Descriptions of Apoplexy by Joseph Frank in the Beginning of the Nineteenth Century in Vilnius

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Keywords

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Abstract

In the beginning of the 19th century, apoplexy was understood to be a disease of the cerebral blood vessels, manifesting with a sudden weakening or extinction of sensation and the patient's inability to move. In this study, we examined the situation of neurology in the beginning of the 19th century in Vilnius through the perspective of a nervous system disease – apoplexy. Case reports and descriptions of apoplexy in the textbook and memoirs by Joseph Frank (1771–1842), descriptions of patients with apoplexy from the proceedings of Vilnius University Clinic were analysed. It was identified that the main cause of apoplexy was not an imbalance of the four humours but the pathology of cerebral blood vessels. However, following ancient tradition, the principles of recreation and moderation were thought to be important for the prevention of apoplexy, and bloodletting and diet were believed to be essential for the treatment.

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Introduction

Vilnius University was founded in 1579 by the Jesuits in the city of Vilnius in the Catholic Grand Duchy of Lithuania. It was one of the oldest universities in Central and Eastern Europe, modelled after the Jesuit College in Rome, and had 2 faculties: Philosophy and Theology. After the abolition of the Society of Jesus in 1773 by the papal bull of Clement XIV, Vilnius University came under the jurisdiction of the Educational Commission of Polish-Lithuanian Commonwealth and partly turned towards secularism. As a result, the Faculty of Medicine was founded in 1781, and special attention was given to the promotion of natural sciences in accordance with the demands of the Age of Enlightenment [1].

On May 3, 1791, the Constitution of Polish-Lithuanian Commonwealth was approved, its ideas were defended against the Russian Army during the uprising of 1794, and the final partition of the Polish-Lithuanian Commonwealth was completed in 1795. Even after the annexation of the Grand Duchy of Lithuania by the Russian Empire, Vilnius University maintained the same rapid pace of intellectual life. In the early 19th century, Vilnius

Fig. 1. Professor Joseph Frank (1771–1842) by Jonas Rustemas. Photographer Antanas Lukšėnas, Lithuanian Art Museum (with permission).

University was the largest in the Russian Empire according to its number of students and university departments [1].

However, little is known about the studies of nervous system diseases in Vilnius before the 19th century. There were no university clinics established before 1804 and students visited the sick in the monastery hospitals [2]. The situation changed in 1803, when 2 famous medical professionals from Vienna, Johann Peter Frank (J.P. Frank, 1745–1821) and his son Joseph Frank (J. Frank, 1771–1842; Fig. 1), were invited to the Vilnius University by the Rector [1].

Joseph Frank was a graduate of the University of Pavia (1785–1791), whose most famous teachers at that time

were Antonio Scarpa (1752–1832), Alessandro Volta (1745–1827), and his father J.P. Frank [3, 4]. J. Frank was appointed Extraordinary Professor of Special Therapy at the University of Pavia in 1795. He later became the Chief Physician at the General Hospital of Vienna (1796–1802). During the period 1802–1803, J. Frank took a scientific tour of France, Great Britain and northern Germany, where he met Jean-Étienne Dominique Esquirol (1772–1840), Antoine Portal (1742–1832), Jean Corvisart (1755–1821), Edward Jenner (1749–1823) and others [3, 4]. J. Frank spent almost two decades in Vilnius (1804–1823); he was Professor of Special Therapy and Clinical Medicine, an organiser, a reformer, a founder of clinics, institutes, and medical societies in Vilnius [3].

How was apoplexy perceived before J. Frank? Hippocrates defined apoplexy by its catastrophic presentation: a sudden loss of consciousness, motion and sensation, and presented the disease as a result of the imbalance of the four humours [5]. His conception had a remarkable longevity, including his follower Galen, who stated that apoplexy might result from a failure of flow of the animal spirits caused by the accumulation of phlegm within the ventricles [5]. When autopsies became relatively common in the 16th century, the humoral theory of apoplexy began to be questioned, and it was recognised that some causes of diseases were found in solid organs [6]. Italian anatomist Antonio Maria Valsalva (1666–1723) in 1707 reported a patient with unilateral cerebral haemorrhage, associated with weakness on the contralateral side of the body [6]. Moreover, the solidism doctrine became more recognised, and it was promoted by the Italian anatomist, Giovanni Battista Morgagni (1682–1771) [6]. A contemporary of J. Frank, London physician John Cooke (1756–1838) in 1824 wrote *A Treatise of Nervous Diseases*, defining apoplexy as a disease in which the animal functions are suspended while the vital and natural functions continue; respiration is generally laborious and frequently attended with stertor [7].

