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Myocardial Infarction and Angina Pectoris in the History of Medicine on the Polish Soil

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1. Introduction

This tale concentrates on a fatal affliction that has been permanently associated with human fate since time immemorial, well before *Homo sapiens* were even consciously aware of their existence.

Incidentally, circulatory failure might have developed in the course of various severe diseases, cardiac defects, septic conditions, severe injuries; what is more – it could have been apparent in all age groups. Theoretically, the disease had every chance to have been noted much earlier in the history of mankind than for example ischemic heart disease and the observers might have been our primogenitors-medicines who were blessed with a keen perceptiveness of the rules of nature. Circulatory failure later started to reveal itself only when human life became long enough to allow for natural death to occur, i.e. the demise resulting from biological ageing of the organism could have gained prevalence over the then domineering causes of death: the ever-present homicide in the fight for survival, traumas and infections.

If it comes to that, circulatory failure could be ultimately blamed for natural deaths of the majority of human beings for millions of years. Yet, this is not the point – the point is the history of rational recognizing and well thought-out attempts at treating the disease that in its nature is the expression of an upset balance of the circulatory system. Here we need to assume that in the history of medicine, the form of circulatory failure being a consequence of non-cardiac diseases, or in other words a simple circulatory complication of another, inevitably fatal disease, could not have been differentiated by ancient physicians from primary ailments of the cardiovascular system.

In the practice of a historian of medicine, it is much simpler to pick out from historical texts information on the terminal stage of – say – coronary heart disease with its drastic incidents of pain than to find reports on mundane deterioration of health, gradual waning of life amidst not quite spectacular symptoms (with some exceptions, though) that were treated as a natural end of life. It is worthwhile, then, to start with such evident descriptions of a severe heart disease, where we also can find properties pointing to circulatory failure. Indeed, the very *circulatory failure* as an ailment with which ancient physicians could not successfully cope, always had to end with the demise of a patient that was treated as the so-called “natural death”.

Throughout the period when – through partitions – Poland was robbed of existing as an independent nation, in the years 1795-1918, the Polish soil became the home country of

numerous illustrious Europeans of various nationalities; here, the history of medicine was developed not only by native Polish nationals. We should remember about their ties with the country, which - by choice or by chance - become their home. In this context, the present paper describes Silesians – Bishop Thomas of Wrocław or A.Ch. Thebesius - in the case of which there are no grounds to count them as members of the Polish society.

On the other hand, Polish scientists who made great contribution to the development of world medicine in the 19th century, but had no home country, were often customarily treated as nationals of the occupant countries. Many of those scientists form a group of obscure research workers – unknown to the public at large not only due to lack of national separateness lasting for more than a century (e.g. Józef Chrzczonowicz, Jan Cenner, Andrzej Janikowski, Józef Rompalski, Napoleon Cybulski, etc.), but also because they most commonly described their achievements in the Polish language, unknown to the universal milieu of great scientists and discoverers (Józef Pawiński, Władysław Biegański, Walery Jaworski, Józef Latkowski, etc.). The times have changed, but recalling the nationality of those individuals and at the same time, their contribution to the development of medicine is our duty, although we live in a different reality, in the common and peaceful Europe that unites many nations and respects national differences. The above arguments justify recalling the history of *angina pectoris* in a central-eastern European country, since scientists who lived there years ago deserve to be remembered.

2. Polish medicine in the Middle Ages

It is impossible to discuss the history of understanding and treating coronary heart disease and myocardial infarction in Poland in separation from the ancient history of world medicine – the former was a part of the latter, albeit very small, although it had a chance of existing on the Polish soil only in the Middle Ages.

We know well that the oldest inscriptions, the content of which may be related to symptoms of coronary heart disease were found as early as in ancient Egyptian papyruses written approximately 3500 ago, in notes from the Middle or Far East, shrouded in mysticism, prejudice and scientific helplessness, or in the legacy of the Mediterranean medicine. We are not certain as to the character of the described ailments; we do not know whether the authors were indeed writing about the signs of *angina pectoris* and myocardial infarction.

Hydrops, undoubtedly associated with circulatory failure, cardiac disease and – indirectly – also with coronary disease and its consequences, was treated since the ancient times (Egypt, Greece) with sea onion (*Urginea maritima*). In the Middle Ages, in central and eastern Europe, lily-of-the valley (*Convallaria majalis*) was used to achieve the same purpose. With the exception of these examples, in those times, we will not find any more interesting descriptions of therapeutic concepts that might refer to heart diseases. In the dark and scholastic Middle Ages or even at the time when Renaissance sciences flourished, we still see no progress. With respect to diagnosing and understanding the nature of heart diseases, the situation was similar if not grimmer. Only the turn of the 16th and 17th centuries did bring some break-through.

Along with the considerably dubious progress of medicine in the Middle Ages, medical thought was slowly and timidly developing in Poland as well. As in the entire European medicine of those times – although with infrequent exceptions – also in Poland there was not a single attempt made at searching for a cause of death resulting from heart ailments.

Possibly only the text on heart diseases included in a fairly well known in Medieval Europe manuscript entitled *Practica Medicinalis*, which was written on the Polish soil, is worth

mentioning as an exception in the medicine of the Middle Ages. Its author was Thomas of Wrocław, the Titular Bishop of Sarepta.



