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THE PICKWICKIAN SYNROME CASE

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The article demonstrates a clinical case of Pickwickian syndrome. The clinical manifestation of the syndrome, a diagnostic approach including instrumental methods, and the up-to-date treatment based on the literature data are shown. The significance of maintaining lifestyle modification with accent on a normalization of body mass is emphasized.

KEY WORDS: the Pickwikian syndrome, obesity-hypoventilation syndrome, lifestyle modification

ВИПАДОК СИНДРОМУ ПИКВИКА

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У статті представлена клінічна картина синдрому Піквікіка. Показані клінічні прояви синдрому, діагностичний підхід, включаючи інструментальні методи, та наведено сучасне лікування на підставі літературних даних. Наголошено на важливості підтримки модифікації способу життя з акцентом на нормалізації маси тіла.

КЛЮЧОВІ СЛОВА: синдром Піквіка, синдром ожиріння-гіповентиляції, модифікація способу життя

СЛУЧАЙ СИНДРОМА ПИКВИКА

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Данная статья демонстрирует клинический случай синдрома Пиквика. Показаны клинические проявления синдрома, диагностический подход, включающий инструментальные методы, и современное лечение на основе литературных данных. Подчеркивается важность сохранения модификации образа жизни с акцентом на нормализацию массы тела.

КЛЮЧЕВЫЕ СЛОВА: синдром Пиквика, синдром ожирения-гиповентиляции, модификация образа жизни

INTRODUCTION

Obesity and its consequences lead to increase of morbidity and negatively influence on quality of life with increased healthcare expenses. One of these repercussions is obesity-hypoventilation syndrome (OHS), or alveolar-hypoventilation in obesity [1]. It has been named as the «Pickwickian syndrome» after Joe, the fat, red faced boy in Charles Dickens' The Pickwick Papers [2]. The diagnosis of this syndrome can be made in the presence of three key components such as obesity if body

mass index (BMI) exceeds 30 kg/m^2, obstructive sleep apnea and daytime or wakefulness hypoventilation resulting in chronic hypercapnia in the absence of alternative causes explaining the hypoxemia-hypercapnia. These signs are known as the Pickwickian triad, too. Although it has been revealed that approximately 10–20 % of obese patients with daytime somnolence have hypercapnia the precise prevalence of OHS really is unknown [1]. Moreover, its prevalence has been markedly increasing during the last three decades, probably due to the present «epidemic» of obesity [1]. OHS often remains undiagnosed until the late stage of the disease. Early detection of the OHS is of greatest importance, as effective treatment can lead to significant improvement in patient outcomes [3].

CLINICAL CASE PRESENTATION

A 50-year old man was admitted to the Institute of Therapy with complaints of dyspnea and chest tightness during moderate physical activity, leg edema, fatigue, daytime sleepiness and weight gain. His wife told that her husband had disturbed sleep at night as well as snoring and short-term pauses during sleeping.

ANAMNESIS MORBI

Patient developed all symptoms two years ago when dyspnea and chest tightness during moderate physical activity occurred. The hypertension (HTN) was diagnosed at the same time. The maximal blood pressure (BP) was 170/100 mm Hg. The patient was prescribed drug treatment with bisoprolol, indapamide and lisinopril but without marked efficacy.

ANAMNESIS VITAE

Patient denies tuberculosis, sexually transmitted infections, traumas, hereditary diseases. He had an appendectomy and surgical intervention because of left-side inguinal hernia in the childhood. Allergic history is negative. The patient smokes a pack of cigarettes in a day and denies alcohol abuse.

OBJECTIVE EXAMINATION

Patient's conciseness is clear, general condition is of moderate severity, posture is active. Patient is orientated in place, time and his personality. Patient is obese with BMI 41,62 kg/m^2. Face is hyperemic. Thyroid gland is slightly enlarged, smooth, elastic, mobile, non-tender to palpation. Peripheral lymph nodes are non-palpable. Respiratory rate is 18 per minute. Lung percussion reveals resonant sounds. Dry rhonchi at the background of the weakened vesicular breathing were auscultated. Heart borders are shifted 2 cm to the left. Heart auscultation: heart rhythm is regular, heart sounds are muffled. Pulse rate is 68 beats per minute. BP is 140/90 mm Hg on both arms. Abdomen is symmetrical, increased in its size due to subcutaneous fat, participates in breathing. Tenderness to palpation is absence. Blumberg sign is negative. Liver edge is palpable 5 cm below the left costal margin without tenderness to palpation. Spleen is non-palpable. Pasternatsky sign is negative on both sides. Moderate feet and shins pitting edema are detected.

