SHORT HISTORICAL REVIEW

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The mysterious "mental illness" of a philosopher: the case of Blaise Pascal

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Abstract

Blaise Pascal (1623–1662) was a French philosopher, who wrote the *Pensées*, a collection of "thoughts" about the apparent insignificance of human existence. In the last three centuries, it was claimed that his disease was mental. Hysteria, melancholia, and post-traumatic neurosis were taken into consideration, but none of the proposed diagnoses seems to be satisfactory. The aim of our work is to identify Pascal's mysterious illness. We correlated the symptoms of the indirect anamnesis (Pascal's letters to friends, letters and biographies made by his sisters and granddaughter) and autopsy data. Based on these data, we consider that Pascal's illness, which has affected him all his life and caused his death, was celiac disease, the diagnosis being supported by: childhood abdominal pain with gradual progression to neurological manifestations in his middle-age, which were expressed by migraine-type headaches, peripheral neuropathy, epilepsy, neuropsychiatric disorders (depression). The hypothesis of a celiac disease is also argued by autopsy data: lack of closure of the fontanelle due to type D hypovitaminosis, intestinal gangrene because celiac disease accelerates the *post-mortem* autolysis, gliosis and calcification of the nervous tissue. The second cause of his death was a chronic traumatic subdural hematoma, probably located in the superior temporal region, which was the reason for his left-sided hemianopsia that occurred immediately after a carriage accident. *Conclusions*: Pascal's philosophy reflects his own inner life, which was deeply influenced by the organic affections he suffered.

Keywords: Pascal, philosophy, autopsy, celiac disease, extraintestinal symptoms.

Introduction

Blaise Pascal (1623–1662) was a French philosopher (Figure 1), who wrote *Pensées*, a collection of thoughts on the seeming insignificance of the human existence, in fact a text unfinished during his life, but published posthumously, in 1670. Although its author wanted to create an apology for Christianity, upon careful analysis we find that the work also includes in its body a detailed and coherent exploration of the human condition perceived in pessimistic terms, which includes topics such as: *The Weakness of man*, *Uncertainty of his natural knowledge*, *The Vanity of man*, *The Effect of his self-conceit*, *The Misery of man*, but also more optimistic chapters, such as *The Greatness of man*.

There are extremely complex and contradictory interpretative versions of Pascal's philosophy, being difficult to define a system in the philosopher's thinking, as it is a rather spiritual experience, his own inner life being influenced by the organic affections he suffered from. He was a fragile man with many debilitating symptoms.

In the last three centuries, Blaise Pascal's symptoms were analyzed to the detriment of his autopsy data. Many authors have considered the philosopher's illness a mental one. Moreover, there are almost 70 references in the literature regarding his illness and death, but none of the proposed diagnoses seems to be satisfactory. It seems that the diseases that were "fashionable" at the time in the medical field were diagnosed when examining the cause of the philosopher's death. In 1747, Julien Offray de La Mettrie (1709–1751) stated that Pascal had an unusual circulation in one of the cerebral hemispheres, the result of which was that the philosopher was half-genius, half-mad [1]. At the beginning of the 20th century, when Sigmund Freud (1856–1939) laid the foundations of psychoanalysis, it was assumed that Pascal suffered from traumatic obsessions and phobias [2], and in the 21st century, when neurosurgery became a booming science, various authors considered that Pascal had a primary non-syndromic craniosynostosis [3].

The purpose of our work is to identify the strange "mental disease" Blaise Pascal suffered from and that led to his death, using both the data on the clinical manifestations that occurred throughout his life and on the basis of the data provided by the autopsy performed after the philosopher's death.

