

CASES OF APHASIA IN A WORK ON MEDICINE FROM THE 16TH CENTURY

SLUČAJEVI AFAZIJE U JEDNOM MEDICINSKOM DJELU IZ XVI. STOLJEĆA

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SUMMARY

*The purpose of this paper is to bring to the attention of the international community the role in the history of aphasiology of the eminent Renaissance figure, the Extremaduran Francisco Arceo de Fregenal. To present the subject, after a brief biography of this surgeon, we will trace the development of the concept of aphasia up to the 16th century. In some ancient cultures we find that this disorder was described as a “cerebral accident”, to be presented subsequently in the Middle Ages as a divine punishment, only for the original idea to be taken up again during the Renaissance. This return to the concept of the early civilisations was not to lead to the formal classification of this condition however, until the studies of Broca and Wernicke were published in the 19th century. The contribution of Arceo lies in the description of clinical cases included in his book *De Recta cvrandorum*, which are presented in their original written version in Latin accompanied by a translation in English. The first of these cases tells of spontaneous recovery from the disease, and the second of the evolution of a patient with aphasia secondary to traumatic brain injury following surgery. Despite the great value of Arceo’s report, the historical context and his professional attitude did not allow for a localisationist interpretation of the concept of aphasia.*

Key words: Aphasia; 16th century; brain injury; Francisco Arceo de Fregenal

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BIOGRAPHICAL NOTES ON FRANCISCO ARCEO DE FREGENAL

Arceo was born in the town of Fregenal de la Sierra, in the province of Badajoz, Spain, as may be seen on the front of his book *De recta curandorum...: FRANCISCO ARCAEO Fraxinalensis*. It is universally believed that he was born in the year 1493 and died in 1580. His accepted date of birth is very likely correct, as it is indicated by Benito Arias Montano in the prologue to this work written in 1573. In the preamble this great humanist wrote:

“Francisco Arceo is still among us, almost at the age of eighty years, and he still practises medicine with the same skill as if he were yet under forty years of age” [1].

Mediaeval training in anatomy, such as it was for Francisco Arceo, enabled him to be both an empiricist and a scientific surgeon at the same time. He was a prototype of the Renaissance man, making new contributions to surgical knowledge at the time and improving the existing techniques. There will always be the question, regarding that period, of the low level of scientific knowledge of surgeons, whom he describes as unskilled, and he compares them to barbers and charlatans. His idea was to place surgery and surgeons at the same level as medicine and doctors. In this way, he shows his dissatisfaction with those of his colleagues who wrote their works in Spanish rather than Latin, which was the language for science at that time. His writings are full of personal experiences and subtle details concerning technical aspects of his profession. Although he worked in very local areas, his work and fame spread throughout all Europe.

Six years before he died, he published his work *De Recta curandorum vulnerum ratione, et alii eius artis praeceptis libri II. Francisco Arcaeo Fraxinelensi, doctore medico et chirurgo, auctore Eiusdem De febrium curandorum ratione*, in Antwerp (Plantinis, 1574), which was reissued in Latin (Amsterdam, 1658) *De Recta curandorum vulnerum ratione, et alii eius artis praeceptis libri II... Eiusdem De febrium curandorum*, Amstelodami, Ex officina Petri Van de Bergelos. The importance of this work may be appreciated if one considers its rapid dissemination across Europe. This highlights a version in English published in London in 1588 entitled: *A most excellent and compendious method of curing woundes in the head, and in other partes of the body, with other precepts of the fame Arte, practised and written by that famous man FRANCISCOS ARCEVS, doctor in Phisicke & Chirurgery: and translated into English by Iohn Read, Chirurgion*. Imprinted at London by Thomas East, for Thomas Cadman. It was also published in German in 1600, 1674 and 1717 (Nürnberg). In 1634

the French version was published in Paris, and in 1667 the Dutch edition printed in Leeuwarden: *Kortbondige, ende rechte middel, en kunst; om allerhande zooten van wonden op de kortste ende zeekerste manier te geneezen... in't Latijn beschereeven... Met aantekeningen op een yeder hoofddeel verrijkt ende overgezet loor, jacobus Geusius ...* Leeuwarden, Yvo Takes Wielsma.

