

## Stages of formation and further development of domestic cardiology. Part 1

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The first stage of the development of the USSR Cardiology as an independent scientific discipline and medical specialty, covering the history of national Cardiology in the first half of the twentieth century, is analyzed.

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Cardiology as a division of clinical medicine, separate from internal medicine and focusing on the morphofunctional characteristics of the cardiovascular system and its pathology, was born in the 20th century. In his monograph, V. I. Borodulin lays out issues relating to its division into various periods. [1] Domestic cardiology has its origin in the classical clinical and experimental studies of A. B. Fokht and his scientific school, which laid the foundations of experimental heart pathology [2], as well as the works of the clinical school's representative M. V. Yanovsky, which were devoted to the study of peripheral hemodynamics. [3] Of crucial significance was the introduction of new diagnostic methods: electrocardiography (A. F. Samoilov and V. F. Zelenin), which quickly advanced the doctrine of heart arrhythmias; the bloodless acoustic method for determining blood pressure (N. S. Korotkoff), which made the clinical study of hypertension possible; cardio-radiography (M. I. Nemenov, A. Y. Shternman, Y. I. Arkusky and others), which gave the doctors the opportunity to study the morphology (orthodiagraphy, teleroentgenography) and physiology (actinocymography) of the heart. The high-priority description of the clinical picture of acute coronary artery thrombosis by V. P. Obratsov and N. D. Strazhesko began the

era of clinical diagnosis of myocardial infarction. The development of an experimental model for atherosclerosis cholesterol and the cholesterol theory of its pathogenesis (N. N. Anichkov, S. S. Khalatov) determined the path for the study of atherosclerosis. [1]

The formation and further development of cardiology as an independent and comprehensive clinical scientific discipline and medical specialization extended through the pre-Soviet era (early 20th century), Soviet and post-Soviet period of Russian history. According to our data, the earliest appearance in Russian-language medical literature of the term "cardiology," in the sense that is of interest to us, dates from 1921 (Kharkov magazine *Physician Business*). [4] Prior to this, the term "cardiology" was already used as a synonym for the adjective "cardiovascular." It is in this sense of the term that we find Zelenin using it. A book published in 1915 featured institutions where the work was performed: "From the faculty therapeutic clinic of Moscow University (director – Professor N. F. Golubov) and cardiology institute at its own sanatorium". [5] In connection with the foregoing, it seems appropriate to use the term "cardiology" to describe the process of formation of this discipline starting from the 1920s.

Analysis of our material suggests three historical stages in the formation and further development of Russian cardiology. In the first

stage (the first half of the 20th century) cardiology developed within the clinical study of internal diseases as one of its most important spheres of research. In the second half of the 20th century, cardiology became an independent scientific and clinical academic discipline (the second stage, 1950s to mid-1970s); its theoretical, diagnostic, and therapeutic framework had undergone significant changes due to the emergence and development of cardiac surgery. Important reforms in the treatment of cardiovascular diseases took place in the 1960s: On the initiative of V.N. Vinogradov and V.G. Popov there was a thorough revision in the treatment policy for the pre-hospital and hospital stages of management of patients with acute myocardial infarction and the creation of specialized cardiac ambulance brigades and wards, and then coronary care units in hospitals. [6]

In the third stage (the second half of the 1970s), the Cardiology Research Center was created, which ran a network of affiliates across the country (a new organizational structure for this scientific discipline); cardiology became practiced as an independent medical specialization. At the first stage the leaders of the cardiology fields at the internal medicine clinics were D.D. Pletnev, G.F. Lang, N.D. Strazhesko, S.S. Zimnitsky, V.F. Zelenin; the second stage – A.L. Myasnikov, M.S. Vovsi, V.N. Vinogradov, P.E. Lukomsky; the third stage – the founder and director of the Cardiology Research Center, academician E.I. Chazov. This article describes the features of the first stage in the history of Russian cardiology<sup>1</sup>.

The founders of cardiology in the USSR – Pletnev and Zelenin (Moscow), Lang (Leningrad), Strazhesko (Kiev), Zimnitsky (Kazan) – continued working on issues in cardiology in the tradition of S.P. Botkin, A.A. Ostroumov (functional, clinical and experimental approaches) and Obraztsov, within the general therapeutic clinical practice – in the departments of internal medicine. Accordingly, the institute established in 1944 as part of the USSR Academy of Medical Sciences (AMS USSR), and which studied mainly heart disease and blood vessels,

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<sup>1</sup> Other stages will be discussed in a following article by the same authors.

was known as the Institute of Experimental and Clinical Therapy. Its first director was Zelenin, and from 1948 – Myasnikov. This first stage in the development of cardiology in the USSR, which took place "within therapy," ran from the 1920s to 1940s. All the aforementioned clinicians (in fact, representatives of not one but two scientific generations), according to modern therapists, cardiologists and medical historians, may be called classics of cardiology.

