of her powerful Macedonian dynasty¹³ (lasting almost two centuries; Figure 4).

(5) *Michael VI the Military (AD 1056–1057)*

Michael VI had held the office of the Minister of Military Affairs for a long time, therefore called “the old” or “the military.” When he ascended to the throne, he was considered very old according to public opinion. The historian, Ioannis Zonaras, records: “Man born in Byzantium, improper for great responsibilities because of his natural laziness and aphelia, whose life had been prolonged.”²¹ A second historian, Ioannis Scylitzes, agrees with him: “Michael the patrician the Military, man originated from Byzantium, boring and monotonous and from his youth only in military matters specialist, and ignorant of other themes, and now at his decadence and approaching the old age, he has all the qualities the imperial environment needs for the throne,” ironically meaning they needed a willingness and not a thinking man, and actually insinuated that the royal councillors were using Michael as a puppet.²³ Two chroniclers also characterize the emperor “senile and

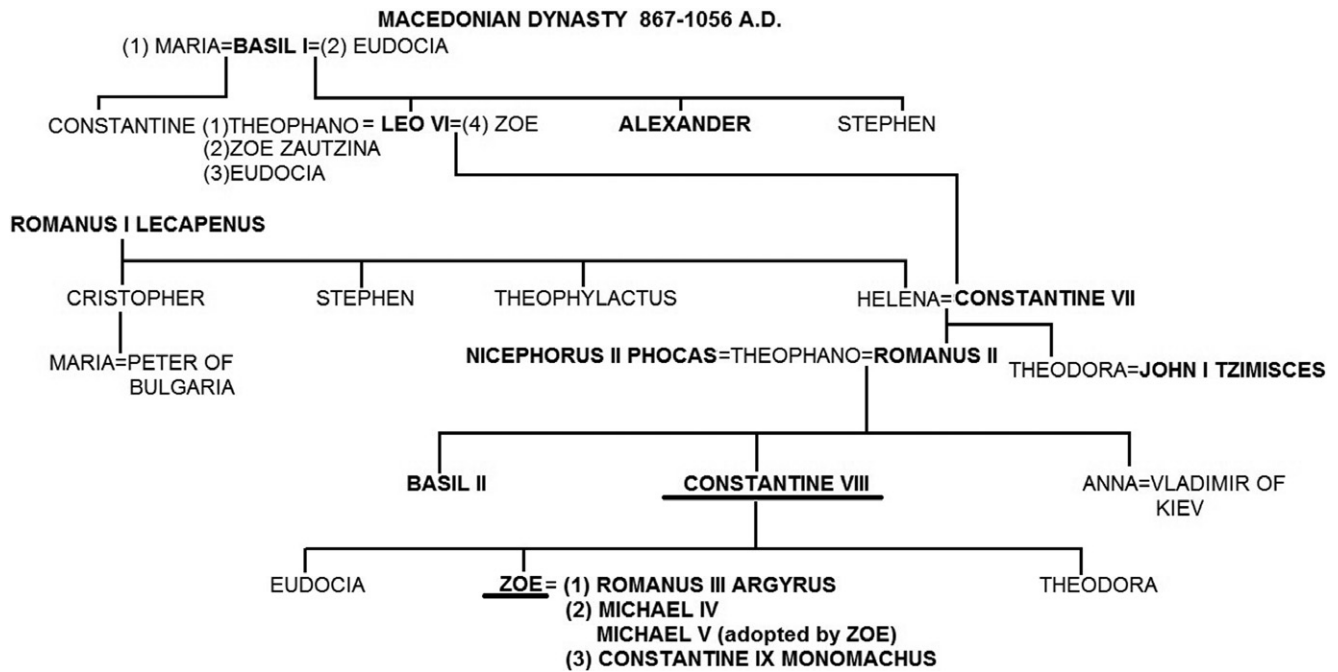


Figure 4 The Macedonian Dynasty (AD 867–1056).

