

RESEARCH OF WALL THICKNESS OF LEFT AND RIGHT VENTRICLES IN PATIENTS WITH ARTERIAL HYPERTENSION BASING ON POSTMORTEM EXAMINATION

A.S.Kerimkulova

State Medical University Semey, k-aiman@yandex.ru

The features of remodeling of the left and right ventricles of the heart in patients who died suffering from arterial hypertension has been studied basing on data from postmortem autopsy of 11 years in Semey. 372 autopsy protocols have been selected. Analysis of protocols showed that left ventricular hypertrophy was observed in almost all cases, while right ventricular hypertrophy in 78.2% of the cases. In arterial hypertension hypertrophy concerns not only left but also the right ventricle.

Keywords: *arterial hypertension, remodeling, mortem examination, the left ventricle, right ventricle*

Изучены особенности ремоделирования левого и правого желудочков сердца у умерших больных при жизни, страдавших АГ на основе данных патологоанатомических протоколов вскрытий г.Семей, умерших за 11 лет. Всего было отобрано 372 протоколов вскрытия. Анализ протоколов вскрытия показал, что гипертрофия левого желудочка отмечалась почти во всех случаях, тогда как в 78,2% случаях выявлена гипертрофия правого желудочка. При АГ происходит гипертрофия не только левого, но и правого желудочков сердца.

Ключевые слова: *артериальная гипертензия, ремоделирование, патологоанатомическое исследование, левый желудочек, правый желудочек*

The urgency of the problem

Arterial hypertension (AH) remains one of the most common diseases, cause of premature death and disability of patients.

Heart is one of the main target organs in AH. The processes of cardiac remodeling in hypertension have been taken much attention recent years, as it is shown that left ventricular hypertrophy (LVH) is an independent risk factor for cardiovascular disease and sudden death [1-3]. Studying the processes of cardiac remodeling in hypertension is one of the important issues of modern cardiology [4-6].

Most researches of heart remodeling in AH are devoted to the study of the left ventricle. A number of studies [7-9] shows that at early stage of changes occur more in the right ventricle, and in patients with stage I or II significant signs of hypertrophy of the right half of the heart are detected early enough.

The studies about cardiac remodeling in AH is mainly related to studies of changes in left ventricular (LV) and all received data are automatically interpolated to the right ventricle (RV). Analysis of long-term clinical experience has allowed A.L.Myasnikov in 1965 to conclude that some patients with AH signs of right heart failure advance the development of left ventricular failure; and in some patients with AH hypertrophy occurs not only in left but also in the right ventricle. However, nowadays there are few researches about the changes in RV in AH, because its study in the clinic represents significant methodological difficulties [10,11].

In this regard, *the aim of our study* was to study remodeling of the left and right ventricles of the heart in patients who died suffering from AH during the lifetime.

Materials and methods

We have analyzed data of 11 years basing on postmortem autopsy of people, who suffered from AH

during the life. For analyzing we used the data from «Pathology Office» of Semey, East Kazakhstan Region, Kazakhstan and Semey branch of «Center of Forensic Medicine, Ministry of Health of Kazakhstan».

The group for analysis included the data of autopsy of the dead as a result of acute cerebrovascular accidents, death from acute myocardial infarction during a day and death in acute surgical pathology of abdominal organs. Total number of selected was 372, 220 of them were men. 152 — women. The average age was 56.9 years (interquartile span from 49 to 66.5). Criteria of non-including in the analyzed groups were: the presence of respiratory diseases, defects of heart, obesity, heart failure. Thus, we selected autopsies of the dead, who had no comorbidities leading to remodeling of the right ventricle except of AH.

For the analysis of available data we took the following numbers that define the parameters of the left and right ventricle at the time of autopsy. As normal left ventricular wall thickness (without papillary muscle) we took: 0.7-1.2 cm, for right ventricle — 0.2-0.3 cm. Hypertrophy of the walls of LV and RV was divided nominally into 2 degrees: left ventricular hypertrophy: I degree — 1.3-2.0 cm, II degree — 2.1 or more, right ventricular hypertrophy: I degree — 0.4-0.6 cm, II degree — 0.7 cm or more.

Our analysis of protocols of autopsies containing 372 sudden death of persons suffering from AH has shown that there is variety of parameters of left and right ventricles.

When studying the parameters characterizing the state of the left ventricle we revealed that the normal size of the left ventricle identified in 2 of the deceased (0.5%), left ventricular hypertrophy was noted in 99.5% of cases, I degree of LVH in 61% of cases — 226 deaths (age: median 55; interquartile span from 48 to 67); II degree of LVH in 38.5% of cases — 144 deaths (age 57, from 49.5 to 64).