Dmitry Dmitriveich Pletnev (1871-1941), a follower of Fokht and the prominent Berlin clinician F. Kraus, headed the department faculty, and then the hospital therapy department at the Moscow University (1917-1929), a therapeutic clinic at the Moscow Regional Research Clinical Institute (MRRCI) and the 2nd department of therapy for doctors at the Central Institute of Advanced Training (CIAT) (1930-1937) and at the same time – the Institute of Functional Diagnostics and Experimental Therapy (1932). He was famous for his virtuoso diagnostic skills, brilliant lectures and speeches, and was the most prominent leader of clinical internal medicine in the USSR. Pletnev markedly enriched domestic cardiology: he established criteria for the differential diagnosis of myocardial infarction of the left and right ventricles of the heart (before the era of electrocardiographic diagnosis), he used a method of continuous digitalization in the treatment of chronic heart failure, he developed the idea of noncardiac pathogenesis of attacks of angina pectoris, he refined the clinical picture of acquired syphilis of the cardiovascular system, and was the author of the first outstanding national guidelines for heart disease. [7] He also produced well-known works on clinical study of typhus and psychosomatic disorders, general pathology, history and methodology of medicine. The tragic end of his life is one of the most famous testaments of the "repression of medicine": In 1937 he was arrested, in 1938 in the infamous "Bukharin process" he was sentenced to 25 years in prison, and in 1941 was shot. [8, 9] Among Pletnev's disciples were prominent cardiologists Vovsi, B.A. Egorov, P. E. Lukomsky, V. G. Popov, L.P. Pressman, A.Z. Chernov and others.

Another of the nation's recognized leaders in cardiology, M.V. Yanovsky's student Lang (1875-1948), was head of the therapy faculty at the 1st

Leningrad Medical Institute. He developed the doctrine of independent nosological form – hypertension, having a neurogenic nature – and the concept of myocardiodystrophy as one of the leading forms of functional heart disease. He proposed a standard classification of cardiovascular diseases, and issued a seminal textbook on diseases of the circulatory system [10], summing up pre-war cardiology research. He created a large scientific school, which included Myasnikov, D.M. Grotel, A.G. Dembo, B.V. Ilyinsky, T.S. Istamanova, A.A. Kedrov, M.I. Khvilivitskaya and a number of other prominent cardiologists. [11-13]

In the "triumvirate" of universally recognized leaders of Soviet cardiologists was Obratsov's student Strazhesko (1876-1952) – head of the department of faculty therapy at the Kiev Medical Institute and director the Ukrainian Institute of Clinical Medicine, which he established. Together with his teacher, he gave the first complete characterization of the clinical picture of acute thrombosis of coronary arteries [14, 15]; he described the "pistol shot tone" in heart blockages, substantiated the hypothesis of the streptococcal nature of rheumatism (1934), and together with his collaborator V. Kh. Vasilenko he developed the doctrine of metabolic disorders in circulatory failure. [16-18]

Kazan University Professor Semyon Semyonovich Zimnitsky (1873-1927), chairman of the 9th All-Union Congress of Physicians in Moscow (1926), developed a functional area of domestic therapeutic clinical study in his lectures [19], which enjoyed exceptional success among the medical community. His original views on issues related to rheumatic and protracted septic endocarditis, aphonic heart diseases, hypertension, the relationship of syphilis of the cardiovascular system and angina pectoris, were widely discussed by the country's physicians. [20]

Among the group of leaders in the field of cardiology in Soviet internal medicine was also the founder (along with the classic physiology's Samoilov) of clinical electrocardiography in Russia, Zelenin (1881-1968) – head of the department of hospital therapy at the 2nd Moscow Medical Institute. He was the organizer and first director of the Clinical Institute of Functional

Diagnostics and Experimental Therapeutics (1925, later called the Biomedical Institute) and the Institute of Therapy at the USSR Academy of Medical Sciences (from 1944). At the inaugural session of the Academy of Medical Sciences in 1944 he was elected academician-secretary of the department of clinical medicine. His numerous works on cardiological problems covered arrhythmias and heart diseases, hypertension, cardiovascular neurosis and cardiopulmonary diseases. In his fundamental guide to diseases of the cardiovascular system he summed up the work of local researchers in the first half of the 20th century. [21] Counted among his scientific school of cardiology were I. B. Kabakov, I.B. Likhtsier, M.A. Lyass, D. F. Presnyakov, L. I. Fogelson and other well-known clinicians. [22]

In addition to clinical and morphological observations and experimental studies of physicians and pathologists in the formation of cardiology as an independent scientific and clinical discipline, an important role was played by the development of instrumental methods of diagnosis – sphygmography, electrocardiography, cardiophonography and cardio-roentgenology. It is worth noting, for example, that the establishment of the second German Society of Cardiology for Cardiovascular Research, which emerged in 1927<sup>2</sup>, brought together not only clinicians and balneologists, but also physiologists involved in electrocardiography and radiologists who followed the electrocardiographic method. [23] It is easy to notice that the term "cardiology" in the original title of the German Society was used not in the sense of a division of internal medicine, but rather in the sense of a set of methods of studying the hearts of healthy and sick people.

