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Sleep disturbances in patients with comorbid coronary heart disease and depression

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ABSTRACT

Aim. To study the presence and severity of insomnia in patients with comorbid coronary heart disease (CHD) and depressive disorder (DD).

Materials and methods. The study included 132 patients with CHD (class II–III exertional angina after myocardial infarction experienced more than 6 months ago): 58 patients with DD and 74 patients without depression. The Beck Depression Inventory (BDI) was used to diagnose DD. The diagnosis in all cases was confirmed by a therapist. Sleep disturbances were assessed using the Sheehan Patient-Rated Anxiety Scale (ShAS). The data were presented as $M \pm SD$; n (%); and *Me* [25%; 75%]. The differences were considered significant at $p < 0.05$.

Results. Insomnia in the general group of patients was registered as follows: none or clinically not significant – in 62 patients (54.9%), clinically significant – in 51 patients (45.1%). Night awakenings in the general group of patients were detected as follows: none or clinically not significant – in 66 patients (58.4%), clinically significant – in 47 patients (41.6%). Disturbances in falling asleep and night awakenings were significantly pronounced in patients with CHD with identified DD compared to patients without mental disorders: disturbances in falling asleep – 2 [1; 3] vs. 1 [0; 2] ($p = 0.0001$), night awakenings – 2 [1; 3] vs. 1 [0; 2] ($p = 0.00002$), respectively. In the group of CHD with DD ($n = 58$), 2 people (3.4%) did not complete the scale. Among those who did, 12 patients (21.4%) had no difficulty falling asleep, 9 patients (16.1%) had little difficulty, and 35 patients (62.5%) had clinically significant disturbances. In the group of CHD without DD ($n = 74$), 17 people (23%) did not complete the scale. Among those who did ($n = 57$), 21 patients (36.8%) had no difficulty falling asleep, 20 patients (35.1%) had little difficulty, and 16 patients (28.1%) had clinically significant problems. In patients with comorbid CHD and DD who completed the ShARS ($n = 56$), 7 patients (12.5%) had no night awakenings, 17 patients (30.4%) had few night awakenings, and 32 patients (57.1%) had clinically significant disturbances in maintaining sleep. In the group without DD, among those who completed the ShARS ($n = 57$), 18 patients (31.6%) had no night awakenings, 24 patients (42.1%) had few night awakenings, and 15 patients (26.4%) had clinically significant disturbances in maintaining sleep. Significant differences were noted for all test questions ($p < 0.0005$).

Conclusion. In patients with comorbid CHD and DD, changes in the circadian rhythm are detected in the form of significant disturbances in falling asleep and awakening, which can aggravate the clinical course of CHD and the prognosis of patients with cardiovascular diseases.

Keywords: coronary heart disease, depressive disorders, myocardial infarction, sleep disturbances

Conflict of interest. The authors declare the absence of obvious or potential conflicts of interest related to the publication of this article.

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Conformity with the principles of ethics. All patients signed an informed consent to participate in the study. The study was approved by the local Ethics Committee at the Cardiology Research Institute of Tomsk NRMC.

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Нарушения сна у больных ишемической болезнью сердца в сочетании с депрессивными расстройствами

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РЕЗЮМЕ

Цель. Изучить наличие и выраженность инсомнии у больных ишемической болезнью сердца (ИБС) в сочетании с депрессивными расстройствами (ДР).

Материалы и методы. В исследование включены 132 больных с ИБС (со стенокардией напряжения II–III функциональных классов после перенесенного инфаркта миокарда давностью более 6 мес): 58 пациентов с ДР и 74 пациента без ДР. Для диагностики ДР использовалась шкала депрессии Бека (BDI). Диагноз во всех случаях подтверждался при консультации психиатра-психотерапевта. Нарушения сна оценивались при анализе шкалы Шихана (ShARS). Данные представлены в виде $M \pm SD$; n (%); *Me* [25%; 75%], значимым считалось различие при $p < 0,05$.