degenerated”²⁴ and “old man, weak, incompetent emperor because of physical disability and old age.”²⁰ Finally, he was forced to leave the throne, as he was incapable of carrying out his duties, and take the monk’s habit, because some characteristic features of his behaviour (insensibility, inactivity, ingenuousness) were incompatible with the duties of his office. Indeed, the lack of strong opinions on state affairs, the apathy and the motor problems described as “weakness” combined with mental decline disguised as “laziness” complete the symptoms of the possible diagnosis of a progressive dementia.¹³

(6) *Nicephorus III Botaneiates (AD 1078–1081)*

There are several descriptions of Nicephorus III Botaneiates’ diseases as a result of his prolonged life. He was considered as a mild and sweet-tempered man, but at the same time dull and indifferent to public issues because of his old age, his illnesses and perhaps his natural indolence: “not caring about state affairs.”²⁰ It is a common topic for the historians to characterize an emperor as “mild”, in order to express the degeneration of mental abilities and the lack of a strong will traditionally attributed to a leader. Ioannis Zonaras stated that: “The Emperor in very old age and because of his nature indifference was not much involved with ruling matters,” probably denoting a withdrawal as a result of dementia.²¹ Therefore, there is evidence that the emperor, although experienced in war expeditions, dramatically changed during his last years (he died at the

age of 80 years), presenting signs of impairment of his mental functions. As no other diseases are mentioned in the texts, it might be that his dementia disorders mainly contributed to his inability to appropriately rule the empire.¹³

(7) *Andronicus II Palaeologus (AD 1282–1328)*

The historian, Nicephorus Gregoras,²⁵ stated that Andronicus II Palaeologus died at the age of 74 years, after having reigned for almost half a century. He also mentioned that the emperor was idle, cruel and indifferent towards his citizens during his last years on the throne, indicative of signs of senile dementia manifestations or simply as a consequence of his prolonged age making him unconcerned.¹³

Discussion

For many years, the term, Alzheimer’s disease, was limited to cases with onset of symptoms before the age of 65 years.^{26,27} The change in the world’s age demographics and the rise in the incidence of age-related diseases, including dementia, is a source of major public health concern.²⁸ The traditional practice of giving Alzheimer’s disease and senile dementia the status of separate diseases is probably attributable to the relatively young age of the patient originally studied by Alois Alzheimer²⁹ (1864–1915), known as “the psychiatrist with the microscope”³⁰ who discovered the characteristic lesions that cause the disease and were baptized with

his name.^{31,32} In the year 2006, some papers on the topic were published commemorating the 100 years of research into Alzheimer's disease, attempting to review the current status of our knowledge concerning behavioral, neuropsychological and neuropsychiatric aspects of the disease.³³

Dementia is said to have affected many personalities through the ages and to have not spared the political classes, being therefore responsible for influencing some historical events. The inability of a leader to carry out his official duties as a result of cognitive decline and behavioral changes might have played a major role in subsequent catastrophic results. The attempts to analyse royal diseases leading to mental disability, including psychiatric cases and senile dementia, have contributed to a better understanding of state crises.⁷ Because of a lower life expectancy in medieval times (ranging from 40 to 50 years), all the aforementioned emperors' lives over 70 years were characterized as prolonged enough. Their problems becoming extremely important because of their official duties. In every instance, it was politically and socially more acceptable to interpret every manifestation of the ruler's declining mental organization as an eccentricity and not as an early symptom of dementia. A possibility that we cannot completely disregard is that dementia could be overdiagnosed in older patients with various psychiatric disorders, as is often the case today.³⁴ Byzantine medical authors dealt with dementia by using the Hippocratic theory of humors and the pneumatic theory of Galen.⁷ According to the first theory, mental illness occurred from the disturbance of the humor balance (for instance when the black bile was dominant the patient developed melancholy), and the treatment was based on the removal of the excess humor by phlebotomy, purgatives or enemas. The second theory suggests that the disturbance of the three spirits – the physical, the animal and mainly the mental – were the main reason for the onset of mental diseases.