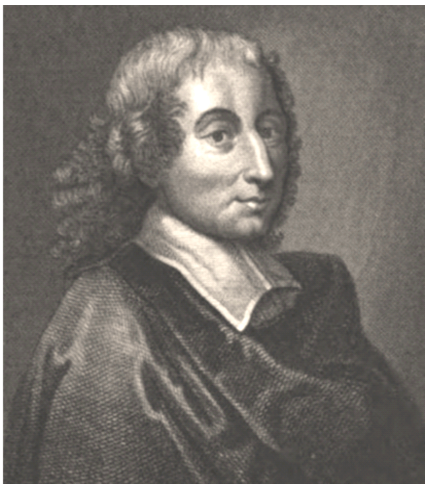

Figure 1 – ***Portrait of Blaise Pascal (unknown artist, made in the 18th century on the cover of the book: Blaise Pascal,*** **Thoughts on religion and philosophy,** ***A new Translation, with an original memoir of the author, and an introductory essay by Isaac Taylor, Printed by William Collins & Co., Glasgow, 1838).***

Materials and Methods

We correlated the symptoms from indirect anamnesis (analysis of Pascal's letters to friends, letters and biographies made by his sisters, Gilberte and Jacqueline, and his niece, Marguerite, data narrated by close persons, witness statements from the last days of his life) and data offered by the autopsy made after his death.

Results

Anamnesis

The philosopher's granddaughter, Marguerite Périer (1646–1733) (Figure 2), in her work *Mémoire sur la vie de M. Pascal* [4], wrote that, from the first year of his life, Blaise Pascal suffered from a strange disease, which manifested itself through a kind of weakness, screams and weight loss. The neighbors attributed this disease to witchcraft and blamed it on an old woman who received mercy from Mrs. Pascal. Étienne Pascal (1588–1651), the father, did not initially accept this hypothesis, but, as all forms of treatment failed, he threatened the alleged witch with jail. Then the woman admitted that she cast a fatal spell on the child, but she had a remedy for it. To this end, poultice of three kinds of special herbs were applied on Blaise's stomach and a cat was thrown out the window to make the spell fall on this creature. In the following hours, it seemed that little Blaise was more dead than alive because, apparently, he had neither pulse nor breath. After three stressful weeks, Blaise Pascal was cured of the disease and his health began to improve [4].

However, from the age of 18, Blaise Pascal would not have spent a day without pain. Especially from the age of 24, the young Blaise (Figure 3) could not drink anything, had unbearable headaches, excessive heat of the intestines and intermittent paralysis "from the belt down", and could only walk in crutches. When he was on a light diet, such as fasting, which was considered ethical and moral at that time, he noticed an improvement in his health [4].

Figure 2 – ***Portrait of Marguerite Périer [François II Quesnel (1637–1699), 1657].***

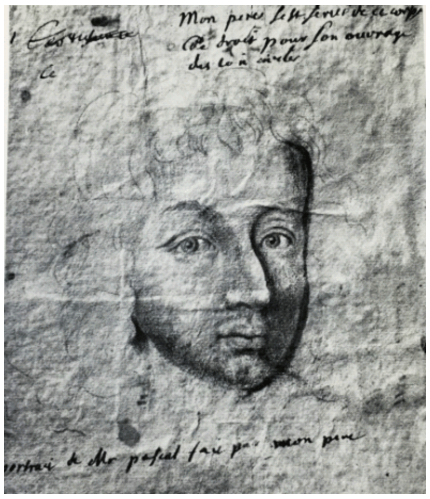

Figure 3 – ***Portrait of young Blaise Pascal, 25 years old [pencil and charcoal drawing by Jean Domat (1625–1696), c. 1649].***

René Descartes (1596–1650), at that time a mathematician and philosopher already recognized not only in France (Figure 4), had become curious to meet the young researcher personally, so he visited him on the 23rd and 24th of September, 1648. On the first day, the two, in the presence of Jacqueline, Pascal's younger sister (Figure 5), Monsieur de Roberval, Monsieur de Montigny, Monsieur Habert, and two or three young people [5] discuss the vacuum, idea in which Descartes did not believe, and analyze the instrument for obtaining the vacuum (syringe). Seeing Pascal's poor health state, Descartes, who also have medical knowledge, promised to come the next morning as a physician to consult him. At 8.00 in the morning, the next day, Descartes consulted the patient, questioned him about his symptoms and prescribed soup and rest [6]. Pascal did not seem to have obeyed Dr. Descartes' recommendations too much, as he engaged in new experiments in order to demonstrate the weight of the atmosphere at different heights.