Fig. 1. Bishop Thomas of Wrocław (1297 - ca. 1378)

Most likely, he came from Silesia, studied medical sciences in Montpellier, Salerno, Padua, and Bologna, and was well-travelled. Later, already as a well-acclaimed scientist, he was invited as a lecturer to the universities of Paris, Montpellier and Oxford. He was a physician to Pope John XXII, Prince Henryk IV and Czech kings: John of Luxembourg and Charles IV (Skalski & Stembrowicz, 2004). The history of cardiology and the works of Bishop Thomas are associated through one of 202 chapters of this manuscript entitled *De syncopi et debilitate cordis* – the text discusses “disability”⁽¹⁾ of the heart, palpitations and the resultant syncope. This was the first Polish dissertation referring to the heart and possibly the first work worldwide that observed an association between loss of consciousness and disturbances in cardiac action. We are not certain what is meant by some sentences. To give an example: “...there appears a malevolent attribute of cold, horrible for the heart (...). This is supported by the heart’s weakness, while its movement is turned into torment. And thus, disability of the heart ensues promptly. And when indeed a fainting spell is prolonged and movement and sensation in the body are lost, death occurs most frequently” (Stembrowicz, 1994).

A lot is left to the imagination of the reader, as well as to the translation of the convoluted and highly scholastic text, abounding in philosophical adornments. In free translation and interpretation, the above quoted fragment might be easily regarded a description of a severe heart disease...

In the 16th century Poland, the level of medical sciences - represented solely in Krakow - was relatively low. Here, the physiological interpretations of Hippocrates, Galen and Avicenna were still upheld. Nevertheless, we could risk speaking about the beginnings of a genuine Polish interest in anatomy and physiology. Numerous works were written by native authors, where they demonstrated associations between the heart and vascular system. Among them, a treatise of obstetrics by Piotr Cziachowski (1620) should be mentioned, with its chapter on *Heart beating and fainting spells in the pregnant*. The chapter contains a fragment, where the author – somewhat clumsily – attempts to explain the cause of weakness and fainting spells by cardiac dysfunction.

¹ „debilitas” may be translated as weakness, feebleness, insufficient function, debilitation, or – in a completely free translation – disease.



Fig. 2. Case consultation for a severely ill patient. Armorial published in Krakow, 1568 (authored by Marcin Siennik).

Many a century has passed since Aulus Cornelius Celsus (53 B. C. – 7 A.D.), a scientist, naturalist and encyclopedist and a considerable Roman intellectualist, drew attention to a prognostic importance of edemas, thus becoming the discoverer of water balance disturbances. For the sake of understanding circulatory failure, we should remember that the works of Celsus most likely contain the first accurate diagnostic indication, medical order and an attempt at establishing a diagnosis, all of them previously unheard of. Namely, in a patient with hydrops, he recommended: "...one should cautiously measure the belly using a thread and in this way pay attention to its size; thus, one sees whether the belly is more or less extended. If the belly is smaller, it means the medications acted beneficially. One should also calculate the amount of fluids given to the patient and the amount of urine he passes. If the patient passes more urine than the volume of fluids he drinks, one may hope for his recovery".

Only in the 16th and 17th centuries did physicians again take interest in edemas and hydrops; many a decade had to pass until in the 18th century, they slowly started to also perceive an association between the above signs and cardiac dysfunction, although the

cause of hydrops could be indeed diversified. In this respect we also should mention a work by a Polish author, Jan Innocenty Petrycy - *De hydrope*, based on which he sought incorporation to the Krakow Academy, which was effected on April 2, 1620. This interesting dissertation has become a part of the world medical literature as one of the first reports in this field (Skalski, 2009).



Fig. 3. Jan Innocenty Petrycy (?-†1641)

In keeping with the rules of the then practiced medicine, in case of hydrops, to eliminate edemas, abdominal puncture and drainage were recommended. For three consecutive centuries, this was a commonly employed method of – as we would say today – symptomatic treatment of the effects of circulatory failure, and thus also of severe coronary disease. The method somewhat lost its relevance when digitalis was introduced at the end of the 18th century, but it persevered in the 19th century, and in a modernized form – until the contemporary times.

Chest pain was still associated with a mysterious and malevolent disease of unknown etiology. No one could pinpoint the source of pain and ascertain whether it originated in the respiratory tract, lungs, heart, vessels, esophagus or the cardia. And the patient, with his unskilled and naïve accounts, could not provide any leading clues to the embarrassed and oftentimes opinionated physician, since there was a common lack of understanding of the nature of such ailments. After all, in Latin, the term “*cardia*” denotes the part of the stomach attached to the esophagus... In 18th and 19th-century dictionaries, “*cardiacus*” means either “cordial” or a remedy against ailments involving the heart and stomach, while pain felt in this area is termed “*cardialgia*” (Richter, 1671).

3. The discovery of coronary artery disease and myocardial infarction

Many of my Colleagues who are reading this chapter now may find unbelievable that in this central and eastern part of Europe, most likely for the first time ever in the history of medicine, atherosclerotic lesions involving the coronary arteries, possibly a direct cause of death of the autopsied patient, were observed. A physician who made such an observation was Adam Christian Thebesius, who described – if not the first, then surely as one among the first physicians – “ossification” of coronary arteries. This was the term he used then to denote coronary arteriosclerosis. Although he did not use the Polish language, was German, and – to be more precise – his home country was simply Silesia, where he spent almost his entire life and worked, I am mentioning his name with a degree of satisfaction, recalling his ties with the Polish soil.



Fig. 4. Adam Christian Thebesius (1686-1732)

Thebesius was one of the most eminent students of heart anatomy, in particular a pioneer of studies on coronary circulation, an expert in the anatomy of coronary vessels and the first to describe their anomalies. Such terms as the “Thebesian veins” and the “valve of Thebesius” are commonly known in the anatomical nomenclature of the heart and recognized in the entire contemporary medical world.