The aim of this study is to analyse the situation of neurology from 1805 till 1821 in Vilnius, which was the capital city of the Grand Duchy of Lithuania until 1795, and the centre of Vilnius Governorate of the Russian Empire during the 19th century, through the awareness of a particular nervous system disease – apoplexy. We investigated clinical case reports and descriptions of apoplexy in the scientific literature and memoirs written in Vilnius by J. Frank, assessing the importance of described risk factors, causes, prophylaxes and treatment methods for the patients with the disease.

Materials and Methods

We first analysed case reports presented by J. Frank in *Mémoires Biographiques de Jean-Pierre Frank et de Joseph Frank son fils* (“Biographical Memoirs of Johann Peter Frank and his Son Joseph Frank”) [4]. Then we turned to descriptions of apoplexy in J. Frank’s textbook *Praxeos Medicae Universae Praecepta partis secundae volumen primum sectio prima, continens doctrinam de morbis systematis nervosi in genere et de iis cerebri in specie* (“Practical Textbook of General Medicine, First Section, Second Part of the First Volume, Containing Doctrine of Nervous System Diseases and the Special Diseases of Cerebrum,” 1818) [8]. Lastly, we analysed statistical data and descriptions of patients with apoplexy in *Acta Instituti Clinici Caesareae Universitatis Vilnensis* (“Proceedings of Vilnius University Clinic,” 1808) [9], presented also by J. Frank.

Results

J. Frank wrote *Mémoires Biographiques* in French, although his native language was German. This manuscript was edited by Doctor Jean de Carro (1770–1857), who was his friend. After the author’s death, the manuscript was purchased by the Vilnius Medical Society in 1855 [10] but was never published. A part of J. Frank’s manuscript was translated into Polish for the first time by Władysław Zahorski in 1913 [11], into Lithuanian by Genovaitė Dručkutė in 2001 [12] and then Italian by Giovanni Galli in 2006 [13]. In this study, we analysed the original manuscript and also used the Lithuanian translation.

The main neurological diseases presented in *Mémoires Biographiques* were convulsions, hydrophobia, hydrocephalus, nervous headaches, acute pain, head trauma and paralyse, apoplexy being one of the most frequently reported diseases [14]. J. Frank described a “peculiar form of apoplexy” of Jacques Briôtet (1746–1819), Professor of Surgery at Vilnius University in 1811:

Briôtet (...) learned that general Niesielowski, who had his 40,000 ducats, went bankrupt. This news overwhelmed Briôtet, and he fell into a deep melancholy with the main symptom of fear of death. Moreover, Briôtet was struck by a peculiar form of apoplexy, which presented as memory paralysis (*d’une espece d’apoplexie, qui paralyse la memoire*). Briôtet did not remember his name, spoke little, and used mainly verb infinitives (...), changing from his native French to the Polish language, which he had never used before [4].

In another case report, J. Frank described a merchant’s disease in 1817 in Vilnius:

Merchant Reyzer suffered from apoplexy that presented as paralysis of one side of the body (*d’hémiplégie*). His days were numbered; he suffered from urine retention and high temperature and sweated profusely (...). I left the patient in agony that evening (...). Although he began to recover, several months passed and the merchant Reyzer was destroyed by a trade crisis [4].

J. Frank also described his father’s disease in 1821: 76-year-old Johann Peter Frank was very exhausted; moreover, a colleague accused J. P. Frank of stealing patients from him. On this day, J. P. Frank experienced signs of apoplexy: distorted mouth, slurred speech, weakness of the right arm, and pain in the occiput (*les traces d’une apoplexie, savoir la bouche de travers, difficulté de parler, et une faiblesse au bras droit, accompagnés d’une douleur a l’occiput*) [4]. Six doctors were called, and J. P. Frank was treated with calomel, bloodletting, and number of other medications. Several weeks passed, and the patient, suffering from gout, fever, seizures and spasms died [4].