At the age of 31, at the end of October 1654, Pascal had an accident that marked his life. He traveled with a carriage with four horses and on the old wooden bridge at Neuilly, the horses could no longer be controlled by the

driver, so they fled while the bridge has broke. The front horses fell into the river, and the wagon hung over the water. Pascal was miraculously spared, but the situation shocked him so much that when he was tired or during sleep, he had a particular form of hallucination: he thought he saw a dark abyss on his left side. Even though his family and friends tried to convince him that this abyss is only the product of his own imagination, he would approve of it, but he would start again a little later to see before him this dreadful half of the abyss [7, 8].

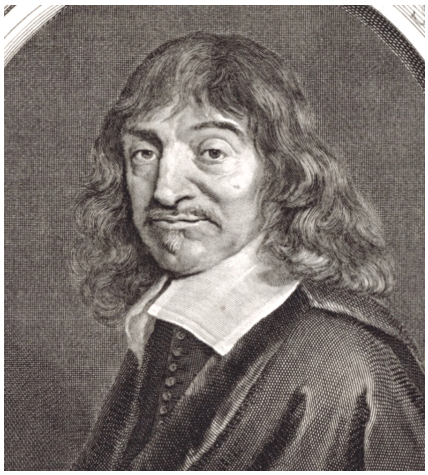

Figure 4 – ***Portrait of René Descartes [engraving by Gérard Edelinck (1640–1707), c. 1707].***

Figure 5 – ***Portrait of Jacqueline Pascal (1625–1661), represented as Sister Jacqueline of the Holy Euphemism at Port-Royal des Champs (unknown painter, c. 1653).***

Madame Gilberte Périer (1620–1687) (Figure 6), the older sister of the philosopher, who also wrote a biography about Pascal's life, told us that, after this accident, the philosopher began to suffer from certain melancholic moods, visual migraines with recurrent headaches; he would also see spectra and other visual hallucinations. A month later, on November 23, 1654, he had the "Night of Fire", Pascal's night of religious ecstasy. That night, exactly between 10:30 and 12:30, Pascal was transposed, through the ardor of his meditation, as Madame Périer wrote, into a kind of ecstasy and felt enlightened. He had an enlightened vision, which he interpreted as a fire, which brought him the complete conviction about the God's reality and presence. This experience could have been based on the effects of the aura migraine attack. In fact, this spiritual experience caused him to devote the rest of his life to religious and philosophical interests [9].

Figure 6 – ***Portrait of Gilberte Périer (unknown painter, 17th century).***

As a consequence of that "Night of Fire", at the beginning of 1655, Pascal, aged 32, returned to Paris and entered the Monastery of Port-Royal. From that moment, he gave up all the pleasures and everything he considered to be superfluous. He denied himself any kind of pleasure, be it nutrition, personal comfort, clothes, etc. Every day he would remove some of his clothes, food and other useful items as he did not consider them absolutely necessary. He wore an iron belt with nails close to his skin, and when a vain thought came to his mind or he was pleased in the conversations he had with various people who visited him to ask for his advice on faith, he gave a few blows with his elbow across his own waist to increase the violence of the sting in order to remember what his true thinking duty was [10]. He was also making his own bed, carrying his plates with food, hiring his servants only to cook and do certain things he could not do. In his room, there were only three chairs, a table, a bed and a few books. There was no ornament on the walls, no carpet on the floor, no curtains on the bed. It had reached a kind of "mortification of the senses". He did not want to taste, smell, or see anything beautiful. On the contrary, he had ended up giving up many foods and eating food only for "the needs of the stomach and of the appetite or cravings" [10].