Born in Lower Silesia, Thebesius studied in Leipzig, Halle and Leiden. When 22 years old, in 1708, in Leiden, he was conferred the title of doctor of medical sciences based on his innovative dissertation on coronary circulation entitled *Disputatio medica inauguralis de circulo sanguinis in corde*. Having intentionally given up all his university positions and honors, he settled in Jelenia Góra. Six years later, in 1714, he was entrusted with an honorable position of a "city physicist" (an equivalent of a municipal physician), which he held for 20 years. He died at the age of 47 years due to pneumonia that developed in the course of asthma (Domosławski, 1967, Skalski & Kuch, 2006).

An eminent place in development of the history of ischemic heart disease is occupied by Giovanni B. Morgagni (1682-1771), the founder of clinical anatomopathology. Morgagni searched for and managed to find lesions involving various organs that were the cause of a disease or death. In 1761, he published a splendid work consisting of letters-articles, mostly case reports, entitled *De sedibus et causis morborum per anatomen indagatis libri quinque*, or, in other words, five volumes focusing on location and putative causes of diseases. In some of Morgagni's "letters" we can easily find descriptions of angina pectoris. In a woman who died presenting with chest pain and dyspnea, he described in the autopsy protocol numerous ossifications involving the aorta and arteries branching off from the aorta.

The knowledge of anatomy of the coronary vessels and the observation of pathological lesions, even when they were encountered incidentally, in a natural way inspired physicians to searching for causative associations between the observed lesions and intravital clinical signs, especially with chest pain. However, in the 18th century, the knowledge of coronary vessel anatomy reached a relatively high level. At long last, there came the time for a genuine "discovery" of ischemic heart disease and myocardial infarction. The discovery of a "new or hitherto unknown disease", as it was referred to, crystallized into certainty; its authors were two physicians, who independently published their observations in 1768: Nicolas Rougnon de Magny (1727-1799), a physician from France, and William Heberden (1710-1801) – a British doctor. The discovery was of a grave importance. Although it was Rougnon who used in his report the strongly put term "a hitherto unknown disease" to describe coronary disease, yet it was not Rougnon, but Heberden who was and is still associated with the "discovery" and for long years to come, as late as in the 19th century, the condition was called "Heberden's disease" (Willius & Dry, 1948).

On July 21, 1768, Heberden presented his memorable lecture during a meeting of the Royal College of Physicians in London entitled *Some account of a disorder of the breast*. In addition to a fairly accurate presentation of the course of the disease and the character of complaints, the paper described the helplessness of a physician with respect to possible treatment, presenting a pessimistic attitude and a sense of resignation. (Pawński, 1908; Willius&Dry, 1948; Stembrowicz, 1987)

4. "Angina pectoris" in the oldest Polish literature

For the subsequent several score years, in the atmosphere of therapeutic nihilism and - to put it mildly - lack of optimism as to the proposed treatment, in various parts of Europe, and obviously also in Poland, there appeared scientific reports. Within a few years, the new disease entity was accepted by the medical world, what is not tantamount to all physicians acknowledging it without a grain of salt (Ruciński&Skalski 2004). The then concept of a patient suffering from some general "chest breathlessness" was too deeply rooted, and the very "breathlessness" was understood in a different way, oftentimes based on prejudice, fanciful diagnoses that today evoke a snicker of tolerant irony.

On the Polish soil, the harbingers of recognizing *angina pectoris* appeared relatively early, but obviously not immediately. In this very spirit a young physician from Vilnius Józef Chrzczonowicz (1790-1823) wrote in 1812 his doctoral dissertation entitled *Dissertatio inauguralis medica de angore pectoris* ⁽²⁾. Chrzczonowicz, a student of Józef Frank (1771-1842), himself an eminent and well-educated clinician, described in his thesis not only the signs of the disease, but also autopsy results of patients who died of angina pectoris. Chrzczonowicz was a very young physician when he submitted his doctoral dissertation, he was only 22 years old and had received a diploma only two years before (Chrzczonowicz, 1812).

Referring to W. Heberden and J. Forthergill, he reported that during autopsies one could observe ossification of the heart, coronary arteries, aorta and semilunar valves; incidentally, most likely he himself neither performed postmortem examinations nor participated in autopsies. Against all common beliefs, he stated that the disease was rather common, mostly affected elderly males, was less often encountered in females and seen mostly in postmenstrual women. The author of the dissertation performed a differential diagnosis of four - in his opinion easily mistaken - conditions: angina pectoris, "periodic breathlessness" [author's note - bronchial asthma], nightmare (!) and fainting spells. Among numerous clinical observations, his descriptions of pain reported by the patients are the most accurate: "pain situated in the lower sternum, extending to the back, ears and through the upper extremities, sometimes involving the hand".

Eight years later, a doctoral dissertation with a title similar to that used by Chrzczonowicz was submitted by a young Cracovian physician Jan Cenner. The doctoral exam open to the public took place in the Jagiellonian University on July 14, 1820 (Chrzczonowicz, 1812; Cenner, 1820).

Cenner lacked support of an experienced supervisor and thus his situation was much worse than that of his older colleague from Vilnius, Chrzczonowicz. Undoubtedly, the supervisor of the latter, the above mentioned Józef Frank, could have much more effectively helped the candidate for doctor's degree both by shaping the idea underlining the dissertation and by his professional expertise. The Krakow university was somewhat behind the Vilnius school, and the professors working with Cenner were unquestionably less experienced in recognizing and treating heart diseases.