In chapter VI of the work entitled “*De las contusiones de la cabeza en niños y muchachos*” (“On head injury in children and young people”), Francisco de Arceo refers to cases of aphasia as a consequence of brain injury. Our objective in this paper is to present these cases taking the context of the period into account, and for this we will first trace the history from ancient civilisations up to the 16th century, to place what he wrote together with the other contributions made during the Renaissance period.

APHASIA THROUGHOUT HISTORY

The papyrus of Edwin Smith is a copy of an ancient manuscript that, in addition to the text of the original author (3000-2500 B.C.), contains a number of commentaries collected some years later in the form of 69 explanatory notes (glosses) [2]. It contains 48 clinical histories set out systematically, starting with head injury and moving down towards the thorax and the spine, where unfortunately the document stops. The cases are individual, and each one of the presentations is divided into title, examination, diagnosis and treatment. There is a very clear distinction between the rational surgical treatments and those medicines based on magic, which were less used. Of the 48 cases contained in Edwin Smith’s surgical papyrus, numbers *seventeen, twenty, twenty-two and thirty-two* refer to the loss of speech [3].

In the Aphorisms of Hippocrates we also find references to the same pathology, specifically in Section V (Aphorism V) and Section VI (Aphorisms 32, 51 and 58).

It has been suggested that the sceptic Sextus Empiricus (ca. 200 CE) was the first person to use the term “aphasia”. The meaning he was to ascribe to it was unrelated to the clinical loss of speech. So, in Chapter XX of the first book of his work *Pyrrhonic Sketches*, the title of which is “Aphasia”, we read: “We explain Aphasia as follows: The word φάτις is used in two ways, having a general and a special signification. According to the general signification, it expresses affirmation or negation, as “It is day” or “It is not day”; according to the special signification, it expresses an affirmation only, and negations are not called φάτις. Now Aphasia is the opposite of φάτις in its

general signification, which, as we said, comprises both affirmation and negation. It follows that Aphasia is a condition of mind, according to which we say that we neither affirm nor deny anything. It is evident from this that we do not understand by Aphasia something that inevitably results from the nature of things, but we mean that we now find ourselves in the condition of mind expressed by it in regard to the things that are under investigation. It is necessary to remember that we do not say that we affirm or deny any of those things that are dogmatically stated in regard to the unknown, for we yield assent only to those things which affect our feelings and oblige us to assent to them" [5].

Then came the Middle Ages, a dark period of intellectual persecution when the emergence of new ideas was suppressed. The Church rejected any theories that proposed a material structure (the brain) rather than a spiritual centre as the basis for mankind's psychic and mental capacities. Beliefs at this time were based on ancestral religio-magical elements gathered from Jewish culture and transmitted by way of the Bible. An example of these is the prayer of Mursili: when going towards the ruins of Kunnu, a storm arose and the thunder said: "I was afraid and in my mouth my voice grew weak". This prayer may be interpreted as the Storm god chastising him for lack of confidence [6]. And so, a few centuries later the Jewish people embraced this thought. In Exodus 4:10 we read: "Lord, O my Lord, I am not eloquent, neither heretofore, nor since thou hast spoken unto thy servant: but I am slow of speech, and of a slow tongue". And in Daniel 10: 15-17 we read: "And when he had spoken such words unto me, I set my face toward the ground, and I became dumb. And, behold, one like the similitude of the sons of men touched my lips: then I opened my mouth, and spake, and said unto him that stood before me, O my lord, by the vision my sorrows are turned upon me, and I have retained no strength. For how can the servant of this my lord talk with this my lord? for as for me, straightway there remained no strength in me, neither is there breath left in me" [7].