At 35, in 1658, Pascal had a severe toothache that kept him awake and then he thought about solving cycloid problems (the curve drawn by a fixed point on the circumference of a wheel moving at a uniform speed on a horizontal plane). Thinking about how to solve these mathematical issues, it seems that the pain was gone.

From the age of 37, he became so weak that he could no longer walk without support, but only with crutches. In June 1662, Pascal began to present "a curious disgust" for food. After a few days, he had a "very violent" abdominal colic, but "the pulse was good and he had no temperature at all" [10]. His health deteriorated progressively, and on August 14, "he felt a great dizziness with a severe headache", which did not disappear until his death. In addition, on the night of August 17/18, the intensity of the headache increased, and generalized epileptic seizures

appeared, which eventually led to the patient's death on August 19, 1662 [10].

Pascal died in the parish of Saint-Étienne-du-Mont (Figure 7). Père Beurrier (1608–1696), a priest in this parish, assisted Pascal throughout his last illness "which lasted six weeks". Beurrier describes Pascal in his *Mémoires* as being "bilious and having nephritis colic" [11].

Figure 7 – ***The house where Blaise Pascal died on August 19, 1662 was situated on Rue Neuve-Saint-Étienne, Paris (engraved image from*** **Magasin Pittoresque,** ***1845).***

The autopsy of Blaise Pascal

Even though an autopsy was rarely made in those days (Figure 8), after the philosopher's death, due to rumors that he had been poisoned, on August 21, an autopsy was performed by Dr. Vallant and his assistants. His favorite granddaughter, Marguerite Périer, described Pascal's autopsy with the precision of a medical student [11]:

- The stomach and liver were almost "gone", having an "wilted" appearance, probably being atrophic;
- The intestines were "gangrenous", it was not possible to determine if he suffered from colic due to his status or, on the contrary, the colic determined his condition;
- The anterior fontanelle was replaced by a callus;
- When his skull was opened, the doctors were surprised to identify only the lambdoid suture as there was no trace of the coronary suture left;
- Doctors also observed that there was an enormous, amazing amount of brain, the substance of which was very solid and condensed;
- In the end, the most remarkable thing found at the autopsy, "was inside the skull; along the ventricles of the brain were two impressions, like fingerprints in the wax, which were filled with coagulated and infected blood that had started to spread gangrene along the *dura mater*".

Discussions

The strange disease of Pascal, which affected his whole life, was examined posthumously by many specialist neurologists, neurosurgeons, internists and many others, based on the symptoms described by his sisters in their correspondence, on the letters exchanged by Pascal with them or with his friends.

Figure 8 – ***The frontispiece of the book*** **De Cerebri Anatome,** ***written by Thomas Willis (1621–1675) and published in Amsterdam, in 1665/1666, presented the modality to perform an autopsy in the same period when the autopsy of Blaise Pascal was made.***

There are some authors who thought he might have had intestinal tuberculosis, possibly complicated by chronic rheumatism [12]. Others considered that Pascal was suffering from neurasthenia, because he was always complaining about transient paraplegia, digestive disorders and headache. There are also a few who claimed that Pascal had visual migraines, with headaches, half blindness episodes and visual hallucinations [9]. It was hypothesized that these aura migraine experiences would have acted as an inspiration for Pascal's philosophical reflections. It is possible that Pascal's sudden religious conversion during the night of November 23/24, 1654, was accompanied by a bright vision triggered by the effects of the aura migraine attack, which he interpreted as a fire that convinced him of "God's reality and presence". However, this spiritual epiphany convinced him to devote the rest of his life to religious and philosophical issues [13].

At the beginning of the 19th century, Pierre-Just Navarre (1849–1922) considered that Pascal had intestinal tuberculosis, a cirrhotic liver and died from hemorrhagic encephalitis [14], but this death diagnosis is less likely today.

Bianucci *et al.* analyzed the mortuary mask (Figure 9), as well as the autopsy data and hypothesized that Pascal had craniosynostosis or primary non-syndromic oxycephaly because he presented congenital facial asymmetry and autism spectrum disorders [15]. Also, analyzing the biographical data, these authors identified three key symptoms of autism: obsessive interests, difficulty in social relationships and communication problems.