In 1814 in Vilnius, J. Frank noted: “I have just completed a treatise on skin diseases, and was intended to be-

gin the other, on nervous disorders” [4]. Therefore, the second source of this study was a textbook *Praxeos Medicae Universae Praecepta*, written in Latin by J. Frank [8]. Various nervous system diseases, including descriptions of headaches, encephalitis, hydrocephalus, sleep disorders, amnesia, St. Vitus dance, epilepsy, and apoplexy could be found in the textbook [8].

J. Frank defined apoplexy as a sudden weakening, interruption, or extinction of sensation and the patient’s ability to move, although respiration and heart activity were usually unaffected [8]. Face flushing, double vision, amaurosis, tinnitus, yawning, hiccups, formication, slurred speech (*lingua balbutiens*) and abnormal movements of extremities were believed to be prodromal signs of apoplexy. Slow, deep breathing, a slow, full, hard, irregular pulse, paraplegia, hemiplegia, urinary bladder paralysis, impaired vision and hearing, and impaired memory were assumed to be the principal symptoms of apoplexy [8]. Eventually, dementia (*imbecillitatem functionum mentalium*) or tearfulness (*proclivitate ad fletum*) was frequently diagnosed if a patient had survived [8].

Autopsy findings of patients with apoplexy revealed pathology of cerebral blood vessels (both veins and arteries), lesions in the cerebrum, brainstem and spinal cord, and inflammatory changes in the meninges [8]. J. Frank described dilation of blood vessels in *dura mater* and *pia mater*, blood in the brain surface, softening of the brain and thalamus (*cerebrum molle, ad latus thalami permolle*), or the presence of blood in the thalamic area. The author also noted tubercles in the *corpus striatum*, pathological cavities in the medullary substance of hemispheres (*cavitates morbosae in substantia medullari hemisphaeriorum*), compressed nearby ventricles, red, inflamed *plexus chorioideus*, a watery, bloody *cerebellum* and *medulla oblongata*. Furthermore, J. Frank described carotid artery obstruction (*carotidum obstructionem*), aneurysms, rupture of cerebral arteries, blood in the spinal canal, *aorta* defects, and *vena cava* compression in the chest wall with tumour [8]. Describing autopsy findings, J. Frank quoted Giovanni Battista Morgagni, Maximilian Stoll (1742–1787), Antoine Portal and John Cheyne (1777–1836). Furthermore, he described his own observations, such as blood or serous fluid in the brain surface, inferior part of the brain, around the *medulla oblongata* or in the cervical part of the spinal canal, inflammation in the brain, dilation of blood vessels within the meninges and petechiae (*punctis rubellis*) in the medullary substance of the brain [8].

J. Frank distinguished 3 causes of apoplexy: predisposing, promotional and cardinal. Predisposing causes (*causae praedisponentes*) included male gender, obesity,

a luxurious and sedentary lifestyle, worrying, low atmospheric pressure, cold and humid weather, time of the equinox and summer heat [8]. Promotional causes (*causae excitantes*) involved dancing, going to bed shortly after meals, hot baths, diving in cold water, satiety, intoxication, drug use (opium and nicotine), strong odours and emotions such as joy, horror, anger, and resentment. Lastly, the cardinal cause (*causa proxima*) of apoplexy was brain, *cerebellum*, or *medulla* compression with venous or arterial blood, serum, tumour, or concretion [8].

The worst prognosis, according to J. Frank, was associated with an observed severe condition of the patient. Foaming at the mouth, an elongated and cyanotic face, difficulty swallowing, wheezing respiration, paraplegia, palpitations, cold sweats, and involuntary urination and defecation were associated with the worst prognosis [8]. On the other hand, a favourable prognosis was given if warm sweating, profuse urination, menstruation, diarrhoea and improvement after bloodletting were observed. The prognosis was believed to be poor if the disease affected the *medulla oblongata* and if bloody fluid was localised in the skull base, especially around the glossopharyngeal, vagus and hypoglossal nerves [8].