The therapeutic modalities had a very poor outcome, a result still valid³⁵ even in Emperors' diseases, aiming at least for the preservation and not for the restoration of brain function. Additionally, physicians suggested a certain diet, encouraged patients to increase their physical activity and gave several medicines, believing in the holistic concept of the human being, and moving away from prejudices and magical influences.³⁶

The patients suffering from dementia were hospitalized in special institutions called "morotropheia" and not in the Byzantine hospitals, the so-called xenons.³⁷ These institutions were founded in Jerusalem and Constantinople. The laws imposed for all patients suffering dementia were not applicable in the cases of the emperors, as they were the actual legislators. However, a king was usually protected by his trustworthy councillors or the empress. For the rest of the civilians, the law was

protecting their life and property. Such laws were in effect in both the Byzantine and Roman Empire, and actually influenced the western European legal system. As a result, the senile patient was not legally responsible for his acts and usually a curator was designated to protect his property and legal rights. This specific Byzantine legislation for people with dementia is very important and is regarded the result and evolution of Jus Romanum.³⁸

From the seven cases of senile dementia presented in the present paper, four could be attributed to family bonds: Justin I and Justinian I were uncle and nephew, respectively, whereas Constantine VIII and Zoe were father and daughter. No further hereditary background was traced in the rest three cases. The majority of the Byzantine emperors came to the throne as members of their dynasty and suffered from various, not necessary genetic, diseases, such as epilepsy, gout and arthritis, but dementia occurred exceptionally, as the two genealogical tables show. Regarding the consanguineous marriages of the royal Byzantines families, there is a small number of known cases from the chroniclers and the historians – the Emperor Heraclius (seventh century AD) and his sister's daughter as his second wife – and some consanguineous relations without marriage – the Emperor Manuel (12th century AD) and his sister's daughter and the Emperor Andronicus (12th century AD) and his cousin's daughter. However, it was not accepted by the Church and the State and, as the study of the Byzantine royal families shows, incestuous marriages were only exceptional.

Disclosure statement

Authors declare no financial support or relationship that may pose a conflict of interest.

References

- Ostrogorsky G. *History of the Byzantine State*. Oxford: Blackwell, 1993.
- Constantelos DJ. *Byzantine Philanthropy and Social Welfare*. New Brunswick, NJ: Rutgers University Press, 1968.
- Olivieri A. *Aetii Amideni Libri Medicinales I–IV*. Lipsiae et Berolini: Teubner, 1935.
- Meletius the Monk. De Natura Hominis. In: Migne J-P, ed. *Patrologia Graeca Cursus Completus*, vol. 64. Paris: Migne J-P, 1857–1906; 1091–1098.
- Lascaratos J, Poulakou-Rebelakou E. The roots of geriatric medicine in Byzantine Times (324–1453 AD). *Gerontology* 2000; **46**: 2–6.
- Berchtold NC, Cotman CW. Evolution in the conceptualization of Dementia and Alzheimer's disease: Greco-Roman period to the 1960s. *Neurobiol Aging* 1998; **19**: 173–189.
- Boller F, Forbes MM. History of dementia and dementia in history: an overview. *J Neurol Sci* 1998; **158**: 125–133.
- Raeder I. *Oribasii Synopsis ad Eustathium. Libri ad Eynapium*. Amsterdam: Hakkert, 1964.