We consider that his death was caused by both a basic disease and a cerebral disease acquired during his life. It is certain, however, that Pascal suffered from a long-term illness, having its onset in his first year of life, which progressively aggravated over the last 20 years of his life.

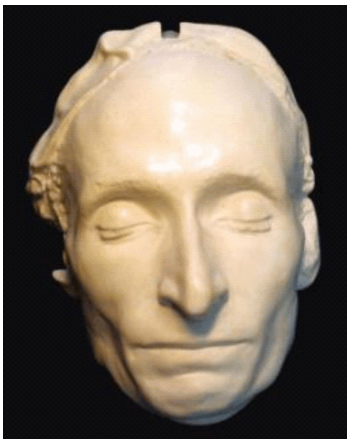

Figure 9 – ***Death mask of Blaise Pascal (1662).***

Regarding the basic disease of Pascal as the first cause of the disease

We take into consideration the celiac disease, an autoimmune disease triggered by the ingestion of gluten, which, in patients who are predisposed genetically, leads to lesions of the small intestine and is clinically characterized by the global malabsorption syndrome, with deficiencies of proteins, lipids, vitamins and minerals. The main histological features of intestinal biopsy in celiac disease are: (*i*) increased density of intraepithelial lymphocytes (>25/100 epithelial cells); (*ii*) crypt hyperplasia, with a decreased villi/crypt ratio; (*iii*) blunted or atrophic villi; (*iv*) mononuclear cell infiltration into the lamina propria; (*v*) epithelial changes, including structural abnormalities in epithelial cells [16]. The immunohistochemical tests have indicated the prevalence of T-lymphocytes, in particular cluster of differentiation 4 (CD4) T-cells [17]. A clinical-histological remission can be seen after excluding gluten from the diet, but the histopathological changes reappear when gluten is reintroduced into the diet [18].

Celiac disease is a multifaceted clinical condition that is considered to be a childhood disease. Its first description was realized 2000 years ago by the ancient Greek physician Aretaeus the Cappadocian (first century AD), who named it "*koiliakos*" ("suffering in the bowels"), which derived from the Greek term "*koelia*" ("abdomen"). In 1888, the English pediatrician Samuel Gee (1839–1911) gave to first modern description of the disease together with the suggestion that the dietary treatment might be of benefit. In the next 100 years, there was no identification of the mechanism of the disease or of its treatment. Only in 1950, the Dutch pediatrician Willem-Karel Dicke (1905–1962) found out that a protein component of cereals, *i.e.*, gluten, is the toxic element that initiates the celiac disease and as such, exclusion of wheat, rye and oats from the diet can lead to health improvement [19].

The disease mainly affects the intestinal tract, but it can also affect other systems and organs, if the disease evolves over a long period without proper treatment. Clinical manifestations range from digestive symptoms, such as malabsorption, to extra-digestive symptoms, such as neurological ones, namely epilepsy, ataxia, peripheral neuropathy and headache.

The most significant digestive symptoms are chronic diarrhea or constipation, vomiting, enlarged abdomen and slowing growth, which occur after the introduction of gluten into the diet [16]. Adults with celiac disease, due to long evolution of the illness, develop neurological manifestations, the so-called "celiac brain", having nutritional deficits as etiology. The patient has migraine-type headaches, with or without aura, which improve after the removal of the gluten from the diet [20], occipital lobe epilepsy [21], cerebellar ataxia, myoclonic ataxia, progressive leukoencephalopathy, and dementia, due to microscopic calcifications in the nervous tissue [22]. In addition, recurrent paresthesias, peripheral neuropathies (which cause inability to swallow even fluids and toothaches) [21], neuropsychiatric disorders (depression, eating disorders, irritability) [23], muscle weakness, relapsing stomatitis, and migraine with or without aura may occur [20]. Anemia, osteoporosis with bone pain and tooth decay, dyspepsia, abdominal pain, fatigue, weakness may also appear. The patient is small in stature, has insomnia and is irritable.

