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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

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ATRIAL FIBRILLATION IN PATIENTS WITH OBESITY AND ARTERIAL HYPERTENSION

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✓ **Resume**

We conducted a study on 184 working-aged male police officers who have been diagnosed with arterial hypertension (AH). Our findings revealed that obesity in this cohort significantly raises the occurrence of atrial fibrillation. Furthermore, we identified a direct correlation between the severity of arrhythmia and the extent of obesity. The primary risk factors for atrial fibrillation in obese men include AH stages II-III, dilation of the left ventricle and left atrium, low serum levels of high-density lipoproteins, and an abnormal blood pressure profile (non-dipper type). No connection was found between atrial fibrillation, age, and ischemic heart disease in these obese patients.

Key words: arterial hypertension, obesity, atrial fibrillation

SEMIRIB KETISH VA ARTERIAL GIPERTENZIYA BILAN OG'RIGAN BEMORLARDA ATRIYAL FIBRILATSIYA

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✓ **Resume**

Biz arterial gipertenziya (AH) tashxisi qo'yilgan 184 ishlaydigan erkak politsiya xodimlarida tadqiqot o'tkazdik. Bizning topilmalarimiz shuni ko'rsatdiki, bu kogortada semirish atriya fibrilatsiyani sezilarli darajada oshiradi. Bundan tashqari, biz aritmiyaning og'irligi va semirish darajasi o'rtasidagi bevosita bog'liqlikni aniqladik. Semirib ketgan erkaklarda atriya fibrilatsiyaning asosiy xavf omillariga AH II-III bosqichlari, chap qorincha va chap atriumning kengayishi, yuqori zichlikdagi lipoproteinlarning past sarum darajasi va anormal qon bosimi profili (dipper bo'lmagan tur) kiradi. Ushbu semiz bemorlarda atriya fibrilatsiya, yosh va yurak ishemik kasalligi o'rtasida hech qanday bog'liqlik topilmadi.

Kalit so'zlar: arterial gipertenziya, semirish, atriya fibrilatsiya

ФИБРИЛЛЯЦИЯ ПРЕДСЕРДИЙ У ПАЦИЕНТОВ С ОЖИРЕНИЕМ И АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ

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✓ **Резюме**

Мы провели исследование с участием 184 мужчин-полицейских трудоспособного возраста, у которых была диагностирована артериальная гипертензия (АГ). Наши результаты показали, что ожирение в этой группе значительно повышает частоту возникновения фибрилляции предсердий. Кроме того, мы выявили прямую корреляцию между тяжестью аритмии и степенью ожирения. К основным факторам риска развития фибрилляции предсердий у мужчин с ожирением относятся АГ II-III стадии, дилатация левого желудочка и левого предсердия, низкий уровень липопротеидов высокой плотности в сыворотке крови и аномальный профиль артериального давления (не по типу Диппера). Не было обнаружено связи между фибрилляцией предсердий, возрастом и ишемической болезнью сердца у этих пациентов с ожирением.

Ключевые слова: артериальная гипертензия, ожирение, фибрилляция предсердий

Relevance

Atrial fibrillation is the most common heart rhythm disorder after extrasystole, frequently encountered by healthcare professionals [5, 6, 8]. Currently, about one-third of all hospitalizations for arrhythmias are related to atrial fibrillation [4], and the actual prevalence of atrial fibrillation in the general population is steadily increasing, with estimates approaching 2% [1]. Numerous studies have focused on identifying the risk factors for atrial fibrillation, which include both cardiac conditions (such as coronary artery disease, arterial hypertension, and heart valve disorders) and non-cardiac pathological states (like obesity and type 2 diabetes mellitus). Obesity is a common comorbidity and a leading risk factor for the development of arterial hypertension [7, 9]. It contributes to structural and functional changes in the myocardium, a process described as lipotoxicity. Lipotoxicity involves the accumulation of plasma triglycerides within the myocardium [10, 11], leading to myocardial steatosis and the subsequent dilation of heart chambers. Therefore, the combination of obesity and arterial hypertension results in myocardial dysfunction and has a proarrhythmic effect.

To examine the prevalence of atrial fibrillation in men with arterial hypertension and abdominal obesity, and to identify factors associated with atrial fibrillation in this population.