In the work of Cenner, similarly as in the case of Chrzczonowicz, the majority of what could be deemed novel was transferred from the cited bibliographical items. Even so, the dissertation prepared by Cenner seems to be an almost encyclopedic listing of medical knowledge on angina pectoris in the early 19th century (Śliwiński, 1976).

Cenner reported as a reliable and verified piece of information that autopsies performed in patients with angina pectoris demonstrated "calcification" of the coronary vessels, walls of large arteries and heart valves. Yet, while reading his text, we have an impression that the said ossification of vessels is treated as a curiosity rather than a sign of the principal nature of the disease. Some of the proposed medical measures seem today bizarre and incomprehensible, others have some deeper meaning, since through a cascade of physiological phenomena they triggered they might have helped the patient to some degree. Our attention is drawn to the use of digitalis and opium. In addition, Cenner's dissertation discussed numerous therapeutic measures, the use of which seems justified today and testifies to a brilliant intuition of physicians practicing the profession at that time. To use some examples, recommendations proposed in those days included snakeroot

² the Latin term „angor“ denotes both suffocation, breathlessness, anxiety and fear.

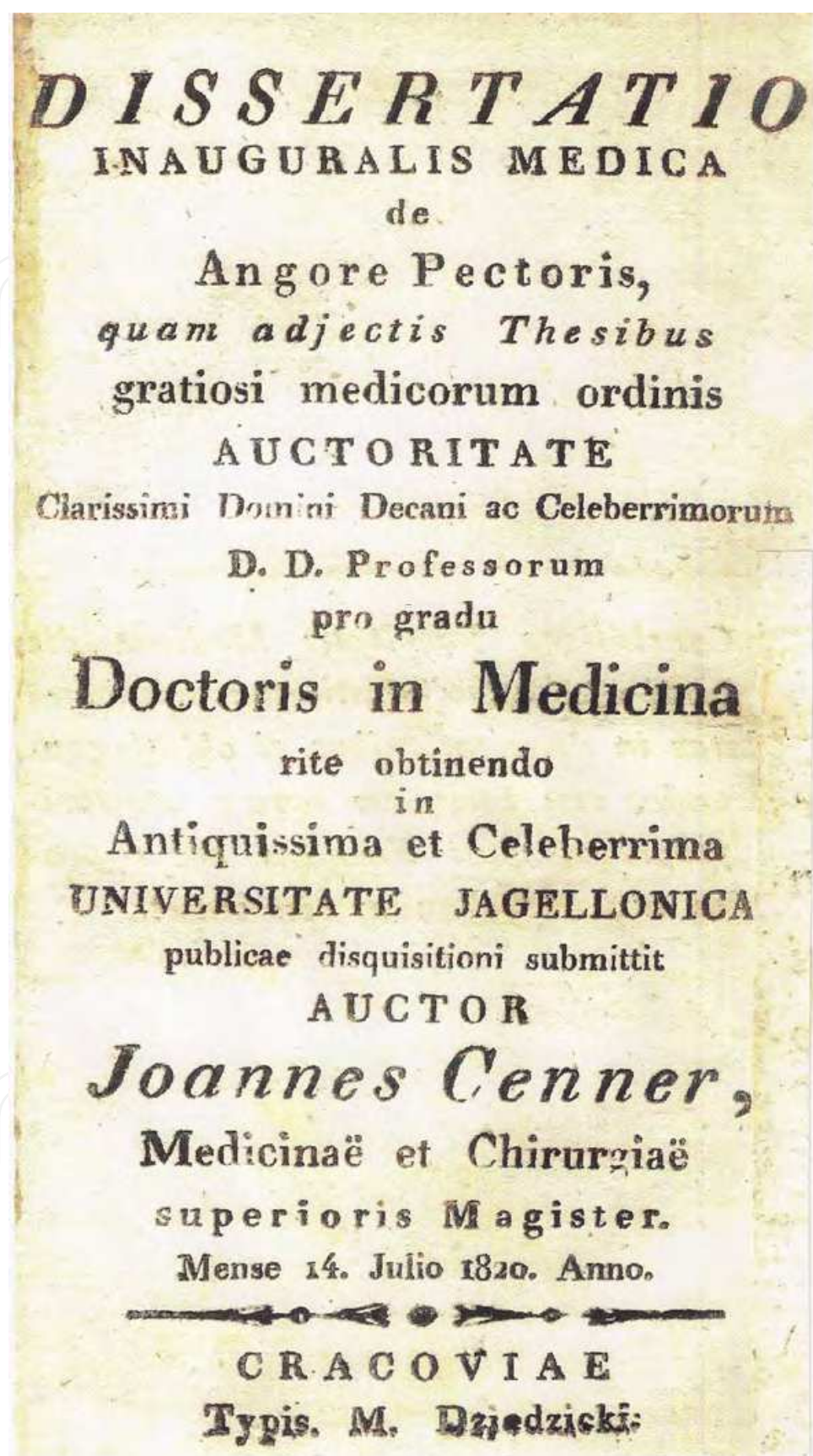


Fig. 5. The title page of Jan Cenner's doctoral dissertation entitled "De angore pectoris".