Changing of the parameters of the right ventricle in the study group was defined as follows: the normal size — in 21.8% of cases (81 deaths in the age of 51, from 46 to 62), right ventricular hypertrophy (RVH) — in 78.2% of cases. Whereas, I degree was determined in 33.6% of cases (125 deaths in the age of 55, from 49 to 63), II degree — in 44.6% (5 died in age of 59, from 49 to 69).

Analysis of the autopsy showed that left ventricular hypertrophy was observed in almost all cases, while right ventricular hypertrophy — in 78.2% of the cases (Fig.1).

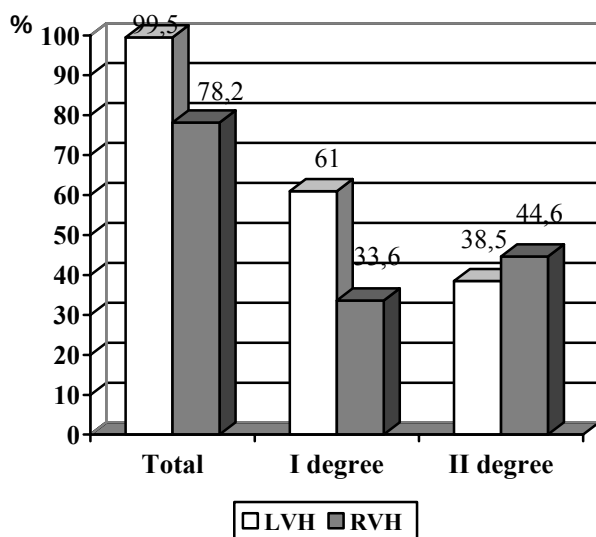


Fig.1. The frequency of ventricular hypertrophy (in %) basing on postmortem studies

Studying the parameters of RV revealed RVH in 78.2% of cases in which there were no any states accompanied by increase in the right ventricle. Revealed changes are confirmed by small numbers of works indicating the possibility of involvement of RV in the process of remodeling of the heart muscle in hypertension [10,12,13]. The recent studies showed that the diseases initially damaging the left ventricle, right ventricle is also involved in the pathological process. Back in 1965 A.L.Myasnikov basing on its long experience of clinical activity concluded that some patients with hypertension have not only hypertrophy of the left, but also of the right ventricular.

M.P.Rubanov, Veber V.R. [14] also have found similar evidence that LVH was noted in 100% of cases and nearly in 45% of cases RVH was detected including 21% of expressed one. According to G.G.Avtandilov [15] during usual postmortem examination RVH in AH is detected in 57.6% cases, during planimetric-weighted — in 78.2%, during histometrical — in 93.5% of cases.

These results agree with those of G.G.Avtandilov [15], M.P.Rubanov et al. [14].

Thus, according to postmortem studies RVH occurs in almost half of hypertensive patients. Such data should guide us to more detailed intravital study changes in the parameters of right ventricular in AH.

Therefore, of course, for practical cardiology it becomes relevant to study in hypertensive patients not only

left, but the right heart, since involvement in the pathological process of the right ventricle in patients with AH are likely to increase the risk of heart failure. Perhaps the evolution of AH in these patients is completely different than in patients with isolated left ventricular hypertrophy.

You can talk about the following options for pathological cardiac remodeling in hypertension:

— isolated left ventricular hypertrophy;

— combination of left ventricular hypertrophy and right ventricular hypertrophy.

Apparently, option when RVH precedes or prevails LVH is to be discussed. This question has not been studied sufficiently.

Therefore, it is interesting to study in patients with AH variants of cardiac remodeling in general, both left and right parts, despite certain technical difficulties.

The cases of death of patients with AH, in whom postmortem study does not show left ventricular hypertrophy present particular interest from the position of clinicians. The main known pathological criteria for AH are left ventricular hypertrophy and damage of target organs. However, if the death of the patient in stage II occurs due to some acute reasons and there are no reliable anamnestic data about the presence of AH and postmortem study found no evidence of LVH, it is unlikely that this diagnosis of patient will be verified as anatomopathologically as AH. Considering that patients with II stage may not have clinical signs of LVH, clinical data should not be underestimated in formulation of post-mortem diagnosis of AH. Obtained clinical data about the possible presence in patients with AH II and III stage with normal LV geometry raise the question to the study of other pathological markers of hypertension except of left ventricular hypertrophy and blood vessels.

At present it became necessary to study remodeling in general, both left and right parts.

Conclusions

Summarizing the material of described pathomorphological studies of Semey we can draw the following conclusions:

1. In AH hypertrophy occur not only in left, but also in the right ventricle.
2. There are cases of lack of LVH in AH.
3. The majority of patients who died from AH had moderate ventricular hypertrophy (61%).
4. A significant proportion of patients with hypertension had RVH (78.2%) that indicates that the possibility of different kinds of remodeling in AH.
5. The data obtained substantiate the need for a detailed diagnosis of intravital changes in the parameters of the left and right ventricles in different variants of cardiac remodeling in AH.

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