In Pascal's case, the diagnosis is clinically supported by the abdominal pain that appeared from the first year of life, with the gradual progression to the neurological manifestations expressed during adulthood by migraine-type headaches, swallowing disorders, depression, peripheral neuropathies (inability to swallow even liquids, toothaches), epilepsy installed in the last months of his life, to which we add his fragile constitution, small stature, as well as the autopsy aspects.

The causes of Pascal's death and lack of health were never completely clarified because the medical knowledge at that time was quite brief. At that time, the pathology as a branch of medicine was not developed, so no correlations could be done between clinical symptoms, autopsy findings, and the cause of death. In addition, scientists have only recently discovered the wonderful benefits of the microscope.

The autopsy report was kept thanks to Pascal's sister, Madame Gilberte Périer, who used it in her brother's biography, which appeared in 1694. Based on autopsy data, we can also draw conclusive evidence that point to Blaise Pascal's diagnosis of celiac disease:

- The anterior fontanelle could not be closed for a long time in his childhood, being replaced until adulthood by a callus due to malnutrition and type D hypovitaminosis;
- The intestinal gangrene had developed *post-mortem* not only because the autopsy was performed three days after death, in full summer, but also because celiac disease accelerates the installation of *post-mortem* autolysis [24, 25];
- The liver atrophy may also be evidence that Pascal had celiac disease because severe liver disease may occur in this condition, including the following: autoimmune hepatitis, severe liver fibrosis, early biliary cirrhosis, liver damage being one of the extra-intestinal manifestations of celiac disease, although the mechanism is not yet known [26];
- The brain in large quantity, with the solid and condensed substance, suggests glucose and nerve tissue calcification, which are in fact the histopathological substrate of epilepsy associated with this condition [27].

However, the increased prevalence of epilepsy in patients with celiac disease is now well-documented [24].

In addition, the symptoms improved or even disappeared when Pascal was on a light diet based on vegetables, as gluten was removed from his nutrition.

Regarding the second cause of Pascal's death

We consider a cerebral disease acquired during his last years of life. The philosopher suffered from hallucinations and left-sided hemianopsia after the carriage accident, and the autopsy revealed two collections of coagulated and friable blood inside the skull. French cardiologist Georges Duboucher also analyzed Pascal's disease and considered that the two collections of coagulated blood could have been thrombosis aneurysms, probably the source of major life-long headaches [28]. We believe that these symptoms, associated with the autopsy findings, may be related to his head trauma from the Neuilly bridge accident. They can be considered the consequences of a chronic subdural hematoma, probably located in the superior temporal region, whose localization can compress the geniculocalcarine tract [29], which was the reason for his left-sided hemianopsia that occurred immediately after the Neuilly bridge accident.

The man, whom Pascal speaks of in *Pensées*, was thus defined: "*L'homme n'est ni ange ni bête; et le malheur veut que qui veut faire l'ange fait la bête*" (*Man is neither angel nor beast; and misfortune is that the one who wants to become an angel will be created as a beast*). Grieved by the disease, always under the specter of death, the philosopher considers that "*L'homme n'est qu'un roseau, le plus faible de la nature, mais c'est un roseau pensant*" (*Man is only a reed, the weakest thing of nature, but it is a thinking reed*). Even if man knows he will die, he also knows that his thought constitutes his greatness: "*la grandeur de l'âme humaine consiste à savoir*" (*the greatness of the human soul is to know*) [30].

Conclusions

The diseases Pascal suffered from throughout his life are difficult to identify almost 400 years after his death. A complete analysis that can elucidate the mystery of the philosopher's illness and death must take into consideration not only to the autopsy data or the symptoms alone, but the case must be analyzed as a whole. Pascal's work reflects the life of its author, influenced by the organic affections he suffered from. He succeeded, however, to use the disease as a source of inspiration for his philosophical reflections.

Conflict of interests

The authors declare that they have no conflict of interests.

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