Результаты. Нарушение засыпания в общей группе пациентов: нет или клинически не значимы – у 62 пациентов (54,9%), клинически значимые – у 51 пациента (45,1%). Ночные пробуждения в общей группе пациентов: у 66 (58,4%) – нет или клинически незначимые ночные пробуждения, клинически значимые – у 47 (41,6%). Нарушения засыпания и ночные пробуждения были значимо выражены у пациентов ИБС с выявленными ДР в сравнении с больными без расстройств психики: нарушения засыпания 2 [1; 3] vs 1 [0; 2] ($p = 0,0001$), ночные пробуждения 2 [1; 3] vs 1 [0; 2] ($p = 0,00002$) соответственно. В группе ИБС с ДР ($n = 58$) два человека (3,4%) не заполнили шкалу. Среди заполнивших 12 пациентов (21,4%) не имели проблем с засыпанием, 9 (16,1%) – немного, 35 (62,5%) – клинически выраженные нарушения. В группе ИБС без ДР ($n = 74$) 17 человек (23%) не заполнили шкалу. Среди заполнивших ($n = 57$) 21 пациент (36,8%) не имел проблем с засыпанием, 20 (35,1%) имели небольшие нарушения, 16 пациентов (28,1%) имели клинически выраженные нарушения. У больных ИБС в сочетании с ДР и заполнивших ShARS ($n = 56$) 7 (12,5%) не пробуждались ночью, 17 (30,4%) – немного пробуждались, у 32 (57,1%) наблюдались клинически выраженные нарушения поддержания сна. В группе без ДР среди заполнивших шкалу Шихана ($n = 57$) 18 (31,6%) не пробуждались ночью, 24 (42,1%) – немного пробуждались, у 15 (26,4%) отмечались клинически выраженные нарушения поддержания сна. По всем пунктам тестирования отмечены достоверные различия ($p < 0,0005$).

Заключение. У пациентов с хронической коронарной болезнью на фоне ДР выявляются изменения в суточном ритме в виде значительных нарушений засыпания и пробуждений, что может усугубить клиническое течение ИБС и прогноз больных сердечно-сосудистыми заболеваниями.

Ключевые слова: ишемическая болезнь сердца, депрессивные расстройства, инфаркт миокарда, нарушения сна

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

Источник финансирования. Авторы заявляют об отсутствии финансирования при проведении исследования.

Соответствие принципам этики. Информированное согласие было подписано всеми участниками исследования. Исследование одобрено локальным этическим комитетом НИИ кардиологии Томского НИМЦ.

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INTRODUCTION

Every year psycho-emotional stress is increasing worldwide, especially among patients with cardiovascular diseases, as evidenced by large epidemiological studies [1, 2]. Almost 70% of patients with arterial hypertension and coronary heart disease (CHD) are characterized by high stress levels. This means that the incidence of affective disorders in patients with cardiovascular disease is also increasing: in the COMET study, anxiety symptoms were present in 47.2% of outpatient cases, in 25.5% of cases, they were clinically significant; symptoms of depression were found in 42.5% of patients, of which 16.3% of cases were clinically significant [1]. It is important to consider that symptoms of depression had not been previously identified in patients. Subsequently, depressive disorder (DD) is often not diagnosed in a timely manner and can aggravate the course of cardiovascular diseases and affect the prognosis [3, 4].

World Health Organization (WHO) assumes that by 2030, CHD and DD will be the leading causes of disability [5, 6]. Depression is the most powerful risk factor for CHD and a predictor of mortality in this category of patients: DD affects 40% of patients in the post-infarction period, increasing the risk of death by 3–6 times [7]. It is known that cardiovascular catastrophes, in particular myocardial infarctions, most often occur at night and early morning hours [8] and are associated with the activation of the sympathoadrenal system. Healthy sleep plays a major role in the balance between the parasympathetic and sympathetic nervous systems, and sleep disorders (insomnia) prevent a physiological nocturnal decrease in sympathetic activity, which in turn affects many pathogenetic mechanisms of cardiovascular pathology. At the same time, it is known that one of the most common manifestations of DD is sleep disturbances, with the incidence reaching up to 80% [9]. Therefore, there is no doubt in the relevance of studying sleep disturbances in patients with comorbid CHD and DD.