LABORATORY AND INSTRUMENTAL TESTS

In CBC (13.09.17) elevated erythrocytes sedimentation rate (ESR) – 16 mm/h with unremarkable other parameters.

Urinalysis (13.09.17): no abnormalities were found.

Blood biochemistry (13.09.17): mild hyperglycemia (fasting glucose level 6,09 mmol/L (normal range is 3,3–5,5 mmol/L), but glycosylated hemoglobin is within normal limits (5,7 %; normal range is 4,5–6,1 %); increased level of ALT (55 U/L, normal limits less than 45 U/L), a high-sensitivity C-reactive protein (hs-CRP) is 4,5 mg/L (normal limits less than 3 mg/L), elevated levels of total cholesterol (5,39 mmol/L, normal limits less than 5,2 mmol/L) and low density lipoprotein cholesterol (LDL-C) (3,78 mmol/L, normal limits less than 3,1 mmol/L). Increased level of thyroid-stimulating hormone (TSH) up to 7,88 mcIU/ml (normal range is 0,23–3,4 mcIU/ml) with normal level of the thyroid hormone free T4 (13,0 nmol/L, normal range is 10,0–23,2 nmol/L) were detected.

Chest X-ray (14.09.17): sings of the left ventricle hypertrophy and dilatation of the left atrium, compaction of the aortic wall and calcification of the left coronary artery, high level of diaphragm position.

ECG (12.09.17) sinus rhythm with heart rate 64 beats per minute, non-specific repolarization abnormalities in the lateral and inferior segments of the left ventricle wall.

Echocardiography (12.09.17): ejection fraction (EF) is 60 %. Contractility function is preserved. Enlargement of the left atrium up to 4, 2 cm (norm less than 4,0 cm). Left ventricle: end-diastolic diameter is 5,2 cm (norm is 3,5–5,6 cm), end-systolic diameter is 3,5cm (norm is 2,3–4,0 cm), posterior wall thickness is 1,12 cm (norm is 0,6–1,1 cm) – increased. Intraventricular septum thickness is increased up to 1, 13 cm (norm is 0, 6–1, 1 cm). Right ventricle: diameter is 2, 6 cm (norm less than 3,0 cm). Right atrium is 3, 8 cm (norm is 2, 0–3,8 cm). The systolic pressure in a pulmonary artery is 35 mm Hg (norm is 30 mm Hg) – increased. Valve apparatus is not changed. Conclusion: thickening of aortic wall and aortal valve leaflets, mild dilatation of the left atrium cavity, the left ventricle hypertrophy and the blockade-type dyskinesia of the inter-ventricular septum. Pulmonary hypertension I degree.

Ultrasonography of the thyroid gland (12.09.17): diffuse goiter, II degree.

Abdominal ultrasonography (12.09.17): diffuse changes of the liver, enlarged gall bladder, sings of chronic pancreatitis.

Consultation of endocrinologist (18.09.17): Diffuse goiter II degree, subclinical hypothyroidism. Obesity 3 degree of mixed etiology. Impaired glucose tolerance. Levothyroxine 12, 5 mcg per day was recommended.

Consultation of neurologist (18.09.17): Diffuse hypertensive encephalopathy II degree.

CLINICAL DIAGNOSIS

IHD: Stable effort angina II functional class. Essential arterial hypertension II stage, 2nd degree, very high total cardiovascular risk. Hypertensive heart (left ventricle hyper-trophy). HF II A stage with preserved systolic function of the left ventricle (EF 60 %), II functional class by NYHA. Diffuse goiter II degree, subclinical hypothyroidism. Obesity 3 degree of mixed etiology. Impaired glucose tolerance. Diffuse hypertensive ence-phalopathy II degree. Pickwickian syndrome.

TREATMENT

Lifestyle modification, with a reduction of energy intake and an increase in physical activity, is essential in all treatment strategies for obesity. Patient received recommendation to follow hypolipidemic low-caloric diet with carbohydrates and salt restriction. Rational physical activity should include at least 30 min/day, 5 days/week of moderate intensity physical activity. Smoking cessation was highly recommended [4].

Drug therapy: acetylsalicylic acid 75 mg/day, atorvastatin 20 mg/day with LDL cholesterol goal level less than 1.8 mmol/L or LDL cholesterol reduction by no less than 50 % when the target level cannot be reached; bisoprolol 2, 5 mg/day in the morning under the heart rate control with target level of 55–60 beats per minute at rest; torasemide 5 mg/day under close urine output control, ramipril 5 mg/day under BP control with target level less than 140/90 mm Hg, L-thyroxin 12, 5 mcg/day under TSH level control. Patient condition was improved: dyspnea did not disturb in the hospital setting, leg edema disappeared.

