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Correct diagnostic conclusion in patients with chronic heart failure: a reality or a pipe dream?

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ABSTRACT

The authors of this article have analyzed the problem of diagnostic conclusion unification in patients with chronic heart failure (CHF). The root of this problematic situation in which practitioners find themselves is that, despite the large number of different regulatory documents, there is no consensus on what is considered correct and what is wrong when formulating a diagnostic conclusion in a patient with CHF. The many-faced syndrome is designated differently: CHF, congestive heart failure, chronic circulatory failure. There are difficulties in determining the stage of CHF in patients receiving optimal drug therapy or in those who are in a state of compensation after a successful surgical correction. When assessing the functional status in a patient with CHF, a distinct subjectivity should be taken into account in determining which limited physical activity is slight or, conversely, marked, as well as what kind of physical exertion is normal for the patient. This subjectivity naturally leads to low reproducibility of the assessment results of the CHF functional class in the same patient by different doctors. CHF should also be classified according to the value of a left ventricular ejection fraction. The diagnosis should also take into account the state characteristics of a diastolic function of the left ventricle (especially in patients with CHF and preserved left ventricular ejection fraction). The authors give examples of diagnostic conclusions, including cases of comorbid pathology.

Key words: chronic heart failure, classification, stage, functional class, left ventricle, ejection fraction, diastolic function, chronic cor pulmonale, 6-minute walk test, diagnostic conclusion.

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Корректная формулировка диагноза у пациента с хронической сердечной недостаточностью: реальность или несбыточная мечта?

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РЕЗЮМЕ

Проанализирована проблема унификации формулировки диагноза у пациента с хронической сердечной недостаточностью (ХСН). Корень проблемной ситуации, в которой находятся практические врачи, кроется в том, что несмотря на большое количество различных регламентирующих документов, нет единого мнения относительного того, что считать правильным, а что неправильным при формулировке диагностического заключения у пациента с ХСН. Многоликий синдром обозначают по-разному: ХСН, застойная сердечная недостаточность, хроническая недостаточность кровообращения. Сложности есть при определении стадии ХСН у пациентов, получающих оптимальную медикаментозную терапию или находящихся в состоянии компенсации после успешной хирургической коррекции. При оценке функционального статуса у пациента с ХСН следует учитывать отчетливый субъективизм в определении того, какое ограничение физической активности является небольшим или, наоборот, значительным, а также того, какая нагрузка является привычной для больного. Данный субъективизм закономерно приводит к низкой воспроизводимости результатов оценки функционального класса ХСН у одного и того же пациента разными врачами. ХСН необходимо классифицировать и в зависимости от значения фракции выброса левого желудочка. В диагнозе следует приветствовать и характеристику состояния диастолической функции левого желудочка (особенно у пациентов с ХСН и сохраненной фракцией выброса). В лекции приведены примеры диагностических заключений, в том числе при коморбидной патологии.

Ключевые слова: хроническая сердечная недостаточность, классификация, стадия, функциональный класс, левый желудочек, фракция выброса, диастолическая функция, хроническое легочное сердце, тест 6-минутной ходьбы, диагностическое заключение.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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INTRODUCTION

Though diagnosis of chronic heart failure (CHF) is not a bedside procedure, usually it can be recognized without great difficulties. The main thing is not to be limited to the clinical assessment of signs and symptoms, as “experienced” cardiologists often do by repeating the mistakes of their teachers. They are convinced that cold hands (“cold” cyanosis) in a patient with dyspnea clearly indicate CHF, while warm hands (“warm” cyanosis) indicate lung disease. In one way or another, for example, using echocardiography, they try to study the heart structure and

function (primarily the left ventricle (LV)), and also to determine the plasma concentration of natriuretic peptides (most often brain natriuretic peptide, N-terminal pro-brain natriuretic peptide and mid-regional pro-atrial natriuretic peptide) before diagnosing a heart failure [1–6].

The authors are convinced that the clinical stage of diagnosis is very important in recognizing CHF [7]. Moreover, if the approach of constant substitution of physical examination of the patient with certain paraclinic tests is practiced for a long time, it can lead to atrophy of the doctor's skills of the so-called bedside diagnosis [8]. However, without the verification stage, the diagnosis of CHF is not always infallible, and the diagnosis itself is imperfect [9, 10], since the coincidence of opinions of different specialists on the presence or absence of symptoms and CHF clinical signs (cross-reproducibility) is not observed in every case [8].