MATERIALS AND METHODS

After signing the informed consent, 132 patients with CHD (class II–III exertional angina after myocardial infarction experienced more than 6 months ago) were included in the study at the Cardiology Department of Cardiology Research Institute (Tomsk): 58 patients with DD (group 1) and 74 patients without depression (group 2). The Beck Depression Inventory (BDI) was used to diagnose and determine the severity of DD (the BDI score of more than 19 was considered as elevated level of depression). In case of elevated depression levels according to BDI, a consultation with a psychiatrist and therapist took place to confirm the diagnosis of DD. We also used the Sheehan Patient-Rated Anxiety Scale (ShARS) to identify sleep disturbances and comorbid DD and anxiety. Sleep disturbances were assessed by analyzing items 30 and 31 of the ShARS. The data were presented as $M \pm SD$; n (%) and Me [25%; 75%]. The differences were considered significant at $p < 0.05$. To test the normality of data distribution, the Shapiro – Wilk test was used. For normally distributed variables, the Student's *t*-test was used, for non-normally distributed variables, the Mann – Whitney test was applied. To analyze qualitative variables, contingency tables and the $\chi 2$ test were used.

RESULTS

The patients did not differ in the main clinical and demographic characteristics. However, in the CHD group with DD, a trend toward more frequent comorbidity of diseases in women was noted: in group 1, 47 men (81%) and 11 women (19%), in group 2 – 68 men (91.9%) and 6 women (8.1%) ($p = 0.06$). The average age in both groups was comparable and

was 55.5 ± 5.9 years vs. 54 ± 7.4 years ($p > 0.05$). After consultation with a psychiatrist, the following disorders were diagnosed: recurrent depressive disorder – in 37.9% of cases, depressive episode – in 27.6% of cases, dysthymia – in 25.9% of cases, bipolar disorder – in 8.6% of cases (Figure). Among depressive episodes, moderately expressed ones prevailed – 92%.

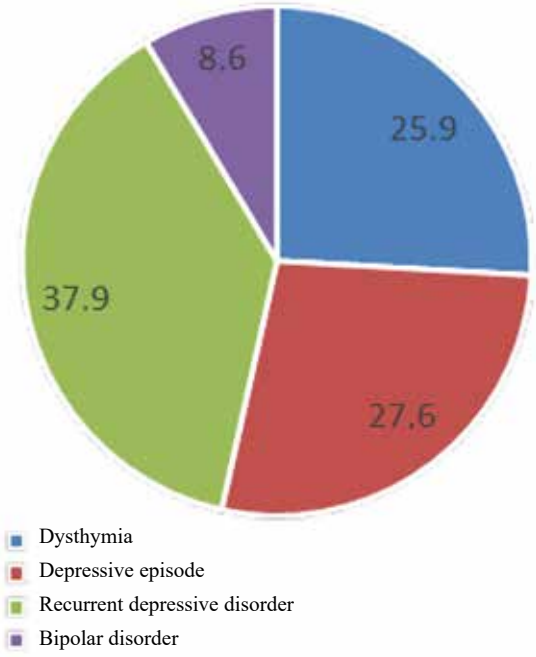

Figure. The diagnosis of depressive disorders in patients with coronary heart disease after previously experienced myocardial infarction

Following the ShARS analysis, high comorbidity with anxiety disorders was noted (53.4%). To study the presence and severity of insomnia, a clinical interview and the ShARS were used (items 30 and 31 (sleep disturbances and night awakenings, respectively)).