(*Rauvolfia serpentina*, with its anti-arrhythmic, hypotensive and anxiolytic effects), angelica (a spasmolytic and diuretic agent, today known to contain a calcium channel blocker), magnesium salts (anti-arrhythmic), potassium carbonate (a donor of potassium ions), Peruvian cinchona bark (its alkaloids quinine and quinidine show an anti-arrhythmic effect), henbane bell (a relaxant effect, e.g. in bronchial asthma) or calcium carbonate (as a donor of calcium ions). In contrast to the above mentioned medications, numerous agents are simply bizarre and their use may be today regarded erroneous and irrational, since they include poisons posing the patient's life at risk, such as copper and gold salts, calomel, cinnabar, hemlock, laurel water (it contains an ingredient that is degraded into hydrogen cyanide!); some irritating agents for external use are also unfounded.

Still others represent long-forgotten medications with anxiolytic, relaxing and analgesic properties (musk, castoreum, asafetida, stink lettuce, leaf stems of bittersweet, etc.) and dehydrating effects. What is striking in addition to numerous recommendations associated with hygiene and diet, is attention to fluid balance ("large amounts of fluids, tea, coffee are contraindicated...") and medical advice to avoid alcohol and other condiments (Skalski et al., 2003).

The problem of angina pectoris returns in the Polish medical literature only after another 24 years, and thus we see that the subject was not then counted among issues being particularly fashionable. A rather interesting case report by Andrzej Janikowski, Chairman of the Warsaw Medical Society, described *angina pectoris* diagnosed intravitaly in a patient, in whom the antemortal diagnosis was confirmed on autopsy. Janikowski's article entitled "Ossification of coronary arteries of the heart", although short, is, nevertheless, the first Polish report based on modern scientific pragmatism and at the same time written in keeping with the principles of clinical pathology, with a postmortem confirmation of the diagnosis (Janikowski, 1844).

4. The lifetime diagnosis of the myocardial infarction

In 1850, the *Tygodnik Lekarski* [the Medical Weekly] published a paper by Józef Rompalski on angina pectoris ("Heberden's asthma, *angina pectoris*, *stenocardia*, etc."), where the author described a death of a patient who had presented with unmistakable signs that might have resulted solely from a completed myocardial infarction. Thus, we acknowledge the report by Rompalski as the first Polish description of myocardial infarction, despite the fact that the patient was not autopsied. The paper is in its entirety based on a case report describing a 69-year old male who suffered from periodic chest pain and chest 'squeezing' "below the sternal bone". The pain was explosive and crushing in character and radiated through the left neck to the left shoulder and elbow; the respiration of the patient was "depressed and restless". Another episode, which occurred two months later, lasted 15 minutes and was more intensive than the first one. The third, 30-minute attack preceded a series of rapidly repeated episodes, which the patient failed to survive.

Based on the reported case, Rompalski presented his knowledge of the causes of the disease he was aware of: "The discussed disease is typical for the second half of human lifespan, being rarely encountered before the 40th or 50th year of age (...) amidst the most prettily blooming health, it terrifies its victims. Its duration is very changeable and the end almost always fatal (...). Almost at all times, more or less complete ossifications are found involving the coronary arteries, along with injuries of the aorta, thickening, ulcerations and calcifications of this great artery" (Skalski, 2004).

A whole century had passed since the publication of the landmark paper by William Heberden on angina pectoris until myocardial infarction as its most severe complication was diagnosed in a living patient based on clinical presentation.

The first such intravital diagnosis was established by an Austrian physician Adam Hammer (1818-1878) in 1878. He described a case of a coronary embolism in a 34-year old male diagnosed when the patient was alive and subsequently confirmed by autopsy. The patient died manifesting signs of cardiogenic shock, pronounced bradycardia, but immediately before death, he did not complain of stenocardiac pain. The autopsy demonstrated a complete occlusion of the left coronary artery ostium caused by a thrombus, which filled the entire right coronary sinus of Valsalva (Lie, 1978).

Nine years later (1887), a Polish physician, a phenomenal clinician and a great scientist, Professor Edward Sas-Korczyński published in Krakow a paper aptly entitled "Coronary artery embolism (*Embolia arteriae coronariae cordis*) diagnosed in a living patient". The report discussed a clinical course similar to that observed by his Austrian predecessor. Unfortunately, the article by Korczyński, published in his native language, remained virtually unknown in the world and was rarely quoted in the literature worldwide. A pity, though, since the unique character of the observations, extraordinary scientific inquisitiveness, conscientious clinical description (the total number of pages in the report equaled 9) and finally, a thoughtfully selected bibliography place the work of Korczyński among the most important clinical reports in the world of the 19th century (Korczyński, 1887; Pamiętniki Jubileuszowy..., 1900).

The report by Korczyński, predominantly based on clinical aspects, had preceded a publication dated 1910 and authored by W. P. Obrastzow and N. D. Straschesko of Kiev, which – as it should be truthfully said – provided a precise description of a clinical presentation of a coronary embolus (myocardial infarction) and for this reason is believed to represent a break-through in the field (Obrastzow & Staschesko, 1910).



Fig. 6. Edward Sas-Korczyński (1844-1905)



Fig. 7. E. Korczyński's paper "Coronary artery embolism (*Embolia arteriae coronariae cordis*) diagnosed in a living patient", 1887.

Also the intravital diagnosis of myocardial infarction established by George Dock, an eminent American scientist, being the first such diagnosis recorded in the United States (1896), happened much later than in Europe and nine years after the publication of Korczyński's report.

