

EPIDEMIOLOGICAL ASPECTS OF CHRONIC HEART FAILURE

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Abstract

This extensive review chronicles the historical evolution of the understanding and treatment of heart failure (HF) from ancient times to modern medical perspectives. Beginning with early mentions in Ancient Rome and Greece detailing clinical presentations, such as anasarca and wheezing, it traces the progression of knowledge regarding HF pathophysiology and symptoms through significant medical milestones. The annotation progresses to pivotal moments in the 17th and 20th centuries, highlighting influential works by notable figures like W. Harvey, E. Starling, and S. Sarnoff, shedding light on critical insights into heart function and the impact on treatment development.

The text then pivots to the contemporary landscape of HF, emphasizing its status as a pressing public health concern, with statistics and prevalence rates elucidating its widespread impact across various populations worldwide. It further delves into the criteria for diagnosing HF and explores its incidence, gender, and age dependencies, drawing on studies such as the Framingham Study and Kaiser Permanente system, which demonstrate how HF prevalence varies with age and gender.

Moreover, it addresses the shift in understanding HF causes and identifies key contributors, such as coronary heart disease (CHD), valvular heart disease, and dilated cardiomyopathy (DCM). The annotation concludes by underscoring the challenging prognosis associated with HF, as evidenced by survival rates documented in studies like the Framingham and Rotterdam studies, emphasizing the need for continued research and improved treatments for this debilitating condition.

Keywords: Heart Failure, Ancient Medicine, Pathophysiology, Historical Milestones, Medical Evolution, Public Health, Epidemiology, Prevalence Rates, Diagnosis Criteria, Gender Disparities, Age Dependence, Coronary Heart Disease (CHD), Valvular Heart Disease, Dilated Cardiomyopathy (DCM), Prognosis, Survival Rates, Research Perspectives.

Introduction

The first mentions of HF were described in Ancient Rome and Ancient Greece, where patients with anasarca, edema and shortness of breath were reported. Hippocrates described wheezing in the lungs as “boiling vinegar,” and Internal Affliction XXIII described “a modern method of removing fluid through a drilled rib” [1]. In determining the cause of symptoms, various factors were determined by the pathophysiology of the disease [2]. Thus, the accumulation of

fluid in the pleural cavity was associated with the fact that “the phlegm descending from the brain penetrates the heart and then palpitations and shortness of breath occur ... and when the phlegm releases cold into the heart and lungs, the blood cools, and the heart flutters, and this leads to difficulty breathing and orthopnea” [3].

In 1628, W. Harvey described the blood circulation in detail: “I am obliged to conclude that in animals the blood moves in a circular chain with continuous circular movements and this function of the heart, which it carries out due to its pulsation, which ultimately is the only cause of pulsating movements hearts.” Subsequently, R. Lower noted a decrease in output as a result of compression of the heart during pericardial tamponade, and in 1715, R. Wieusens described in detail the physiological basis for the development of symptoms and signs in patients with mitral stenosis, as a more common cause of HF [4].

In the 20th century, E. Starling presented his work “The Law of the Heart,” which states: “The force of contraction of the ventricles of the heart, measured by any method, is a function of the length of the muscle fibers before contraction,” that is, the greater the end-diastolic volume of the heart, the greater the cardiac output. ejection. However, this law did not find understanding among physiologists of that time until the end of the twentieth century. In 1955, S. Sarnoff described “Starling’s 7 laws” [5]. He demonstrated that several laws can be applied at once, therefore, not only end-diastolic volume affects the work of the heart, but also the contraction of the smooth muscle of the heart. This statement was reflected in the results of biochemical studies, which showed that the main components of the contraction of the smooth muscle of the heart are calcium entering the cytosol and its further binding by stroponin. In turn, this discovery also helped explain the effectiveness of inotropic drugs for the treatment of heart failure, which increased cardiac smooth muscle contractility, while in heart failure cardiac smooth muscle contractility was reduced.

One of the first drugs with an inotropic effect was digitalis (digitalis), discovered by W. Withering. In his work “An account of the Foxglove,” published in 1788, he described 169 clinical cases of the use of this drug, collected over eleven years, detailing the indications for the use of this drug and all its side effects [6].

Currently, chronic heart failure (heart failure) is a significant public health problem, which is manifested by high mortality, frequent rehospitalization of patients and, as a result, a high financial burden on the healthcare system. heart failure according to the recommendations of the European Society of Cardiology (ESC) is “a clinical syndrome characterized by typical complaints or symptoms such as shortness of breath, swelling in the legs and weakness, which are accompanied by such external manifestations or signs as increased pressure in the jugular vein, moist rales over lungs and peripheral edema as a result of impaired cardiac structure and/or impaired cardiac function, which ultimately leads to a decrease in cardiac output and/or an increase in intracardiac pressure at rest or during stress” [7].