At the same time, in the study of domestic sources from the 1930s we came across the use of the term "cardiology" by the country's leading physicians (for example, Lang, R.A. Luria) [24, 25], and radiologists (B.M. Kudish, Arkusky and M.I. Nemenov) [26-28] with the meaning of a clinical division of internal

<sup>2</sup> Deutschen Gesellschaft für Kardiologie – Herz- und Kreislaufforschung. The first society was the American Heart Association, created in 1925.

medicine. Prominent physician B.B. Kogan tied its appearance to the development of a clinical and physiological field in therapeutic clinical study. [29] Moreover, the term "cardiology" in the 1930s had already entered the scientific and public life of Soviet therapists. For example, a cardiology section was functioning in the Moscow Society of Physicians in 1938. [30] And even in the language of official documents of the period under review, the term was already used: In 1932, there was a cardiology department at the State Central Institute of Balneology in the Caucasian mineral waters region (Kislovodsk). [26] This suggests in the 1930s there began a process of separation of cardiology as a clinical division within internal medicine in the USSR. But the vast majority of Soviet writers of the time did not use the term "cardiology," instead using the terms "disease of the heart and blood vessels," or "circulatory diseases," and Pletnev called his textbook "Heart Disease." [7]

The main areas of cardiology research by physicians in the period under review were the problems of classification of cardiovascular diseases, the role of peripheral level circulation, rheumatism and rheumatic heart disease, heart failure, cardiac arrhythmias, myocardial infarction and essential hypertension. There were already many methods of laboratory and instrumental diagnostics at researchers' disposal. At the same time the basic form of pathology characteristic of the first half of the century had not changed, with a clear predominance of hospital patients suffering from rheumatism and heart defects, but not hypertension, ischemic heart disease, atherosclerotic heart diseases and alcoholic cardiomyopathy – typical forms of cardiac pathology in the second half of the 20th century. Surgical treatment (initially for defects of the heart and large vessels) was still in an experimental stage of development, and correspondingly, medical diagnostic monitoring could be only performed in the autopsy room and not on the operating table. Effective drug treatment was limited to digitalis and diuretic drugs. There were no cardiac institutions<sup>3</sup>,

<sup>3</sup> One small Institute of Experimental and Clinical Cardiology in Tbilisi (1946) did not play a fundamental role in the development of the discipline.

departments, scientific societies and journals. There were not, of course, relevant departments in hospitals nor specialist cardiologists.

Thus, the first stage in the formation of national cardiology took place in the first half of the 20th century as part of the clinical study of internal medicine. Research was carried out mainly in the therapeutic departments of the country's medical universities. The results of this phase were reflected in Lang's textbook "Diseases of the circulatory system" [10] and Zelenin's "Diseases of the cardiovascular system." [21]<sup>4</sup> It is clear that these general works in their methodological relationship, theoretical basis and therapeutic recommendations wholly belonged to cardiology of the first half of the 20th century.

This phase as a whole and these guidelines in particular are characterized by the primacy of clinical data, a historical approach to the issues, a functional research field and a clear understanding by the authors of the issues' development prospects. However, they do not cover the upcoming revision of the decisive concepts of semiotics, diagnosis, treatment strategy and prognosis, i.e. about the importance of clinical phenomena: such a review was made possible only in 1950-1960s, based on the achievements of a new surgical discipline – cardiac surgery.

As concerns the beginning of the second stage we can point to the late 1940s and early 1950s, when the director of the faculty of surgery at the 2nd Moscow Medical Institute academician A.N. Bakulev and professor at the clinic E.N. Meshalkin conducted the first surgery in patients with congenital heart disease (1948-1951), and later (1952) A.V. Gulyaev and Bakoulev conducted the first surgery for stenotic heart disease of rheumatic origin.

The beginning of this new phase is fixed in the general publications of the original surgeons [32], and later by the surgeons and physicians based on a joint study of the issues. The first such book was a monograph by Professor A. A. Busalov and A. M. Damir, "Mitral stenosis in the coverage of physicians and surgeons." [33]

<sup>4</sup> Fogelson's textbook "Diseases of the heart and blood vessels" [31] was less popular among leading experts and the country's ordinary physicians.



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