The immense importance of Professor Korczyński's paper was recognized by a humble Polish internal medicine specialist from Częstochowa, Władysław Biegański, in his textbook (*Differential diagnosis of internal diseases*, 1st edition dated 1891, page 115): "An embolus of one of the major branches of coronary arteries results in an almost instantaneous death. Diagnosing such an embolus intravitaly is possible only in certain extremely favorable circumstances. The literature basically reports only two cases of coronary artery occlusion that were diagnosed in a living patient, namely the one described by Hammer and the other – by Korczyński. In the former instance, the occlusion occurred relatively slowly, resulting from a thrombus situated over the semilunar valve and the patient survived for more than 24 hours; in the latter, death occurred within less than 10 minutes, while Professor Korczyński was present in the Department" (Biegański, 1891).



Fig. 8. Władysław Biegański (1857-1917)

Increasingly more often, physicians-practitioners attempted to confirm their diagnoses of angina pectoris by postmortem examinations. They sought lesions involving coronary vessels, more consciously associating necrotic foci of the cardiac muscle with consequences of ischemic heart disease. "Myocardial infarction" was becoming a new diagnosis, not only from the anatomopathological, but also clinical point of view. Pioneering reports in this field also include an early but exquisite paper on myocardial infarction by Józef Pawiński of Warsaw, published in 1883 in the "Gazeta Lekarska" [the Medical Newspaper] and entitled "Coronary artery stenosis and occlusion – a physiological, pathological and clinical view". Pawiński was most assuredly the father of Polish cardiology, its founder on the Polish soil; at the same time, he was a historian of medicine with inclinations towards the humanities; moreover, he deserves the title of a "philosopher of medicine". He was highly valued for his knowledge of pathology and treatment of heart diseases also outside the country (Skalski, 2008).

In 1908, Pawiński wrote in the *Pamiętnik Towarzystwa Lekarskiego Warszawskiego* [the Memoirs of the Warsaw Medical Society]: "Not only in the history of mankind, but also in

the history of medicine do we find issues that - if we are to understand them precisely - require our going back several centuries. What I mean here is the gradual development of the symptomatology and pathogenesis of *angina pectoris* before Heberden, who in 1768 was the first to present a thorough description of the ailment as a pathological entity and the first to call it *angina pectoris*" (Pawiński, 1908).

Unfortunately, the patients still could not have been offered effective therapy and this was true both for coronary disease and myocardial infarction. Some knowledge was available on the fact that a hygienic lifestyle may prevent episodes of *angina pectoris* or on how to alleviate pain and thus, even in this modest way, increase the chances of the patient to survive the attack. Thus, opium was employed, along with its derivatives, herbal remedies continued to be recommended due to their anxiolytic, spasmolytic, diuretic and relaxing properties, as well as digitalis and various salts - potassium carbonate, calcium carbonate, magnesium compounds. The turning point in treatment of *angina pectoris* attacks was the introduction of nitrates. In 1867, a British physician Thomas Lauder Brunton (1844-1916) introduced *Amylium nitrosum*, a medication whose beneficial relaxing properties are unquestionable (Fye, 1986).



Fig. 9. Józef Pawiński (1851-1925)

Nevertheless, a large-scale employment of nitrates commenced after a British pharmacologist William Murrel (1853-1912) published in 1878/1879 a paper on his experience in using glyceryl trinitrate. Almost immediately after Murrel's report appeared in print, nitroglycerine was introduced in Krakow by E. Korczyński. As soon as only two years later, in 1881, he published his clinical observations of the use of the pharmaceutical. Based on experiments performed jointly with Michał Janocha, Korczyński introduced nitroglycerine to everyday clinical practice, on a large scale at that. He administered 1-6 drops of the drug and observed its effect on the circulatory system that lasted from 3 to 45 minutes, with the most pronounced effect occurring within 3-15 minutes. He described a simultaneous effect exerted on the nervous system and manifested - as reported by the patients - as a sense of warmth appearing inside the head and problems with attention focusing. These are the words Korczyński used while writing about nitroglycerin: " (...) nitroglycerin is a medication which promptly, strongly and almost completely eliminates attacks of stenocardia (...). Most likely, it is also a potent drug that relieves heart palpitations that developed for any reason. If stenocardia or palpitations have no anatomical

grounds, nitroglycerin is capable of completely curing these ailments. In stenocardia with aneurismal background, nitroglycerin is capable of not only temporarily eliminating the attacks, but in rare cases it may to some degree prevent such an attack" (Korczyński, 1881).

In the early 20th century, together with the first experiments with the use of an electrocardiograph developed by Willem Einthoven (1903), the era of increasingly effective clinical diagnostic management began.

In 1912, James Bryan Herrick (1861-1954) of Chicago stated that using the apparatus, one might intravitaly establish a firm diagnosis of myocardial infarction and thus autopsy ceased to be the only method of confirming the disease. Indeed, seen from the perspective of the last century, in the history of cardiology, the papers by Herrick should be considered crucial. The possibility of intravital diagnosing myocardial infarction has provided medicine with a chance to modify the available therapy, change general management principles, and finally allowed for determining the prognosis and decrease mortality rates (Herrick, 1912, Acierno & Worrel, 2000).

Subsequent pioneering observations on electrocardiographic diagnosis of myocardial infarction were made by Harold Ensign Bennet Pardee (1886-1973) of New York. In 1920, he presented examples of patients-survivors with a history of myocardial infarction diagnosed based on characteristic ECG recordings (Kligfield, 2005).