- 9 Nemesius of Emesa. *On the Nature of Man. [Original Text and Translation]*. Thessaloniki: Zetros, 2006.
- 10 Adams F. *The Seven Books of Paulus Aegineta*. London: "The Sydenham Society", 1846.
- 11 Leonis Philosophi et Medici. *Conspectus Medicinae*. In: Ermerins FZ, ed. *Anecdota Medica Graeca*. Amsterdam: Hakkert, 1963; 106–107.
- 12 Ioannes Actuarius. *De Diagnosi liber I*. In: Ideler IL, ed. *Physici et Medici Graeci Minores*, vol. II. Amsterdam: Hakkert, 1963; 371–389.
- 13 Lascaratos J. *Diseases of the Byzantine Emperors*. Athens: J and J, 1995 [Greek].
- 14 Haurly J, Wirth G. *Procopii Caesariensis opera omnia*. Lipsiae et Berolini: Teubner, 1962.
- 15 Stein E. *Histoire du Bas-Empire*. Paris-Bruxelles-Amsterdam: Palanque JR, 1949.
- 16 Rubin B. *Das Zeitalter Justinians*. Berlin: W de Gruyter, 1960.
- 17 Körbler J. Die Krebserkrankung der byzantinischen Kaiserin Theodora (Ein Beitrag zur Geschichte der Syphilis). *Janus* 1974; **61**: 15–22.
- 18 Lascaratos J, Poulakou-Rebelakou E. Did Justinian the Great suffer from syphilis? *Int J Dermatol* 1999; **38**: 787–791.
- 19 Browning R. *Justinian and Theodora*. London: Thames and Hudson, 1987.
- 20 Lampsides O. *Ephraem of Aenos Chronography*. Athens: Centre for Edition of Greek authors, 1984.
- 21 Büttner-Wobst T. Ioannis Zonaras Annalium. In: Büttner-Wobst T, ed. *Corpus Scriptorum Historiae Byzantinae*. Bonnae: Weber, 1897; 725.
- 22 Psellus M. *Chronography*. London: Penguin Books, 1966.
- 23 Thurn I. Ioannis Scylitzae Synopsis Historiarum. In: Thurn I, ed. *Corpus Scriptorum Historiae Byzantinae*. Berlin: W de Gruyter, 1973; 480.
- 24 Constantine Manasses. *Chronicle*. In: Bekker I, ed. *Corpus Scriptorum Historiae Byzantinae*. Bonnae: Weber, 1837; 271.
- 25 Schopen L. *Nicephori Gregorae Historiae Byzantinae*. Bonnae: Weber, 1829.
- 26 Merritt's. *Textbook of Neurology*, 9th edn. Baltimore, MD: Williams and Willkins, 1995.
- 27 Adams RD, Victor M, Ropper AH. *Principles of Neurology*, 6th edn. New York, NY: McGraw-Hill, 1997.
- 28 Brayne C, Stephan BC, Matthews FE. A European perspective on population studies of dementia. *Alzheimers Dement* 2011; **7**: 3–9.
- 29 Vishal S, Sourabh A, Harkirat S. Alois Alzheimer (1864–1915) and the Alzheimer syndrome. *J Med Biogr* 2011; **19**: 32–33.
- 30 Lage JMM. 100 years of Alzheimer's disease (1906–2006). *J Alzheimers Dis* 2006; **9**: 15–26.
- 31 Derouesné C. La maladie d'Alzheimer: regards sur le présent à la lumière du passé. Une approche historique. *Psychol Neuropsychiatr Vieil* 2008; **5**: 115–128.
- 32 Goedert M, Spillantini MG. A century of Alzheimer's disease. *Science* 2006; **314**: 777–781.
- 33 Hodges JR. Alzheimer's centennial legacy: origins, landmarks and the current status of knowledge concerning cognitive aspects. *Brain* 2006; **129**: 2811–2822.
- 34 Korner A, Garcia Lopez A, Lauritzen L, Andersen PK, Kessing LV. Acute and transient psychosis in old age and the subsequent risk of dementia: a nationwide register-based study. *Geriatr Gerontol Int* 2009; **9**: 62–68.
- 35 Hirazakura A, Hatakeyama R, Fukuoka Y *et al.* Emotional therapy for patients with dementia [Letter to the Editor]. *Geriatr Gerontol Int* 2008; **8**: 303–306.
- 36 Scarborough J. Introduction. In: Scarborough J, ed. *Symposium on Byzantine Medicine*, vol. 16. Washington, DC: Dumbarton Oaks Papers, 1984; 97–115.
- 37 Miller TS. *The Birth of the Hospital in the Byzantine Empire*. Baltimore, MD: The Johns Hopkins University Press, 1985.
- 38 Lascaratos J, Kalantzis G, Poulakou-Rebelakou E. Nursing homes for the old (Gerocomeia) in Byzantium (324–1453 AD). *Gerontology* 2004; **50**: 113–117.