Prophylaxes mainly included the principles of “recreation and moderation,” following the ancient tradition, further suggesting periodic bloodletting and the use of purgatives [8]. Bloodletting (phlebotomies of the jugular or brachial veins), leeches on the head, and cupping therapy (*cucurbitulas scarificantes*) on the dorsum were also used as treatment options. Diet was an essential part of the treatment. J. Frank recommended vegetables, fat-free food, sour drinks, dishes with boletus, egg yolks, rice, ginger, and broth of veal, chicken, fish, frogs, turtle, and poultry. If a patient became weak, an infusion of Arabic coffee, raspberry water, and white wine with lemon juice and sugar were prescribed. Chemicals such as various purgatives, potassium nitrate and physical treatment (rubbing the limbs with wool cloth) were also used [8].

The third source of this study was *Acta Instituti Clinici Caesareae Universitatis Vilnensis* [9], written in Latin by J. Frank. These proceedings give the first statistical data from the Vilnius University Clinic, established in 1804 by Johann Peter Frank. For example, during the period 1805–1806, 230 patients (*suscepti*) were treated: 202 were cured (*sanati*), 13 were transported or improved (*translati, ex parte sublevati*) and 15 died (*mortui*) [9]. The mortality rate at the clinic was 6.5%. The majority of the treated patients were diagnosed with fevers, several patients with lues (9 patients), phthisis (6), facial erysipelas (4), hydrops (4), icterus (3), peritonitis (2), metrorrhagia (1),

metritis (1), extrauterine pregnancy (1), epididymitis (1), hysteria (3) and mania (2). There were several patients diagnosed with neurological diseases: paralysis (2), headache (2), epilepsy (1), encephalitis (1), apoplexy (1), and St. Vitus dance (1) [9].

A patient with apoplexy was described in detail: a printer, stout 24-year-old man complained of headache, fatigue, fever and diarrhoea on April 22, 1806. The patient was treated at home with a powder of Ipecacuanha and opium, and his diarrhoea resolved. However, the patient began to weaken and became lethargic, his eyes were fixed, breathing was stertorous, internal sensations (*sensuum internorum*) diminished and his pulse rate increased. An enema with infusion of chamomile flowers was administered, and the patient sweated profusely and all symptoms regressed. The next day, he described a mild headache and vertigo, but the paroxysm of lethargy recurred in the afternoon, the patient became delirious and was considered to be in *status apoplecticus*. The apoplectic printer was brought to the Vilnius Clinic on April 26, with a flushed face, contracted pupils, firmly closed mouth, slow breathing, cold extremities and a weak pulse. It was also described that internal sensations and movements were abolished. Bloodletting (*venaesection*) was performed and the patient began to breathe more deeply, spasms remitted and he was able to swallow and sit up in the bed. Even though the printer complained of headache, he slept well, sweated and urinated a great deal, with his breathing and pulse being normal. The patient was treated with a solution of potassium nitrate, cranberry syrup and enemas. Several days passed, and the printer was discharged home in a completely healthy condition (*omnino sanus*) [9].

Discussion

J. Frank lived at a time when the equipotent theory, which asserts that the thinking soul resides throughout the brain [15], was still relevant and acceptable, and newer theories on cerebral localization were assumed to be materialistic, scandalous and antireligious [16]. The ideas of Albrecht von Haller (1708–1777), who presumed the functional equality of every part of the brain, were familiar to those of J. Frank. However, J. Frank also studied and discussed the principles of Franz Joseph Gall's (1758–1828) organology. Gall proposed that the cerebrum is composed of different functional regions; each was associated with a different faculty of mind. Moreover, Gall suggested that he could identify these regions by correlat-

ing bumps and depressions on the skull with natural behaviours such as vanity, worshipping, stealing, etc [17]. J. Frank criticised Gall's doctrine in 1801 in Vienna, stating that "although some of these facts seemed to be important, but neither strong nor abundant enough to form a system" [4]. It seems that these theories were not of great importance to J. Frank, as they did not change the available treatment strategies.