However, it is in the New Testament that the loss of speech is explained more clearly as a chastisement. In Luke 1: 19-22 we read: "I am Gabriel, that stand in the presence of God; and am sent to speak unto thee, and to shew thee these glad tidings. And, behold, thou shalt be dumb, and not able to speak, until the day that these things shall be performed, because thou believest not my words, which shall be fulfilled in their season. And the people waited for Zacharias, and marvelled that he tarried so long in the temple. And when he came out, he could not speak unto them: and they perceived

that he had seen a vision in the temple: for he beckoned unto them, and remained speechless” [7].

From the 1960s works began to appear placing the Renaissance as a starting point for the concept of aphasia as a problem of trauma. We have carried out a review of the available literature, below.

First of all, we have the study by Benton and Joynt (1960), who wrote: “Soury cited the very early references to traumatic aphasia by Nicolò Massa (1558) and Francisco Arceo (1588 (*sic*))” [8]. Shortly after this Benton (1965) stated: “Renaissance medicine witnessed further developments. First, the distinction between speech impairment due to “paralysis of the tongue” and an amnesic type of speech disorder was clearly drawn. Secondly, an initial speculative step in the topical localisation of language function was taken by Antonio Guainerio when he advanced the concept that certain types of aphasia were due to a loss of memory caused by excessive accumulation of fluid in the posterior ventricle. Finally, the concept of the cerebral origin of aphasic (or anarthric) disabilities became a practical medical reality when physicians and surgeons, such as Nicolò Massa and Francisco Arceo, inferred from the observation of aphasia following head injury that fragments of the skull might have become lodged in the brain and interfered with its functions. Acting on this inference, they searched for and removed the fragments from the brain, this intervention being followed by restoration of speech in the patients” [9].

Almagro (2003) points out that “The enormous gap that occurred during the Middle Ages regarding aphasiology was due to the advent of the Renaissance. It further consolidates the idea of a cerebral origin for aphasia with authors such as Nicolò Massa (?–1596), and Francisco Arceo (1543[*sic*]–1573[*sic*]) observes cases of aphasia following brain damage” [10].

Victoria A. Fromkin states that “Descriptions of other kinds of aphasic disorders were reported in the 15th century by Baverius de Vaveriis, Paracelsus, Francisco Arceo, and the anatomist, Nicolo Massa” [11].

In 2003 Coelho de Matos wrote that “In the past the treatment of aphasia was not always considered as it is today. The first references to spontaneous recovery and intervention in this area date back to 1558, by Nicolò Massa and Francisco Arceo, describing the total recovery of language in patients who underwent surgery following brain trauma” [12].

Archibaldo Donoso (1998) states: “The modern history of the cerebral locations begins with Paul Broca (1824–1880). All that existed prior to this, of lesser fame, were Massa and Arceo, Morgagni, Dax. According to Benton (1971), Massa and Arceo were surgeons of the 16th century who looked after patients with traumatic aphasias from collapse of the skull. They managed to remove the bony fragments that compressed the brain and verified the recovery of language” [13].

When Arthur Benton and Steven W. Andersen referenced aphasia in the Renaissance they wrote: “Reports describing cases of depressed skull fracture in which removal of bone fragments in the brain led to restoration of speech in the patient were published by Nicolo Massa and Francisco Arceo” [14].

George M. Gould (1896) cited this testimony: “Franciscus Arcaeus gives us the narrative of a workman who was struck on the head by a stone weighing 24 pounds falling from a height. The skull was fractured; fragments of bone were driven into the brain. For three days the patient was unconscious and almost lifeless. After the eighth day a cranial abscess spontaneously opened, from the sinciput to the occiput, and a large quantity of “corruption” was evacuated. Speech returned soon after, the eyes opened, and in twenty days the man could distinguish objects. In four months recovery was entire” [15].

One of the first references to aphasia in the Renaissance was made by Antonio Guainerio (?–1440), a professor at the University of Padua. In his work *Opera Medica* (“Medical Works”), published in 1481, he gave the following short description of cases of aphasia:

“I had under my care two old men, one of whom did not know more than three words [...] The other [...] rarely or never recalled the right name of anyone. When he summoned someone, he did not call him by name” [8].

