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CLINICAL CASE OF CHRONOTHERAPY OF ARTERIAL HYPERTENSION: FOCUS ON DIASTOLIC BLOOD PRESSURE

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A clinical case of chronotherapy of arterial hypertension (AH) with insufficient blood pressure (BP) night decline has described. Patient P., the BP daily means according to ambulatory BP monitoring (ABPM) was 148/84 mmHg, BP circadian rhythm violation with insufficient degree of nocturnal BP reduction. We recommended the patient to change the mode of antihypertensive drug intake from morning to evening in the same dose. After 3 months complete AH control was achieved with normalization of diastolic BP profile.

KEY WORDS: arterial hypertension, chronotherapy, ambulatory blood pressure monitoring, diastolic blood pressure

КЛІНИЧНИЙ ВИПАДОК ХРОНОТЕРАПІЇ ГІПЕРТОНІЧНОЇ ХВОРОБИ: ФОКУС НА ДІАСТОЛІЧНИЙ АРТЕРІАЛЬНИЙ ТИСК

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Описано випадок хронотерапії пацієнта з гіпертонічною хворобою (ГХ) з недостатнім ступенем нічного зниження артеріального тиску (АТ). Пацієнт П., середньодобовий АТ за даними добового моніторингу АТ (ДМАД) 148/84 мм рт. ст., порушення циркадного ритму АТ за типом «недостатня ступінь нічного зниження АТ». Пацієнту рекомендовано змінити режим прийому гіпотензивного препарату в тій же дозі з ранкового на вечірній. Через 3 місяці було досягнуто повний контроль ГХ з нормалізацією добового профілю діастолічного АТ.

КЛЮЧОВІ СЛОВА: гіпертонічна хвороба, хроноterapia, добове моніторування артеріального тиску, діастолічний артеріальний тиск

КЛИНИЧЕСКИЙ СЛУЧАЙ ХРОНОТЕРАПИИ ГИПЕРТОНИЧЕСКОЙ БОЛЕЗНИ: ФОКУС НА ДИАСТОЛИЧЕСКОЕ АРТЕРИАЛЬНОЕ ДАВЛЕНИЕ

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Описан случай хронотерапии пациента с гипертонической болезнью (ГБ) с недостаточной степенью ночного снижения артериального давления (АД). Пациент П., среднесуточное АД по данным амбулаторного мониторинга 148/84 мм рт. ст., нарушение циркадного ритма АД по типу «недостаточная степень ночного снижения АД22». Пациенту рекомендовано сменить режим приема гипотензивного препарата в той же дозе с утреннего на вечерний. Через 3 месяца достигнут полный контроль ГБ с нормализацией суточного профиля диастолического АД.

КЛЮЧЕВЫЕ СЛОВА: гипертоническая болезнь, хроноterapia, суточное мониторирование артериального давления, диастолическое артериальное давление

INTRODUCTION

During ambulatory blood pressure (BP) monitoring (ABPM) its circadian fluctuations in accordance with international recommendations, are evaluated by the degree of its night-time reduction, the so-called «sleep-time relative BP decline» [1]. Depending on the

value of this index the 4 types of circadian blood pressure profile are distinguished: «dippers» – physiological decrease in BP during the night – sleep-time relative BP decline 10–20 %; «overdippers» – an excessive fall in BP at night, sleep-time relative BP decline > 20 %; «non-dippers» – the lack of BP reduction at night, sleep-time relative BP

decline < 10 %; «night-peakers» – night-time BP more than during daily activity, sleep-time relative BP decline < 0 [1].

The cardiovascular risk (CVR) and AH prognosis in vast majority cases is assessed taking into account only the systolic BP (SBP) daily profile [2–3]. However, diastolic blood pressure (DBP) is an important predictor of AH outcomes and successful BP control [4] and its daily fluctuations may have clinical and prognostic significance in patients with hypertension also, that we has shown earlier [5].

A complete chronobiological analysis of BP using ABPM provides dynamic information about the BP level, which allows to optimize the drugs administration, taking into account the individual BP daily profile [6–7].