After correct recognition of CHF, paradoxically, the doctor faces even greater difficulties, since he needs to formulate a detailed clinical diagnosis so that the latter performs all its functions (a patient with their diseases and their key mechanisms is visible behind it, it serves as an accurate justification for choosing methods of personalized treatment/prevention and rehabilitation, provides continuity of therapy; it is a tool for statistical accounting and medical forecasting, it helps to assess the ability to work and fitness for military service, as well as professional selection and medical control in sports and so on). On the other hand, it should avoid conflict situations of administrative and legal nature, related to issues of insurance medicine. Sometimes it should also help against the almost manic desire of some experts to find medical errors [11]. As leading Russian morphologists rightly point out, any diagnosis from a medical diagnosis becomes a medical-social, in fact becoming a legal, "insurance" and legal element in solving many life situations. Payment for the completed case of treatment and sometimes even the doctor's fate depend on it.

The root of the problem situation in which practitioners find themselves is that, despite a large number of different orders, regulatory documents, guidelines and manuals, as well as reference books (updated by the WHO Committee of experts international statistical classification of diseases and health problems of the tenth revision, orders of the Ministry of Health of the USSR and the Russian Federation, recommendations of the European Society of Cardiology on the diagnosis and treatment of acute and chronic heart failure, National recommendations for the diagnosis and treatment of CHF, the standard of rules for the formulation of final clinical and pathoanatomical diagnoses, approved in 2006 by the Federal service for supervision of health and social development, as well as clinical recommendations / treatment protocols approved by the Ministry of Health of the Russian Federation) [11, 13–18], the citation of which could be continued, there is no consensus on what is considered correct and what is wrong when formulating a diagnostic conclusion. And this is not only among representatives of various medical specialties, but even among specialists of the same profile, some of whom may change their views over time (for example, considering CHF first as a disease, then as a syndrome). We see nothing wrong in the latter, as it says *"Cujusvis hominis est errare, nullius, nisi insipientis, in errore perseverare".*

To those who doubt this, we suggest comparing examples of the formulation of a clinical (or pathoanatomical) diagnosis, which are given in the works by individual authors. They will include examples of lapidary (CHF IIB FC III) and detailed diagnostic conclusions, as well as those in which CHF (sometimes out of habit referred to as circulatory failure or congestive heart failure) is considered an independent nosological form and is a syndrome. There is no consensus on what is considered the main disease in the case of comorbid pathology (recall that a patient with heart failure in most cases is a middle-aged person with a "bouquet" of diseases). At the same time, clinicians, referring to these documents with different legal force, can formulate diagnoses in completely different ways.Sometimes it seems that practitioners can avoid cognitive dissonance under the avalanche of information coming from various sources, which is based on conflicting views, only if they decide to leave the profession, since the prospect of achieving harmony of their own ideas formed at the university and during medical practice, with the varying requirements of professional medical associations and expert communities, looks very vague.

The target issue of this lecture is an attempt to deal with the problem of unifying the formulation of the diagnosis for a patient with CHF.

Diagnosis (Greek. διάγνωσις, lat. diagnosis – "recognition") is a brief medical conclusion (more precisely − medical, since physician assistants in accordance with the Order of the Ministry of health and social development of the Russian Federation of 06.11.2009 No. 869 also "diagnoses typical cases of the most common diseases..") about the pathological state of health of the subject, about the diseases (in-

juries) available to him or about the cause of death, issued in accordance with the current standards and expressed in terms provided by the current classifications and nomenclature of diseases [17].

As for the terms, despite the pluralism of opinions, in accordance with the dominant views in the diagnosis, only the abbreviation of CHF should be used. Proponents of the term "chronic circulatory failure" (as a rule, they use abbreviations CF, CCF or C) rightly point out that the classification of N. D. Strazhesco and V. H. Vasilenko, approved at the XII All-Union Congress of therapists in 1935, and which is still a current tool for classifying CHF, was precisely about circulatory failure. Other experts justifiably note that severe CHF is often associated with hypervolemia (in the absence of effective therapy, including diuretics, it is almost natural), associated with retention of sodium and water, manifested by symptoms and signs of "congestion" (sometimes only in a small circle of blood circulation), for descriptions of which the term "congestive heart failure" is recommended. However, in accordance with National recommendations for the diagnosis and treatment of CHF, the terms "congestive heart fail- ure" and "chronic circulatory failure", which are essentially synonymous with CHF, should not be used to unify the terminology [13, 15].