Fig. 10. Napoleon Cybulski (1854-1919)

Poland was not left behind. Soon, the first electrocardiograph was installed in Krakow on the initiative of a Krakow scientist Napoleon Cybulski. Fascinated with the discoveries of Einthoven, Cybulski was the first Polish researcher who obtained in 1910 a recording of electric heart activity, so he is also a pioneer of electrocardiography in Poland (Skalski & Kuch, 2006). He founded a well-known in Europe center of physiological research, and a major part of his studies provided a significant contribution to the development of knowledge on the circulatory system on the international scale. His most important findings, which set foundations for sciences concentrating on arterial hypertension and led to further progress in clinical studies include Cybulski's discovery (jointly with Władysław Szymonowicz) of a substance found in adrenal glands that exhibited potent vasoconstrictive

and hypertensive properties (1894). The scientist called the substance in Polish "nadnerczyna" (from the term denoting the adrenal glands) and the name was translated into "adrenalin" (Cybulski, 1895).



Fig. 11. Józef Latkowski (1873-1948)

In Krakow, also for the first time, Józef Latkowski published a paper that described an ECG recording in pericardial sac obliteration (constrictive pericarditis). The same author presented in 1912 a report that was extraordinary considering it appeared in the initial phase of development of this diagnostic modality, namely "A demonstration of an electrocardiogram from a female patient with *dextrocardia vera*" (Śródka, 2004).

In 1903, Zdzisław Dmochowski published his splendid and extensive textbook entitled "Anatomopathological diagnostics". Obviously, we can find there a modern, reasonable and logical argument focusing on myocardial infarction. Let us quote a fragment: "A gradual growth of intravascular thrombi and their calcification finally lead to pronounced stenosis or a complete occlusion of the vessel. Other condition that causes a complete occlusion of coronary arteries is emboli (*embolia art. coronariae*). This phenomenon is relatively rare and

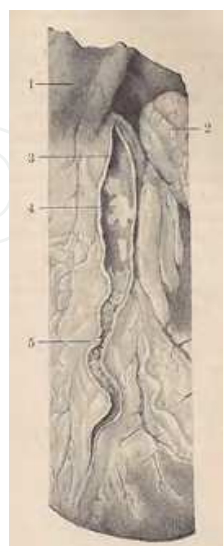


Fig. 12. A presentation of a completely occluded left anterior descending artery from the textbook by Dmochowski (1903).

usually is a complication of acute endocarditis. In such cases, the diagnosis is made based on detecting an embolus. Stenosis or a complete occlusion of coronary arteries strongly affects the cardiac muscle (...). Coronary artery embolus triggers the development of myocardial infarction" (Dmochowski, 1903). In this manner, in the above cited sentence, probably for the first time in the Polish medical literature there appears the term "myocardial infarction". As late as in 1920, the enforced in Europe *International Nomenclature of Diseases and Causes of Death adopted by the International Commission in Paris* (Mianownictwo chorób i przyczyn zgonów..., 1922) did not include "myocardial infarction" at all (it included only an "embolus, thrombus" – without providing information on the location and with the pathologies involving organs other than the heart), not even as the cause of death!



Fig. 13. Walery Jaworski (1849-1924)

In the well-known textbook "The science of internal medicine" edited by Walery Jaworski (Krakow, 1905), a well-executed and extensive chapter on heart diseases written by a student of Korczyński - Antoni Gluziński (1856-1935), a Lvov University, and since 1919 - a Warsaw University professor of internal medicine, also addressed myocardial infarction. Nevertheless, the chapter, 161 pages in length, devoted to myocardial infarction only (or possibly as much as) half a page. Gluziński stated: "Clogging the main coronary artery trunks (...) is the cause of sudden deaths. However, clogging of further situated branches is not as dangerous as it might have been inferred from preliminary experience, and much depends here on the prior status of the cardiac muscle. A consequence of clogging, if there is no sudden death, is the formation of an infarction (*infarctus*), which softens and the heart may rupture at the malacia site (*ruptura cordis*), or else the infarction is absorbed and a larger scar develops at the site (...)" (Gluziński, 1905).

A valuable, although small textbook *Diagnostic management of circulatory organ diseases* authored by a scientist from Lvov Marian Franke presented certain, at that time obligatory knowledge on "angina pectoris" and "cardiac asthma" in condensed, thus entitled chapters. The text is well thought-out, conscientiously written and based on the vast clinical experience of the author. But we also find here a somewhat archaic subject in a chapter "Acute fatigue of the heart" (Franke, 1921). The issue of myocardial infarction is treated by the author as a problem of minor importance only – laconic information on the subject is

squeezed in a small sub-chapter entitled "Embolus and thrombus of the coronary artery", which can be found near the end of the textbook and occupies half a page!

Another important Polish textbook published in the interwar period "Pathology, diagnostics and therapy" (1938), with Feliks Malinowski and Zenon Orłowski as the editors, still provides not enough information on myocardial infarction - at least according to our contemporary expectations. And medicine could then offer insufficiently little help to the patients, although some progress was noticeable. On the issue of treating myocardial infarction (in the chapter authored by Z. Michalski and H. Skwarczewska), the textbook says: "The treatment has three objectives - two immediate (keeping the patient alive and alleviating his pain and general suffering) and subsequently - prevention of new infarctions developing. The first two recommendations require a bed rest with the patient kept as calm as possible for at least 3-4 weeks, i.e. until the necrotic part of the cardiac muscle becomes organized, combined with a simultaneous administration of all types of *excitantia* (camphor and related agents), as well as painkillers. Nitroglycerin is not effective here, most likely it is even noxious, as it decreases blood pressure, which is already low anyway. Large doses of morphine are necessary, although theoretically it is not recommended, since as a vagotonic agent, it causes vessel constriction (...)" (Michalski & Skwarczewska, 1936).