CLINICAL CASE

Patient P., male, 78 y.o., complained of chest pain, unstable BP with a tendency to increase. Chest pain occurs on physical exertion (climbing on the fifth floor), relieved by rest or nitroglycerin. BP increases up to 175–180/90 – 100 mm Hg, usually in the evening, accompanied by palpitations, facial flushing and headache in the occipital region.

Retired engineer, does not smoke, no alcohol abuse. The living conditions are satisfactory. Physical activity is an average – daily perform morning exercises. Past medical history – chronic cholecystitis, pancreatitis, gastroduodenitis.

Patient has been suffering from arterial hypertension for 20 years. In 2011 a paroxysm of atrial flutter was revealed, with new-onset complete right bundle branch block. The same time chest pain occurred for the first time. Patient was examined in the institute of therapy named by L. T. Malaya, where the diagnosis was made: AH, II stage, 2 degree, high CVR. Ischemic heart disease, stable angina, II FC. Atherosclerotic cardiosclerosis. Paroxysmal atrial flutter. Heart failure, IIA stage, II FC. Since that time constantly takes losartan in a daily dose of 50 mg, once daily in the morning, occasionally – nitrogranulong, cardiomagnil, and nitroglycerin – as needed.

During last 2–3 months the chest pain frequency increased up to 3–4 times a week.

On physical examination, the general condition was satisfactory. Patient was of normal constitution, proper nutrition, height 1.72 m, weight 72 kg, BMI 24.3 kg/m². Peripheral edema was not found. Over the

entire surface of the lungs vesicular breathing has been auscultated, no wheezing. Cardiac activity was rhythmic with a heart rate of 70 beats/min. Cardiac sounds were clear, sonorous; accentuated 2 tone over the aorta. A short systolic murmur was determined in the aortic valve auscultating point. The borders of the relative cardiac dullness were not extended. BP on the right arm was 164/90 mm Hg, on the left arm – 165/88 mm Hg. Abdomen was soft, painless. The liver was at the edge of the costal arch, painless on palpation. Pasternatsky's sign was negative bilateral.

Further laboratory and instrumental investigations according to current standards [8–9] were prescribed, as well as ABPM and quality of life (QOL) survey using the SF-36 questionnaire was recommended.

The other obtained results: full blood count, urinalysis, fasting plasma glucose, creatinine, urea, blood electrolytes, ALT, AST, total cholesterol – within normal rangers; ECG – sinus rhythm, heart rate 65/min, complete right bundle branch block, frequent supraventricular extrasystoles; ultrasound of the heart – diffuse cardiosclerosis, moderate left ventricle hypertrophy, aortic stenosis 1st. with minimal regurgitation, EF – 59 %; ultrasound of the abdomen and kidneys – unremarkable. ABPM – the SBP and DBP daily means as well as hypertension load were increased – the stable systolic hypertension during all period of monitoring was recorded; the SBP, DBP, pulse pressure (PP) and mean arterial pressure (MAP) daily patterns were as non-dipper type (tab. 1–3.). The QOL survey showed low levels of physical and mental health components (tab. 4.).

Diagnosis: AH, stage II, grade 2, high CVR, violation of the SBP, DBP, MAP and PP circadian rhythm as non-dipper. Left ventricular hypertrophy. Ischemic heart disease, stable angina, FC. Atherosclerotic cardiosclerosis. Atherosclerosis of the aorta and its valves with aortic stenosis 1 st. Paroxysmal atrial flutter. Heart failure IIA stage with preserved left ventricular function, II FC.

The patient was prescribed bisoprolol 2.5 mg in the morning for a long time under the control of heart rate, cardiomagnil 75 mg in the evening for a long time, losartan was recommended not to take the morning, but shift the time of drug intake to the bedtime, in the same dose – 50 mg – under the control of blood pressure.