The modern classification of heart failure was developed by experts of the Society of Heart Failure Specialists (SHFS) and approved at a meeting of the Presidium of the All-Russian Scientific Society of Cardiology on October 11, 2002 [19]. In the official comment of the SHFS [20], attention was drawn to the continuity of this edition of the classification with the classifications of N.D. Strazhesko and V.H. Vasilenko (the classification "lost" all the additions to the classic version that were made over its long history, but new concepts were introduced into it: "asymp- tomatic dysfunction of the left ventricle", "adaptive remodeling of the heart and blood vessels", "mal- adaptive remodeling of the heart and blood vessels") and the New York Heart Association (NYHA) [21]. Thus, an internist should reflect the stage of heart failure and its functional class (FC) in the diagnosis.

It is quite simple to determine the stages I and II of an untreated heart failure: Stage I − latent heart failure, II A − monoventricular (consider left ventricular), II B − biventricular (right ventricular, secondary to left ventricular). It is not easy at a physical examination to diagnose these stages in a patient with heart failure, who, during the previously prescribed optimal drug therapy, managed to achieve euvolemia, when in the situation of compensated heart failure the information content of the so-called hemodynamic changes is lost (symptoms and signs of stagnation in the pulmonary circulation and large circulation with full compensation may be absent!). With the phenotype of the treated CHF, it is possible to objectify its I or II stage by the results of an echocardiographic assessment of remodeling (the presence and severity of spherification and thinning of the walls) and function (primarily diastolic) of the left ventricle, diagnosing asymptomatic dysfunction of the left ventricle, adaptive or maladaptive remodeling of the left ventricle, which correspond to I, II A or II B stages of heart failure [15].

A more complicated situation develops with the justification of the III stage of heart failure. According to SHFS experts, the difference between CHF III stage and CHF II B stage is the presence of irreversible structural changes in target organs (heart, lungs, blood vessels, brain, kidneys) [15]. However, in the comments of the SHFS experts to their classification, nothing is said about what "irreversible" structural changes, for example, in blood vessels or brain, have a direct causal relationship with heart failure, on the one hand, and can be considered as criteria for verification of CHF III stage, on the other. We were taught at different times that the most striking manifestation of CHF III stage is congestive (cardiac) fibrosis and cirrhosis of the liver [22–24]. However, the liver is not included in the list of target organs in the SHFS classification, which, in our opinion, along with the lack of clear criteria for irreversible structural changes associated with heart failure in these organs and systems (heart, lungs, blood vessels, brain, kidneys) is a significant omission of the classification under discussion, which impedes the unification of diagnostic conclusions. For example, we had to deal with a more than controversial diagnosis when in a patient with coronary heart disease, developed on the background of type 2 diabetes mellitus, and complicated by the development of refractory nephrotic syndrome, and massive proteinuria ("severe, irreversible kidney changes"), justified the CHF III stage, despite moderate manifestations of biventricular heart failure.

Finally, another drawback of the modern classification of CHF stages, which is often criticized by specialists in heart failure [25–28], is its so-called rigidity in gradation, as the authors use a staged approach that excludes the transition from higher gradations to lower. Recall that the classification of N.D. Strazhesko and V.H. Vasilenko was approved at the XII All-Union Congress of Therapists back in 1935, when the possibilities of effective

pharmacological or surgical correction of a severe heart failure were more than modest, and when doctors actually observed a "natural" progressive course of a heart failure. Therefore, the classification did not provide for a revision of the established stage in the opposite direction. But even in our time, when no one doubts that the introduction in clinical practice advances of clinical pharmacology and cardiac surgery often provides positive dynamics for the parameters characterizing the process of heart remodeling, SHFS experts allow only ascendant revision of the stage ("the stage of heart failure may worsen despite treat- ment") [20].

A patient with anasarca hospitalized for qualified or specialized care should be discharged with a diagnosis of CHF II B stage, even if during treatment the patient at rest managed to eliminate all the symptoms and clinical signs of heart failure without exception (we discharge the patient with the diagnosis of pneumonia or acute appendicitis, when after successful treatment there are no clinical and X-ray/ tomographic signs of pneumonia, and there is no appendix at all). And in this case, everything is clear, since such a diagnosis serves as the most solid justification for active combination therapy conducted at the stationary stage [7, 25].