Another interesting case was presented by the famous anatomist Nicolò Massa (1504–1589) in his *Epistolae Medicinae* (“Medical Letters”), published in 1558. The case is described of a young man who was injured in the head by the sharp point of a spear, and consequently was unable to speak for 8 days:

“Since the doctors declared that they had seen no bone [in the wound] I concluded that the reason of the loss of voice was that part of the bone was lodged in the brain. I took an instrument from a certain surgeon who was in attendance and extracted the bone from the wound, whereupon the patient

began to speak at once, saying: "Praise God, I am cured." This drew much applause from the doctors, nobles, and attendants who were present" [8].

On the basis of this text it is hard to tell now if the young man's loss of voice was a case of traumatic aphasia or anarthria, although the latter possibility seems the more likely because of the sudden recovery of speech.

In the 16th century, Johann Schenk von Grafenberg (1530-1598) was possibly the first person to point out that language disorders caused by brain injury (aphasia) are not due to paralysis of the tongue, and therefore he makes a distinction between aphasia and dysarthria, a neuromotor speech disorder that affects the ability to articulate words. So it was that in 1585 Schenk von Grafenberg published his work entitled *Observationes medicae de capite humano* ("Medical observations on the human head"), in which he presented a collection of clinical observations ranging from ancient descriptions to those made by his contemporaries. More than a dozen of these descriptions report consequences of brain injury. For example:

"I have observed in many cases of apoplexy [...] and similar major diseases of the brain that, although the tongue was not paralyzed, the patient could not speak because, the faculty of memory being abolished, the words were not produced" [16].

Elsewhere, in 1552, Ambroise Paré tells us of the surgical intervention on a French soldier who, although he survived, suffered sequelae of aphasia and hemiplegia [17].

THE CASES OF APHASIA IN DE RECTA CVRANDORUM...

As noted earlier, a translation into English exists of the work *De Recta cvrandorum...*, which confirms the tendency to publish treatises in the vernacular language at the end of the 16th century since most surgeons were unable to read Latin [18]. In spite of this, as we have found, only one of the cases of aphasia mentioned by Arceo is briefly reflected in the English-speaking literature. Below we present the literal fragment of Latin of the two episodes of speech loss as a consequence of a brain lesion, and an updated transcription in English by our team.

In the first of the cases Francisco Arceo writes: "Fere autem innumeri quibus prior meninx vehementer fuerat lacerata, ex his autem nouem, quos retulimus, prius apud urbem Xeres, Pacensis dioeceseos, familiaris quidam Joannis Bazzani, qui gladio vulnus in capite acceperat, ex quo vulnere

membranis ruptis, tantum cerebri decessit quantum duo tritici grana sunt. Successit citissima paralysis et alterius corporis partis et linguae impedimentum qua usque ad quartum mensem laboravit, ex qua tamen affectione, postquam vulnere sanatus est, melius etiam habere in dies coepit” [1]. We translated this as follows:

“Countless individuals have suffered serious injury to the primary meninx; the first of the nine we have described, near the city of Jerez, in the diocese of Badajoz, was a relative of Juan de Bazán, who had been injured in the head by a spear, and as the membranes were broken, he lost a portion of the brain equivalent to two grains of wheat. He became paralysed immediately on one side of his body and his tongue became numb, and he had difficulties with it for more than four months. But this complaint started to improve day by day, after the wound healed” [1].

The second case he presents concerns an accident suffered by a labourer when a tower attached to a church was being built in the area of Valverde de Llerena, in Extremadura. Francisco de Arceo wrote:

“... dum operarii quidam praegrandes lapides machinis et arte in turrem quae tunc aedificabatur tollerent (productum autem opus iam erat et templum, cui haerebat, altitudine superabat) vnus ex lapidibus decidens quemdam eorum qui machinam voluebant in capite plene percussit, qua sagittalis co[m]misura est. Is autem subito corrui simulq[ue] cum lapide terram attigit. Erat autem lapis cubitali latitudine et longitudine, duodecim vero digitorum altitudine et pondere quatuor et viginti librarum. Iacuit autem homo in eodem loco per horae dimidium nihil omnino sentiens. Inde autem pro mortuo pene aut intra horam saltem expiraturo domum est sublatus. Hic cerebri commotionem passus, tres integros dies non solum sermonis sed motus etiam expers, mouebatur autem ab adstantibus non secus ac si mortuus fuisset. Magna autem ossium pars depressa cerebro incubuerat, sanguis vero oculis atque auribus eruperat; caput autem ipsum et collum tumidum atroque colore conspiciebatur. Post octauam autem diem sponte sua apertum est caput a sincipite atque ab occipite et ex altero etiam latere. Maturauerant enim iam apostemata. Nos igitur ossa in locum suum restituumus; membranae autem inflammationem passae sunt. Tertia die locutus est, imperfecte tamen et, vt commotae mentis homines solent, apertis oculis imo et patentibus epilepticoru[m] more erat sed nihil omnino videbat neque cernere coepit vsque ad vigesimam diem in diesq[ue] visu etiam proficiebat. Secundum vero post mensem recte iam cernere, vt sanus cu[m] esset, potuit,

cum vulnus iam sanatum fuisset, nam ad vigesimam quintam plurima ossa remissa sunt. Statim autem e lecto surrexit, tametsi tunc recte ingredi non valebat, atque ita diuina magis quam humana ope sanatus est. Euasit autem paetis et tra[n]suersa tuentibus oculis qui etiam curatione procedente quarto mense restituti sunt recteque intuebatur. Vivit adhuc uxoremq[ue] duxit, nam iuuenis tunc erat, oculos vero aliis auxiliis restituimus” [1].

In this second fragment there are two parts. In the first, we have the clinical history, which we have transcribed as follows:

“... while some labourers were skilfully climbing up huge stones with machinery on the tower that was being constructed (the work was already well advanced and was higher than the adjacent temple), one of the stones fell, hitting one of the men operating the machine on the head just at the point where the sagittal joint lies; he fell immediately, hitting the ground together with the stone, which measured one cubit in width and length, and twelve inches in height, and weighed twenty-four pounds. The man was left lying in the same spot for half an hour, having lost all his senses; from there he was taken to his house almost given up for dead or awaiting death within the hour.

Following the blow, the labourer suffered concussion, unable not only to speak but not even able to move, for three whole days: those present jostled around him as if he was already dead. A large number of the sunken bones had become lodged in his brain; blood had spurted out from his eyes and ears, and the head and neck were swollen and black in colour. After eight days, the head split open spontaneously from the middle, and from the back of the neck and from the other side the abscesses had matured” [1].

ARCEO THEN COMMENTS ON THE TREATMENT:

“So, we put the bones back into place; the membranes were inflamed; on the third day he spoke, albeit with some difficulty, and as is usual in individuals who suffer mental shock, his eyes were wide open as in the case for those with epilepsy, but he saw nothing, and he did not begin to distinguish things for twenty days, and his vision continued to improve daily. After the second month he was able to see correctly, just as when he was healthy, once the wound had healed. And after twenty-five days many of the bones had become reintegrated. Next he got out of bed, although he was still unable to walk properly, and so he healed more by the grace of God than of man. He was left with eyes back to front and squinting, but his eyes recovered in four months as the healing progressed and he regained normal vision. He still

lives in his house, as he was a young man then. We restored his eyes with other procedures” [1].