Three months later, the patient came to the follow-up. He noted the improvement in general condition. The frequency of chest pain decreased to 1–2 times a week, according to a home blood pressure monitoring BP stabilized at 130–140/80–85 mm Hg. Dynamics of QOL and ABPM indices is presented in Tables 1–4. There is a decrease in daily BP means and hypertension load, especially for DBP. Daily DBP and MAP profiles transformed from non-dipper to dipper; the daily profiles of SBP and

PP remain non-dipper, but, in comparison with the baseline values, the degree of their night-time reduction has increased, which also can be considered as a positive dynamics. Repeated QOL survey showed a significant improvement in the mental health component.

Thus, we achieved the SBP, MAP and PP daily means reduction and target levels for DBP and normalization of DBP and MAP daily profiles only by shifting the time of antihypertensive drug – losartan – administration.

Table 1

BP means according to ABPM data

Parameter	Visit 1 (20.01.16)	Visit 2 (30.03.16)	Normal ranges
24-h period			
SBP mean, mm Hg	148	138	90–130
DBP mean, mm Hg	84	75	60–80
MAP mean, mm Hg	110	99	80–95
PP mean, mm Hg	65	63	no more then 46
Awake period			
SBP mean, mm Hg	150	140	90–135
DBP mean, mm Hg	86	77	60–85
MAP mean, mm Hg	112	101	80–95
PP mean, mm Hg	65	63	no more then 46
Asleep period			
SBP mean, mm Hg	142	129	80–120
DBP mean, mm Hg	78	66	50–70
MAP mean, mm Hg	104	90	80–95
PP mean, mm Hg	65	62	no more then 46

Table 2

Hypertension load indices according to ABPM data

Parameter	Visit 1 (20.01.16)	Visit 2 (30.03.16)	Normal ranges
24-h period			
Time index SBP, % (duration of BP excess)	91,6	67,8	up to 15
Time index DBP, % (duration of BP excess)	67,0	22,9	up to 15
Square index SBP, mm Hg/h (hyperbaric index)	438,9	213,3	up to 15
Square index DBP, mm Hg/h (hyperbaric index)	111,1	34,1	up to 15
Awake period			
Time index SBP, % (duration of BP excess)	87,2	61,6	up to 15
Time index DBP, % (duration of BP excess)	58,9	22,6	up to 15
Square index SBP, mm Hg/h (hyperbaric index)	254,1	139,6	up to 15
Square index DBP, mm Hg/h (hyperbaric index)	52,0	18,2	up to 15
Asleep period			
Time index SBP, % (duration of BP excess)	98,9	80,0	up to 15
Time index DBP, % (duration of BP excess)	80,2	23,5	up to 15
Square index SBP, mm Hg/h (hyperbaric index)	184,8	73,7	up to 15
Square index DBP, mm Hg/h (hyperbaric index)	59,1	15,9	up to 15

Table 3

Daily BP pattern according to ABPM data

Sleep-time relative BP decline	visit 1 (20.01.16)	visit 2 (30.03.16)
SPB	5,4 % non-dipper	7,8 % non-dipper
DBP	9,4 % non-dipper	13,9 % dipper
MAP	7,2 % non-dipper	10,2 % dipper
PP	0 % non-dipper	1,58 % non-dipper

Table 4

Health-related quality of life (in points by SF-36 scale)

Scale	visit 1 (20.01.16)	visit 2 (30.03.16)
Physical Functioning (PF)	80	75
Role- Physical (RP)	0	0
Bodily Pain (BP)	41	41
General Health (GH)	60	75
Physical Component Summary (PCS)	40,43	39,39
Vitality (VT)	75	75
Social Functioning (SF)	50	87,5
Role- Emotional (RE)	0	100
Mental Health (MH)	64	88
Mental Component Summary (MCS)	36,75	58,74

CONCLUSIONS

In the treatment of patients with hypertension it is important not only to achieve target BP levels, but also to restore and

maintain its physiological circadian rhythm, including, as the present case reports, DBP. AH control without antihypertensive drugs dosage increase is possible only within chronotherapeutic approach.

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