But at the outpatient stage, the need for revision of the CHF stage will inevitably arise, in order to be able to determine the actual disability and prescribe the appropriate treatment, looking at the clinical diagnosis and correctly assess the severity and prognosis of the disease (it is obvious that in a patient with latent heart failure, manifested only at physical exertion, less active therapeutic measures are required to control the symptoms of the disease than in a decompensated patient). It is not easy to understand why in a young man with rheumatic mitral stenosis, complicated with clinically pronounced left ventricular heart failure, and after effective surgical treatment, should have stage II A of CHF in medical documents until the end of his life.

In view of the above, no matter how important the memories of the distant past are, when the patient had decompensation, the possibility of restaging should be discussed. The actual stage of heart failure (including that established on the basis of an echocardiographic study) should be indicated in the diagnosis, along with the stage that the patient had before treatment. D.V. Preobrazhensky and B.A. Sidorenko [28] offer the following example of such flexible approach to diagnosis: Dilated cardiomyopathy. CHF stage I (stage II B in 1998), I FC (IV FC in 1999). Heart Transplantation (1999).

While there is no official decision that the stage can be changed either one way or the other, it was proposed to use the NYHA functional classification to reflect the dynamics of heart failure [21]. Since at rest the symptoms of heart failure are observed only in case of CHF IV FC (so-called manifest or clinically pronounced heart failure), the latter is fundamentally different from the heart failure corresponding to FC I, II or III, in which symptoms occur only during physical exertion (in fact, latent heart failure) – intense, ordinary or less than usual, respectively. Nevertheless, we note that in the latest recommendations of Russian cardiologists [16], clinically expressed and severe CHF correspond to FC II, III and IV, and it is proposed to describe latent heart failure using only I FC.

When assessing the functional status in a patient with CHF, a distinct subjectivity should be taken into account in determining which limited physical activity is slight or, conversely, marked, as well as what kind of physical exertion is ordinary to the patient. This subjectivity naturally leads to low reproducibility of the assessment results of the CHF functional class in the same patient by different doctors.

At the same time, a fairly free interpretation of the NYHA classification by some doctors and researchers, allowing the allocation of intermediate FC values (in fact, three additional gradations: I – II, II – III, III – IV), cannot be considered a good alternative to an attempt to objectify the assessment of FC using any approaches and make it more accurate. For this purpose, it is most often proposed to evaluate exercise tolerance in a functional test (distance traveled in 6 minutes, threshold stress test etc.) and the maximum amount of oxygen consumed, or to use the so-called clinical condition assessment scale [15, 29], as well as other approaches to stratification (when developing a decision rule, a wide range of indicators are used to characterize the condition of patients, in particular, the level of markers of inflammation in the blood serum) [30].

Unfortunately, not all medical institutions have a flat, precisely marked, corridor free of obstacles (pieces of furniture, oncoming and passing traffic of patients and medical workers, doors opening into the corridor, and so on), and even more so a system for performing spiroergometry. But even if there are all the necessary conditions for conducting stress tests, the possibility of their successful implementation in many patients is limited due to associated diseases and conditions: angina pectoris, intermittent claudication, joint diseases, paresis, paralysis and other pathology of the nervous system, which makes it dif-

ficult or precludes the possibility of movement, respiratory failure, severe anemia, morbid obesity etc. [28]. Obviously, if in this case, a stress test (say, a 6-minute walk test) is performed, a correct interpretation of its results will be impossible, since not only myocardial, but also coronary, respiratory failure and other factors will affect the distance traveled by the patient (taking into account the fact that CHF affects mainly the elderly, you cannot surprise anyone with high comorbidity) [7, 31].

Presented in the National Recommendations for the Diagnosis and Treatment of CHF and modified by V.Yu. Mareev, the clinical condition assessment scale for CHF can be a good alternative to the 6-minute walk test when objectifying FC CHF in the absence of the possibility for any reason to perform (correctly interpret) the last [15].

Note that the diagnosis does not need to mention the fact that CHF FC belongs to the NYHA recommendations, like it is often done (apparently out of habit) in clinical practice – CHF II B stage FC II (by NYHA). We get along with indicating the stage of heart failure in the diagnosis without specifying the "copyright" of N.D. Strazhesko and V.H. Vasilenko, as in the description of stable angina pectoris FC – without mentioning Canadian cardiologists [7].