J. Frank did not follow a single system of medicine. His principles on the perception of diseases, clinical methods and treatment strategies revealed an eclectic mix of Hippocratic medicine, vitalism, common sense and experience-based observation. For example, when J. Frank became an Extraordinary Professor at the University of Pavia in 1795, he declared his principles during his first lectures of special therapy:

I have chosen vitalism (*la doctrine des forces vitales*), based on the medical system of Stahl and Friedrich Hoffmann and developed by Cullen, Brown, and Hufeland; however, we should never forget that the human body is also dependent on mechanical and chemical laws (...). Finally, these principles should be followed to the extent that they are consistent with experience [4].

More than 40 years later, J. Frank once more confirmed his principles when addressing a meeting in Pisa in October 1839 with scientists. During the first session of medicine, J. Frank announced a 500-franc prize for the best thesis on Hippocratic medicine (*de la médecine hippocratique*). The dissertation, according to J. Frank, should "clearly define Hippocratic teachings and note the most prominent Italian scholars who followed Hippocrates and his basic principles: observation, experience, and common sense" [4]. It is obvious that J. Frank applied the same principles to diagnosing and treating nervous system disorders.

The perception of apoplexy by J. Frank was almost the same as that of his contemporaries. J. Frank, describing apoplexy in his textbook, omitted the sudden loss of consciousness, which was an essential part in the ancient definition. J.P. Frank and his son both established correlations between clinical features and pathological findings. For example, J.P. Frank increased the numbers of pathological autopsies of the "unhappy victims" of various incurable diseases, rare conditions and cases that were "obscure even to the practiced eye of experienced physicians" at the General Hospital of Vienna; he also established a pathological museum there [18]. After J. Frank arrived in Vilnius, he and his students performed autopsies of patients who were treated at the Vilnius Clinic and subsequently became deceased [3], while most of the relatives of his private patients and nobility rejected autopsies [4].

However, J. Frank mainly reported haemorrhage in the brain and spinal cord for the deceased patients with apoplexy. Even though he mentioned softening in the thalamic area, pathological cavities in the hemispheres, or a carotid artery obstruction as other potential causes of apoplexy, it is not clearly known whether the novel theory of cerebral softening (*ramollissement cérébral*) and the treatise *Recherches sur le ramollissement du cerveau* (“Researches on the Cerebral Softening,” 1819) by Léon Rostan (1790–1866) [19] were really known to him.

J. Frank emphasised that psychological stress or mood disorders (the loss of savings and melancholy in Briôtet’s case and a trade crisis in Reyzer’s case that were presumed to have triggered their symptoms) could promote apoplexy and even induce a bad outcome. Many of the patients, except for J. Frank’s father, who presented with speech disorder, facial asymmetry and weakness of the right arm, and hemiplegic merchant Reyzer, did not have the focal neurological deficits. Only the classical symptom of apoplexy, which is a sudden onset of the disease, was described for all of his patients. Furthermore, we cannot completely exclude that these symptoms could have been due to other diseases (for example, global amnesia for Briôtet or probable secondary meningoencephalitis for the printer). Still, identifying the nature of the described diseases is not the aim of this study, as retrospective diagnoses are speculative, could be inaccurate, and tend to be representational of more modern ways of thinking [20].

Bloodletting had been the primary treatment for apoplexy since Greco-Roman times. Although the main cause of apoplexy in the beginning of the 19th century was no longer recognised as an imbalance of the four humours, therapeutic options of bloodletting, purging, and promotion of sweating were still proposed as interventions that formerly served to correct these humoral imbalances. As bloodletting cannot cure a paralysis or overcome commu-

nication disorders, it can still have limited therapeutic effect by decreasing blood pressure and risk of more haemorrhaging, and reducing the patient’s agitation [21].

Conclusions

In the beginning of the 19th century in Vilnius, apoplexy was understood to be the result of an experienced psychological stress, overwork and lack of a healthy lifestyle. The main cause of apoplexy was no longer considered an imbalance of the four humours, but rather the pathology of cerebral blood vessels. However, following ancient tradition, the principles of recreation and moderation were thought to be important for the prevention of apoplexy, and bloodletting and diet were believed to be essential for treatment.