5. Myocardial infarction in the last half of century

In the last decades, the problem of preventing and treating myocardial infarction has become one of major challenges of contemporary medicine. Infarction has long ceased to be a death sentence for the patient; it is merely one of life-threatening conditions that absolutely require immediate medical intervention. The years of Second World War represent stagnation in all sciences, including medicine, both in Poland and in other war-tormented European countries; American medicine might have been affected to a lesser degree, as it was not so much afflicted with the drama of war.

In the post-war years, Polish physicians attempted to keep pace with modern trends in all fields, although in this dark period of our history, successes of our cardiology were seen clearly later in time as compared to Western countries. Nevertheless, in spite of post-war problems and an immense gap in therapeutic possibilities that opened between the Western world and our country, tormented by the war and rampant post-war Communist lawlessness, Polish cardiologists tried to keep pace with progress. In the forties and fifties, successes of Western medicine (predominantly seen in the United States) were carefully followed. As it is apparent - I hope - in the present article, Polish physicians have always been in the forefront of establishing the foundations of world cardiology and this was true both centuries and decades ago. We have to bear in mind what modest diagnostics modalities they had at their disposal - they only had the legacy of pre-war Poland, subject to terrible destruction of the war.

Nevertheless, as early as in 1945, the first Polish reports on problems pertaining to myocardial infarction appeared, authored by Edward Szczeklik. One paper, worthy of particular mention in view of its unique character, concentrated on damages of the heart conduction system in the course of myocardial infarction (Szczeklik, 1945a, 1945b).

Let us emphasize that since the beginning of keeping a register of Polish medical bibliography, doctoral dissertation addressing circulatory system diseases appeared already in the early 19th century (1812). When, then, did the first Polish doctoral theses unquestionably addressing myocardial infarction appear? As it turns out, this happened

only in the post-war period – in 1949 and 1952 (Stanowski, 1949; Jodkowski, 1952; Stawowiak, 1952), and subsequently in 1961 (Smolarz, 1961). However, various problems of circulatory system diseases were relatively frequently the subject of doctoral dissertations (Śródka, 1994).

Physicians found out that the appropriate form of therapeutic management was not exactly the conservative treatment with all pharmacological novelties introduced, fibrinolytic therapy (both intravenous and intracoronary) and adjuvant therapy, but rather restoration of blood flow to the occluded artery. Such a solution of the problem became a milestone in myocardial infarction treatment.

R. G. Favaloro and D. B. Effler were the first to initiate surgical reperfusion in fresh myocardial infarction; in 1971, they published their preliminary observations on this treatment modality (Favaloro et al., 1971). Subsequent reports demonstrated that revascularization in fresh infarction is possible, although associated with a high risk (Cohn et al., 1972; Sanders et al., 1972). In time, the risk related to such a radical and aggressive treatment diminished and in the eighties, the results started to be promising. Mortality rates dropped as low as down to 5%. It became apparent that the major objective of treating fresh myocardial infarction was preservation of cardiac muscle contractility in the infarcted site and - to implement the goal - restoring the patency of the occluded artery.

In Poland, surgical reperfusion in fresh myocardial infarction was introduced by Zbigniew Religa in the Zabrze center in 1985. In 1988 and 1989, Marian Zembala presented his experience in employing this therapeutic modality (Zembala, 1989).

Regardless of progress in surgical treatment of myocardial infarction, in the late seventies, new possibilities emerged of restoring the patency of the occluded artery through a procedure belonging to the realm of modern interventional cardiology. First reports were published describing an attempt at invasive opening of the occlusion from the artery responsible for the zone of infarction (Rentrop et al., 1979) and presenting the first successful results in interventional removal of occlusion of the coronary artery in fresh myocardial infarction (Meyer et al., 1982; Hartzler et al., 1983).

Soon (in 1986), the first in Poland publication on such a therapeutic method authored by M. Dąbrowski et al. appeared in Warsaw (Dąbrowski et al., 1986). At the same time, independently, interventional restoration of patency of the occluded artery in fresh myocardial infarction was introduced in Zabrze.

In the history of medicine, the knowledge on myocardial infarction has been taking shape and maturing as long as there has existed medicine based on intellectual perception of the phenomenon of human health and disease. For centuries and millennia, myocardial infarction was a phenomenon or a quirk of fate that was completely incomprehensible, threatening, even awesome. Later, its mystery was gradually revealed, but still with immense respect and without any genuine confidence that man might change anything in the natural course of the disease.

When we look cross-sectionally on the history of our understanding, diagnosing and treating myocardial infarction, a question arises whether the extraordinary progress of medicine in the 20th and 21st centuries has brought a definitive solution of the problem of treating the condition, whether medicine has finally combated the disease. The answer is "probably not", and the future of myocardial infarction treatment - as it seems today - is associated mostly with genetics and related fields, profound interference with molecular biology within the cell; if revascularization is foreseen in the future, it will have to be completely different than contemporary surgical and interventional procedures. Shall we ever

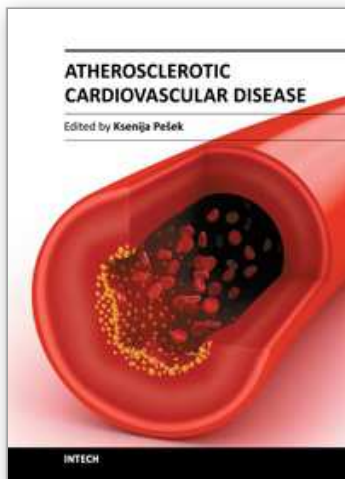
be able to responsibly claim that myocardial infarction, which today we have somehow managed to grasp in the sense of understanding the disease and having therapeutic abilities, is a thing of the past?

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