Purpose of the study: To study atrial fibrillation in patients with obesity and arterial hypertension

Materials and methods

A total of 184 male police officers from Nizhny Novgorod with arterial hypertension, aged 20 to 65 years (mean age 43.6 ± 5.8 years), were examined. Exclusion criteria included the presence of thyrotoxicosis, valvular heart defects, diabetes mellitus, severe comorbid conditions, and secondary obesity (due to hypothyroidism or hypocortisolism). The presence and severity of obesity were assessed based on body mass index (BMI), calculated as $BMI (kg/m^2) = \text{weight (kg)} / \text{height (m}^2\text{)}$. To evaluate the distribution type of adipose tissue, the waist-to-hip ratio was calculated. Lipid profile indicators were measured in all patients, including triglyceride levels, total cholesterol, low-density lipoproteins (LDL), very-low-density lipoproteins (VLDL), and high-density lipoproteins (HDL). Fasting blood glucose was analyzed using a glucose dehydrogenase mediator reaction with an Accu-Chek Active Roche device and test strips. Echocardiography (ECHO) was performed using a LOGIQ 3, General Electric, USA. Measurements included left ventricular wall thickness, end-diastolic and end-systolic dimensions of the left ventricle, left atrial size, and ejection fraction. Chronic heart failure was assessed based on the six-minute walk test [3]. The 24-hour blood pressure profile was evaluated using 24-hour ambulatory blood pressure monitoring [2].

Statistical analysis was performed using Statistica 6.0. The distribution characteristics of the results were evaluated using the Kolmogorov-Smirnov test. For non-normally distributed data, results were presented as the median and 25th and 75th percentiles. The Mann-Whitney test was used to assess the significance of differences between two independent samples. Differences between relative values were analyzed using the chi-square (χ^2) test. To determine the strength of association between qualitative indicators, Yule's association coefficient was calculated. Relative risk of rhythm disturbances was calculated for individual conditions along with their confidence intervals. In cases where values in a 2x2 table were equal to zero, Yates' correction was applied to the calculation of the Yule association coefficient and relative risk, similar to the chi-square test. The critical significance level (p) for this study was set at 0.05.

Results and discussions

All patients received antihypertensive therapy at the inpatient stage in accordance with established standards. Comorbid conditions were similar across groups, including chronic gastrointestinal disorders (gastritis, peptic ulcer disease, pancreatitis, and cholecystitis in remission) and spinal osteochondrosis; cardiac pathology manifested as coronary artery disease with stable angina of class I–II.

The prevalence of atrial fibrillation in each group is shown in Figure 1. It was found that the frequency of atrial fibrillation significantly ($p=0.08$) increased with higher body weight: no atrial fibrillation was detected in patients with normal weight, while it was observed in 4.3% of Group II participants and in 15.3% of those in Group III. In all patients with overweight, the persistent form of atrial fibrillation was detected, while in the group of obese patients, both the persistent (43.8%) and permanent forms (56.2%) of atrial fibrillation were observed. The presence and increasing severity of obesity were associated with a tendency for a higher prevalence of atrial fibrillation. Specifically, among patients with grade I obesity, atrial fibrillation was found

in 12.3% (8 out of 65), whereas in those with grade II–III obesity, it was observed in 21.1% (7 out of 33), with $p = 0.25$. Furthermore, our analysis revealed that obesity significantly ($p=0.004$) increased the relative risk of atrial fibrillation by 6.12 times. Thus, obesity notably raises the risk of atrial fibrillation in patients with arterial hypertension, with a clear direct correlation between the prevalence of atrial fibrillation and the severity of obesity.

We assessed the significance of various risk factors for the development of atrial fibrillation in the context of arterial hypertension with obesity (Table 1). The analysis revealed that statistically significant risk factors for atrial fibrillation in patients with obesity included left ventricular and left atrial dilation, stage II–III hypertension, and low levels of high-density lipoprotein (HDL) cholesterol, with no significant risk association with coronary artery disease. Notably, the presence of coronary artery disease was not associated with an increased risk of atrial fibrillation, while atrial fibrillation was linked to lipid profile abnormalities, particularly low HDL cholesterol levels. This finding suggests that obesity may introduce additional factors that exacerbate myocardial remodeling risk. The potential impact of myocardial lipodystrophy, as described in the literature [10, 11], may also intensify the effects of other arrhythmogenic factors in these cases.

Blood pressure profile disturbances in patients with obesity and atrial fibrillation, as determined by 24-hour ambulatory blood pressure monitoring, corresponded to a non-dipper pattern. A correlation between atrial fibrillation and an abnormal daily blood pressure profile was identified. The prevalence of atrial fibrillation in non-dippers was 22.2%, compared to 6.8% in dippers, with $p=0.03$.

Conclusion

Obesity in working-age men with arterial hypertension significantly increases the prevalence of atrial fibrillation-type arrhythmias (15.3% compared to 0% in individuals with normal body weight, $p=0.004$), with a clear association between arrhythmia and the severity of obesity. The relative risk of developing atrial fibrillation in patients with arterial hypertension combined with obesity is increased by 6.2 times, $p=0.004$. Significant risk factors for atrial fibrillation in men with obesity include stage II–III hypertension, left atrial and left ventricular dilation, low levels of high-density lipoprotein (HDL) cholesterol, and an abnormal daily blood pressure profile of the non-dipper type ($p=0.03$). No association was found between atrial fibrillation in obese patients and either age or the presence of coronary artery disease.

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