Disturbances of falling asleep in the general group of patients were registered as follows: none or clinically not significant – in 62 patients (54.9%), clinically significant – in 51 patients (45.1%). Night awakenings in the general group of patients were registered as follows: none or clinically not significant – in 66 patients (58.4%), clinically significant – in 47 patients (41.6%). Difficulty falling asleep and night awakenings were significantly pronounced in patients with comorbid CHD and DD compared to patients without mental disorders: difficulty falling asleep – 2 [1; 3] vs. 1 [0; 2] ($p = 0.0001$), night awakenings – 2 [1; 3] vs. 1 [0; 2] ($p = 0.00002$), respectively. In the group of CHD with DD ($n = 58$), 2 people (3.4%) did not complete the scale. Among those who did, 12 patients (21.4%) had no difficulty falling asleep, 9 patients (16.1%) had little difficulty, and 35 patients (62.5%) had clinically significant disturbances. In the group of CHD without DD ($n = 74$), 17 people (23%) did not complete the scale. Among those who did ($n = 57$), 21 patients (36.8%) had no difficulty falling asleep, 20 patients (35.1%) had little difficulty, and 16 patients (28.1%) had clinically significant problems. In patients with comorbid CHD and DD who completed the ShARS ($n = 56$), 7 patients (12.5%) had no night awakenings, 17 patients (30.4%) had few night awakenings, and 32 patients (57.1%) had clinically significant disturbances in maintaining sleep. In the group without DD, among those who completed the ShARS ($n = 57$), 18 patients (31.6%) had no night awakenings, 24 patients (42.1%) had few night awakenings, and 15 patients (26.4%) had clinically significant disturbances in maintaining sleep. Significant differences were noted for all test questions ($p < 0.0005$).

DISCUSSION

The relationship between two diseases – CHD and DD – has been studied for years. Data of large studies (Cardiovascular Health Study, MONICA, ENRICHD, INTERHEART, SADHART) prove that depression is a powerful prognostic factor for cardiovascular complications. The relationship between CHD and DD is not accidental, since there are common pathogenetic mechanisms underlying both the diseases and causes of mortality. There are two main mechanisms that cause sudden cardiac death in patients with cardiovascular diseases: increased thrombus formation and impaired cardiac autonomic regulation with the development of severe arrhythmias [10, 11].

It is known that cardiac autonomic regulation is closely related to circadian rhythms and quality of sleep in patients with CHD [12]. Considering the fact that DD is often not diagnosed in a timely manner [1], and sleep disturbances are some of the manifestations and diagnostic criteria of affective disorders, we can always suspect a mental disorder in the context of insomnia and refer to a specialist. In our study, we analyzed sleep disturbances in patients with a history of myocardial infarction in combination with DD. In order to assess insomnia, we used the ShARS. It turned out that there was high comorbidity of DD with anxiety disorders (53.4%), which is consistent with literature data. According to epidemiological studies,

60% of patients with DD have anxiety symptoms [13].

According to our study, sleep disturbances were also found in patients with CHD without mental disorders: approximately every third patient had minor difficulties falling asleep, every fourth patient had significant difficulties falling asleep and maintaining sleep. Apparently at this stage the patient already needs counseling and comprehensive rehabilitation: confidential "doctor-patient" contact for patient awareness about their disease, secondary prevention, healthy lifestyle, maintaining therapy compliance, consultations by a psychologist and therapist to prevent the development of clinically significant signs of anxiety and depression.

With the development of DD in patients with CHD, the severity of sleep disturbances increased significantly: more than half of the patients had severe disturbances of both falling asleep (62.5% of cases) and maintaining sleep throughout the night (57.1% of cases). Given that with sleep disturbances, the resulting stress causes hyperactivation of the sympathoadrenal system and autonomic dysfunction [14], this can contribute to deterioration of the clinical presentation of CHD and cause serious cardiovascular complications. Certainly, the obtained data determine the need for close attention to patients with comorbid CHD and mental disorders, timely screening for DD, and effective correction of the disease with modern antidepressants.

CONCLUSION

Patients with comorbid CHD and DD are characterized by changes in the circadian rhythm in the form of significant disturbances of falling asleep and awakening, which can aggravate the clinical course of CHD and the prognosis of patients with cardiovascular diseases. Identification of sleep disturbances through interviews and the use of psychometric tools will allow to suspect the presence of DD and prescribe antidepressant therapy in a timely manner, improving the clinical presentation of CHD and reducing the risk of developing life-threatening cardiovascular complications.

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