J. Frank’s conception of apoplexy was almost the same as that of his contemporaries. Moreover, he was neither original nor did his writings have a significant impact on European medicine. However, J. Frank, being a medical professional, an organiser, a reformer, a founder of clinics, institutes, and medical societies, was an emissary of enlightened medicine, and improved the diagnosis and treatment of apoplexy and other nervous system diseases in Vilnius.

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References

- 1 Bumblauskas A, Butkeviciene B, Jeglevicius S, Manusadzianas P, Pšibilskis V, Raila E, et al: *Universitas Vilnensis 1579–2004*. Vilnius, Spauda, 2004.
- 2 Andriušis A, Rimševičienė A: The beginnings of institutionalized medical sciences at Vilnius University: from Vilnius Medical School to Collegium Medicum (1775–1781); in Andriušis A (ed): *Vilniaus Medicinos Istorijos Almanachas*. Vilnius, Medicina Vilnensis, 2006, pp 17–25.
- 3 Kondratas RA: Joseph Frank (1771–1842) and the Development of Clinical Medicine. A Study of the Transformation of Medical Thought and Practice at the End of the Eighteenth and the Beginning of the Nineteenth Centuries. Harvard University, 1977.
- 4 Frank J: *Mémoires Biographiques de Jean-Pierre Frank et de Joseph Frank son fils*. Leipzig, 1848.
- 5 Storey CE, Pols H: A history of cerebrovascular disease. *Handb Clin Neurol* 2010;95:401–415.
- 6 Schutta HS: Morgagni on apoplexy in *De Sedibus: a historical perspective*. *J Hist Neurosci* 2009;18:1–24.
- 7 Cooke J: *A Treatise on Nervous Diseases*. Boston, Wells and Lilly, 1824.
- 8 Frank J: *Praxeos Medicae Universae Praecepta. Partis Secundae Volumen Primum, Sectio Prima*. Lipsiae, Sumptibus Bibliopolii Kuehniani, 1818.
- 9 Frank J: *Acta Instituti Clinici Caesareae Universitatis Vilnensis. Annus Primus*. Lipsiae, Impensis Bibliopolii Schaeferiani, 1808.
- 10 Prašmantaitė A: Jozefas Frankas ir jo “Atsiminimai”; in Frankas J: *Vilnius XIX amžiuje. Atsiminimai*. Pirma knyga. Vilnius, Mintis, 2013, pp 5–19.

- 11 Frank J: Pamiętniki d-ra Józefa Franka Profesora Uniwersytetu Wileńskiego. Wilno, Druk Józefa Zawdzkiego, 1913.
- 12 Frankas J: Atsiminimai apie Vilnių. Vilnius, Mintis, 2001.
- 13 Frank G: Memorie I. Milano, Cisalpino-Istituto Editoriale Universitario, 2006.
- 14 Sakalauskaitė-Juodeikienė E, Jatužis D: Nervous system disorders and mental diseases presented in "Memoirs" by Joseph Frank. *Neurologijos seminarai* 2015;66:296–307.
- 15 Karenberg A: Cerebral localization in the eighteenth century – an overview. *J Hist Neurosci* 2009;18:248–253.
- 16 Clarac F, Boller F: History of neurology in France. *Handb Clin Neurol* 2010;95:629–656.
- 17 Finger S: The birth of localization theory. *Handb Clin Neurol* 2010;95:117–128.
- 18 Frank JP: Biography of Dr. Johann Peter Frank, Imperial and Royal Court Councillor, Hospital Director and Professor of Practical Medicine at the University in Vienna, Member of various learned Societies. Trans. from the German by G. Rosen. *J Hist Med Allied Sci* 1948;3:11–46.
- 19 Poirier J, Derouesné C: La neurologie à l'assistance publique et en particulier à la Salpêtrière avant Charcot. *Rev Neurol (Paris)* 2000;156:607–615.
- 20 Karenberg A, Moog FP: Next emperor, please! No end to retrospective diagnostics. *J Hist Neurosci* 2004;13:143–149.
- 21 Rosenberg CE: The therapeutic revolution: medicine, meaning and social change in nineteenth-century America. *Perspect Biol Med* 1977;20:485–507.