The incidence of heart failure is steadily increasing throughout the world. Thus, in developed countries this figure is 1.1-2.2% of the adult population, in Europe - from 0.41% to 2.1%, which is ten million people for the 903 million population of Europe. However, this indicator depends on the selected criteria by which heart failure is determined. In the MONICA study, which had "strict" criteria (shortness of breath and LV ejection fraction (LVEF) less than 32%), the prevalence was 1.6%, in the Rotterdam study, which used only clinical data - 4.1%. In the United States, the number of patients with heart failure exceeds 5.78 million people and more than 550,550 new cases are diagnosed annually [8]. In the Russian Federation (RF), out of 8.114 million people with heart failure, 3.421 million have a terminal stage of the disease. The gender and age dependence of the prevalence of heart failure (HF) is determined. In studies of the Kaiser Permanente system, comparisons were made between the incidence of heart failure from 1971 to 1975 and 1991-1996 among persons over 65-66 years of age, an increase in incidence over time by 14.1% was found, and in heart failure in Aries for males [9]. The Framingham Study, begun in 1949, showed that the prevalence of heart failure varied by both age and gender. Thus, the incidence of heart failure in its early stages was between 1.44 and 2.2 per 1000/year between the ages of 30 and 80 years, while the number increased with age among both men and women. According to the Rotterdam study, the likelihood of developing heart failure (heart failure) at age 52 is 30% for men and 32% for women. Heart failure was approximately twice as common among men as among women, except for those aged 50–60 years, where no cases were identified among men. According to the Cowie Hillingdon Study, 250 new cases were identified during a 25-month follow-up period in a population of 15,000 people; the average age at first diagnosis of heart failure was 74 years, and more common among men. In Russia, the incidence of heart failure increased from 29.1 cases per 1000 population at the age of 55 years, reaching 105.7 cases per 1000 population at the age of 95 years.

According to the Euro Heart Failure Survey Study (2011), the number of patients with preserved LVEF is close to 34%.

According to J. McMurray et al. Every year, about 3 people out of 1000 adults are discharged from the hospital with a diagnosis of heart failure, which accounted for 5.2% of all medical and geriatric hospitalizations and is one of the most common causes of hospitalization for patients aged 65 years and older. The increased prevalence of heart failure is associated not only with increased life expectancy, but also with improved treatments for heart failure and the cardiovascular diseases (CVDs) that lead to its development. Euro HeartFailure Survey Study in 69% of cases the cause was coronary heart disease (CHD), valvular heart disease (18%) and dilated cardiomyopathy (DCM) (10%). The unfavorable prognosis of patients with heart failure is evidenced by the results of the Fermingham study (USA), as well as the Rotterdam study (Netherlands). Thus, 6-year survival from the onset of clinical symptoms

according to the Framingham study was twenty-five% in men and thirty% in women, according to the Rotterdam study it was forty% and was the same in both men and women.

Literatures

1. Littré E. Oeuvres Complètes d'Hippocrate. Katz AM, trans. – Paris; France: J. B. Baillière, 1839–1861.
2. Arnold M. Katz. The “Modern” View of Heart Failure. How did we get here? // Circulation Heart Failure. 2008. - No. 1. R. 63-71.
3. Hippocrates. Jones WHS, trans. London; UK: William Heinemann, 1923–1931.
4. Arnold M. Katz. The "Modern" View of Heart Failure: How Did We Get Here? // Circ Heart Fail. 2008. No. 1. R. 63-71.
5. Harvey W. Exercitatio Anatomica de Moto Cordis et Sanguinis in Animalibus. – Frankfurt; Germany: William Fitzer, 1628.
6. Lower R. Tractus De Corde. Gunther RT, trans. 1669 / in: Early Science in Oxford. Franklin KJ, trans. London; UK: Dawsons, 1932.
7. Ахунбаев, О. А., & Мамасалиев, Н. С. (2022). Влияние анемии на течение сердечно-сосудистых заболеваний. Экономика и социум, (6-2 (97)), 329-332.
8. O. A. Axunbayev. (2023). Risk factors for anemia in patients with chronic heart failure. Conferencea, 48–53. Retrieved from.
9. O. A. Axunbayev. (2023). Anemia in cardiovascular diseases. Conferencea, 36–40. Retrieved from.
10. Begijanova D.T., & Akhunbaev O.A. (2022). Nosocomial respiratory infections in children and the role of coronaviruses in their occurrence. Экономика и социум, (3-2 (94)), 62-65.
11. Impaired carbohydrate tolerance as a risk factor for ischemic heart disease among the population of the Fergana Valley of the Republic of Uzbekistan. U. T. Sadikov, M. M. Karimova, O. A. Akhunbaev, Sh. A. Kholboboeva and Sh. M. Suyarov. BIO Web Conf., 65 (2023) 05032. Published online: 04 September 2023.