As has been noted, the cases reported by Francisco de Arceo lie in the area of medical history; nonetheless, did he manage to establish an association between the clinical picture of aphasia and hemiplegia or did he simply miss it? At no point does he make any reference to it, but as a good man of the Renaissance it is logical that he would have an interest in natural phenomena and that he would look for explanations and interpretations from them. As we have already seen in looking through the history of the subject, during the Renaissance precise primary references about aphasia exist, though they are scarce. This was an eminently descriptive period, where so far the international literature has highlighted cases and works published by the professor at the University of Padua, Antonio Guainerio, the anatomist Nicolò Massa and the doctor Johannes Schenck; less well-known are the cases of the surgeon Ambroise Paré and those concern us here (see 8, for example). However, it is certain that the work of Arceo is an important descriptive contribution to this period of history, and hence our interest in presenting it. And to return to the initial question: why has a localisationist interpretation not been made? On the one hand his notes form an authentic clinical history in the Hippocratic mode, which are a preliminary to the interpretation of symptoms. On the other hand, in Renaissance medicine a distinction was made between the *historia morbi* and the *explicatio*, in accordance with the doctrine of pathology of the time; but Francisco Arceo was a surgeon, not a doctor... Moreover, although the doctors were starting to understand surgical operations, Medicine and Surgery were still separate practices [19-21]. In view of this, we think that the reason why Francisco de Arceo gives no information about the association in his work is because that was not its purpose, and as a surgeon of the 16th century he had no objectives to lead him to create it. We can see another example of this mentality in his professional colleague Ambroise Paré [22], who, as we have already mentioned, also describes a case and makes no interpretation of it (see 17). Yet, it is worth noting that in 1481 Antonio Guainerio tried to localise language in an area of the brain, from his cases published in *Opera Medica*, but he did this in a different professional context and it was an isolated event in his time [8]. At any rate, apart from this attempt by Guainerio, it was not until the 19th century that the localisation of aphasia was given any clear thought. So, in the 18th century, as the predominant mentality was based on the unity of psychological processes, identifying specific functions in different regions of the brain did

not fit into the scheme of things [23]. It is common knowledge that the origin of the modern history of aphasiology lies in the demonstrations carried out by Broca on the location of motor aphasia, which were published in the *Bulletin de la Société d'Anthropologie* in 1861 [24]. We have not found in the primary literature, nor in the secondary, any reference citing knowledge of the cases of Arceo by the classic aphasiologists such as Broca and Wernike. Yet, although it would have been a significant datum for these researchers, it is worth noting that developments in knowledge about aphasia do not grow through slow, gradual accumulation of scientific knowledge, but rather by a change in paradigms.

CONCLUSIONS

In the 16th century Francisco Arceo de Fregenal determined the aetiology of aphasia as the result of brain trauma or lesion. The clinical cases contained in his work *De Recta curandorum...* suggest that patients may recover spontaneously or require treatment to be performed on the causative underlying condition, i.e. the traumatic brain injury, and consequently require surgery. There is no doubt that the success of Francisco Arceo's therapeutic procedure was backed up by his great knowledge of surgery, which made him one of the most important medical figures of his age in this speciality. His report in the form of clinical histories is one of the greatest testimonies on aphasia prior to the localisationist advances of the 19th century.

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SAŽETAK

Cilj je ovog rada skrenuti pažnju međunarodne publike na ulogu eminentnog renesansnog čovjeka, Extremadurana Francisca Arcea de Fregenala, u povijesti afazilogije. Da bi predstavili temu, nakon kratke biografije ovog kirurga, ocrtati ćemo razvoj koncepta afazije sve do 16. stoljeća. U nekim starim kulturama otkrivamo da je ovaj poremećaj opisan kao «cerebralni udes», da bi kasnije u srednjem vijeku bio predstavljen kao božanska kazna, da bi naposljetku kao izvorna ideja opet bila razmatrana tijekom renesanse. Međutim ovaj povratak konceptu ranijih civilizacija nije doveo do formalne klasifikacije ovog stanja, sve dok u XIX. stoljeću nisu objavljene studije Broca i Wernicka. Arceov doprinos leži u opisu kliničkih slučajeva uključenih u njegovoj knjizi *De recta cverbandorum*, koji su predstavljeni u svojoj izvornoj verziji pisanoj na latinskom jeziku praćenom prijevodom na engleski jezik. Prvi od tih slučajeva govori o spontanom oporavku od bolesti, a drugi o razvoju pacijenta sa afazijom dobivenom uslijed traumatske ozljede mozga nakon operacije. Unatoč velikoj vrijednosti Arceova izvješća, povijesni kontekst i njegov profesionalni stav nisu omogućili alokalizacijsko tumačenje pojma afazije.

Ključne riječi: afazija; XVI. stoljeće; ozljede mozga; Francisco de Arceo Fregenal.