DISCUSSION

The feature of this case is the combination of obesity with respiratory complications during nighttime sleeping, sleepiness and fatigue in daytime which allow thinking about Pickwickian syndrome, or OHS. We also can assume that hypofunction of thyroid gland has contributed to the development of obesity.

Radiographic features in OHS may be heterogeneous. Patients with OHS may either have normal chest radiographs or exhibit cardiomegaly and/or abnormal pulmonary vascularity, i.e. signs of pulmonary hypertension. Typically, subtle radiographic signs of pulmonary vascularity are difficult to evaluate given the patient body habitus [5]. These literature data can explain the absence of lung abnormalities in chest X-ray in our patient. Presence of high level of diaphragm position which has been seen in our patient can be due to severe abdominal obesity.

According to the literature data OHS is generally observed in subjects over 50 years. Comorbidities, favored by obesity, such as arterial hypertension, left heart diseases, diabetes are very frequent in these patients [3]. All these clinical manifestation are present in described clinical case.

The other interesting feature which is present in our patient is elevated level of hs-CRP. From our point of view this abnormal laboratory marker can be explained by the presence of low-grade inflammation specific to obesity. Increased visceral adiposity has

been shown to activate the important pathways connecting low-grade chronic inflammation, oxidative stress and blood coagulation [6]. The expansion of adipose tissue produces a number of bioactive substances, known as adipocytokines or adipokines, which trigger chronic low-grade inflammation and interact with a range of processes in many different organs. Although the precise mechanisms are still unclear, dysregulated production or secretion of these adipokines caused by excess adipose tissue and adipose tissue dysfunction can contribute to the development of obesity-related metabolic diseases [7].

Chronic inflammation is pivotal in heart disease; studies have shown that high levels of CRP, measured by hs-CRP, can be a marker of atherosclerosis. hs-CRP is an important predictor for adverse cardio-vascular events including myocardial infarction, cerebrovascular events, peripheral vascular disease, and sudden cardiac death in individuals without a history of heart disease [8]. Relative risk of future cardiovascular events based on hs-CRP testing is estimated as follows: low risk: CRP < 1.0 mg/L; intermediate risk: CRP 1.0–3.0 mg/L; high risk: CRP > 3.0 mg/L [9].

The patient did not undergo a spirography. But it may be recommended for such patients, because it typically reveals a restrictive pattern with a reduction in forced expiratory volume in the first second (FEV_1) and forced vital capacity (FVC) but normal FEV_1/FVC ratio. This restrictive pulmonary physiology is further impaired in OHS. Chest wall compliance is reduced and respiratory resistance is increased, likely secondary to the reduction in functional residual capacity and expiratory reserve volume. As a result, the work of breathing in OHS patients is twice that of obese eucapnic individuals and increases further when these patients are positioned supine from sitting as a result of the cephaled shift of abdominal contents [10].

CONCLUSIONS

There are two tasks in the treatment of Pickwickian syndrome: maintaining a healthy body weight and oxygen therapy. Weight loss is achieved first of all by the lifestyle modification, which means a hypocaloric diet, rational physical activity and also drugs therapy, which opportunities are rather limited. If conservative treatment for obesity is non-effective the expediency of the surgical intervention should be taken into account. Bariatric surgery has been shown to be the most effective modality of reliable and durable treatment for severe obesity. In practice, several mini-invasive and invasive surgical approaches exist to achieve the optimal weight in obese patients with or without obesity-hypoventilation syndrome. According to the guidelines issued by the National Institutes of Health, patients with body mass index greater than 35 kg/m^2 and an obesity-related comorbid condition (including obesity-hypoventilation syndrome) or patients with a body mass index greater than 40 kg/m^2 can be referred for surgical treatment. The second task can be achieved by noninvasive ventilation bi-level positive airway pressure (inspiratory and expiratory positive airway pressure) [11]. The value of timely and effective treatment of Pickwickian cannot be overestimated because in the absence or non-efficacy treatment the mortality caused by respiratory arrest during sleep and the abnormalities in heart and lungs can reach 70 %. On the other hand, Pickwickian syndrome is entirely reversible if it is diagnosed and treated properly. If the problem goes undiagnosed or untreated, the outcome can be fatal due to adverse cerebrovascular or cardiovascular events including sudden cardiac death.

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