In accordance with the latest recommendations of the European Society of Cardiology for the diagnosis and treatment of acute and chronic heart failure [32], CHF should also be classified depending on the value of LV ejection fraction (EF), as shown in the Clinical Recommendations approved by the Ministry of Health of the Russian Federation [18]: *Ischemic heart disease: Angina of effort, FC III, post-infarction cardiosclerosis, CHF with reduced EF (32%), stage II A, FC III.*

Taking into account the numerous experimental and clinical studies, the results of which cast doubt on the "monopoly" role of systolic dysfunction of the heart as the main and only hemodynamic cause responsible for the onset and clinical manifestations of heart failure, the characteristic of LV diastolic function should be welcomed in the diagnostic conclusion (especially in patients with CHF and preserved LV EF) [33–37].

In our opinion, the clinicians' desire to reflect the clinical situation with heart failure in the diagnostic conclusion in detail (for example, indicating the severity of LV diastolic dysfunction) in terms provided for by the classifications available, should be welcomed, as it is dictated by the desire to build the most effective differentiated therapy and accurately determine the prognosis of the disease. However, one cannot reach the point of absurdity. We had to consult patients who were diagnosed with several CHF at once (!). Most often, this occurs in patients with a combination of coronary heart disease with chronic obstructive pulmonary disease of stage (degree) IV, when in a combined diagnostic conclusion with competing diseases, stage II B CHF is first indicated as a manifestation of severe ischemic heart dysfunction, and then as a decompensated chronic cor pulmonary as a complication of chronic obstructive bronchitis. We deliberately will not give an example of such a diagnostic conclusion, since "a bad lesson is often well learned" [7].

We propose to proceed from the rule "one heart – one heart failure" and recall that, in accordance with the initial definition of the World Health Organization committee of experts (1961), the term cor pulmonary cannot be used to describe a situation in which pulmonary hypertension is associated with primary failure of the left heart or congenital and acquired heart defects (in most cases it is) [7, 38]. The following is an example of a diagnosis statement in which we tried to avoid reiteration:

The main disease: *Coronary heart disease: Post-infarction cardiosclerosis (1999, 2001): aneurysm of the posterior LV wall at the apex with parietal thrombosis, akinesia of the anterior LV myocardium segments throughout.*

Background disease*: essential arterial hypertension, stage III, 3 degrees, risk IV.*

Competing disease:

chronic obstructive pulmonary disease, stage IV, group D; severe infectious (H. influenzae, M. catarrhalis, S. pneumoniae) type I exacerbation (by N. R. Anthonisen). Respiratory failure, III degree.

Complication of competing diseases*: CHF with reduced LV FV (38%) and restrictive type of LV diastolic dysfunction, stage II B, FC IV.*

In addition to the fact that the diagnosis must be justified, timely, structured and detailed, in accordance with the rules for formulating clinical and pathological diagnostic conclusion approved in the established order [11], it is necessary to observe the nosological principle in it. CHF, being a syndrome without any reservations, cannot be considered as the main disease [39], even if direct costs are associated mainly with the treatment of heart failure. We are convinced that the correct diagnostic conclusion, which corresponds to the rules of formulation, serves as the best justification for treatment and the practitioner should not, adjusting to deviant requirements, replace the main disease in the diagnostic conclusion (for example, any form of coronary heart disease)

with its complication in order not to face a fear of a refusal to pay for a completed case of a patient's treatment in a specialized hospital (for example, in a heart failure clinic). After all, it is not clinical medicine with its scientific basis for the health insurance system, but vice versa.

CONCLUSION

In conclusion, we would like to say about the inadmissibility of the so-called tandem diagnostic conclusion, when two or more nosological units are indicated sequentially (often disorderly) in the rubric "Main disease". This is most often observed in a combination of coronary artery disease and arterial hypertension, when internists, usually referring to examples of non-categorized diagnostic conclusion findings presented in the Russian recommendations for the diagnosis and treatment of hypertension in 2010 (fourth revision), describe coronary disease between the degree of arterial hypertension and risk cardiovascular complications and death (we quote, *"essential arterial hypertension, stage III. Degree of arterial hypertension 2. Coronary heart disease. Angina of effort, II FC. Risk 4 (very high)"*). Recall that, in accordance with the rules of diagnosis [11], if any form of coronary heart disease is detected in a patient with arterial hypertension (the timing of the diagnosis does not matter), the last should be indicated in the diagnosis conclusion under the heading "Background diseases". It is impossible to correctly code the disease in any other way, since codes for diseases characterized by high blood pressure (I10–I15) should not be used in cases involving coronary vessels (I20–I25).

In order to make standardized diagnostic conclusions a reality, we call on colleagues of various specialties to be "law-abiding" and follow uniform rules of formulating clinical and pathoanatomical diagnoses, rather than creating their own.

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