

# A Rare Example of a Combination of Diffuse Idiopathic Skeletal Hyperostosis and Bronchial Asthma in the Elderly

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## INTRODUCTION

Diffuse idiopathic skeletal hyperostosis (DIG), or senile ankylosing spinal hyperostosis is a process of heterotopic osteogenesis with hyperplasia of the spongy and cortical bone matrix, mainly localized in the vertebral section of the musculoskeletal system (Mosher 1926; Forestier & Rotes-Querol 1950). Excessive ossification here extends to ligaments, tendons and articular structures. Such remodeling in the cervical and thoracic zones determines the compression of ventrally located anatomical structures, the clinical expression of which may be the development of respiratory discomfort or dysphagia (Presutti et al. 2010; Palmer & Ball 2000). The mechanical effect of hyperostotic foci on the larynx or trachea in rare cases of initially existing bronchial asthma becomes an independent trigger of relapses or enhances bronchial obstruction.

## MATERIALS AND METHODS

As an example of such a combination of two diseases, we present the clinical observations of a man S., 66 years old, 30 years old, suffering from the leukotriene form of bronchial asthma (polynosis, aspirin intolerance), who was hospitalized in the pulmonology department of the regional clinical hospital. In the past 8 months, an uncontrolled course of asthma. In addition, he noted progressive

## ABSTRACT

Prediction of fatal arrhythmias in acute myocardial infarction (AMI) is extremely important. Objective: Create a differential diagnostic model for predicting sudden cardiac death in elderly patients with STEMI with the history of PCI. Methods: We studied 152 patients (143 men and 9 women), mean age 70.3±3.4 years, with STEMI after PCI; EF LV less than 50%. The patients were divided into 2 groups: those who died on the first day from SCD and those who survived. The QT interval and its parts were measured upon admission and after PCI. The control group consisted of 30 healthy individuals. Results: A model was developed for determining the level of risk of arrhythmic death on the first day from SCD after successful PCI based on ECG criteria using DA. The most informative for the differential diagnosis was a set of the following indicators: QTd, QTapcd, and SubTd. The most significant indicator is Sub Td. The following algorithms were developed: ROAD = Qtd × 0.3438 + QTapcd × 0.0842 - SubTd × 0.0864 - 19.5068, NROAD = Qtd × 0.1997 - QTapcd × 0.0148 + SubTd × 0.3261 - 20.893. Their practical implementation on models is proved. Conclusion: The creation of a "ROAD/NROAD" differential diagnosis model for predicting SCD in patients with STEMI after PCI suggests practical application at the prehospital stage in this category of patients for prophylactically fatal VA and SCD. Assessment of the possible development of adverse events in patients with STEMI after PCI is possible using the ECG method based on the use of indicators such as QTd, QTapcd, and SubTd at the prehospital stage.

**Keywords:** acute myocardial infarction (AMI), ST-segment elevation myocardial infarction (STEMI), ventricular arrhythmias (VA), sudden cardiac death (SCD), percutaneous coronary intervention (PCI), discriminant analysis (DA).

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dysphonia not associated with inhaled glucocorticosteroids and a feeling of pressure in the neck. A patient with abdominal obesity. A radiological examination revealed common hyperostosis in the cervical spine with ventral protrusion of the larynx and trachea.

## RESEARCH AND DISCUSSION

Patient S., 66 years old, was admitted with complaints of paroxysmal shortness of breath, dyspnea at rest, aggravated by minor physical exertion, dry paroxysmal cough, chest tightness. A history of smoking is 25 packs/year. Suffers from bronchial asthma (BA), for 30 years, in the last 8 months, the disease has acquired an uncontrolled course, with the requirement to increase the average daily dose of basic drugs. Simultaneously with dyspnea, a hoarseness of the voice and difficulty swallowing solid food began to be noted.

Suffers from arterial hypertension and coronary heart disease. Upon admission, a moderate condition, height 178 cm, body weight 120 kg, Waist circumference 121 cm, body mass index 37.9 kg / m<sup>2</sup>. The respiratory rate at rest is 21 per minute, SpO<sub>2</sub> 98 %, on auscultation of the lungs, dry wheezing. Blood pressure on both hands 150/90 mmHg. In a biochemical blood test revealed high cholesterol 8.1 mM/l, hyperuricemia 467 mmol/l. Ultrasound dopplerography of

the veins of the lower extremities was performed: veins are passable, becker cysts are determined on both sides of the popliteal regions, on both legs there are signs of supra-fascial edema of soft tissues (more pronounced on the right at the level of the ankle joint). Radiological examination of the soft tissues of the neck with contrast and organs of the chest cavity: deformation and ventral protrusion of the pharynx, larynx and upper third of the esophagus with a massive osteophyte complex in the C3-C7 segment, significant osteophytic overlays of the ventral and lateral parts of the vertebral bodies (Th3-Th12): Fig. 1, 2.



Fig 1: Computed tomography: 2D reconstruction of the cervical and thoracic spine (cervical lordosis is straightened, massive osteophyte complexes near the anterior margin of C3-C7 and Th3-Th12 vertebrae).



Fig 2: MRI of the cervical spine: severe deforming spondylosis at the C3-C7 level, moderate secondary spinal stenosis at the C4-C7 level, deformation of the pharynx, larynx and upper third of the esophagus with their ventral protrusion.

The problem of axial skeleton diseases leading to disposition and functional disorders of internal organs is widespread and causes serious diagnostic difficulties in clinical practice.

One of the nosological forms associated with pathological proliferation of bone tissue of the spine, its deformation is DISH. In 1926, Mosher (1926) described a case of dysphagia against the background of identified osteophytes of the cervical spine. This pathological condition in elderly patients with polysegmental lesions was examined in detail by J. Forestier and J. Rotes-Querol in 1950 in "Annals of the rheumatic diseases". The disease is characterized by massive non-inflammatory ossification of the longitudinal ligament of the spinal column. A feature here is a significant limitation of motor function, due to multifocal ankylosis, with relatively moderate complaints from the patient. The disease is common in the elderly and senile moreover, with age, its frequency increases, reaching 12-35% in some populations (Presutti et al. 2010; Palmer & Ball 2000; Boachie-Adjei & Bullough 1987).

The mechanisms of ADHD (or J. Forestier disease) are not fully understood. However, this process is reasonably considered as a separate link in the pathogenetic continuum of the metabolic syndrome: similarly to the description presented, patients with J. Forestier disease are overweight and have hypertension, hyperuricemia, dyslipidemia, and insulin resistance. Men are more susceptible to the disease than women (Presutti et al. 2010; Palmer & Ball 2000; Hwang et al. 2013; Sridharan & Uberoi 2008; Kiss et al. 2002; Westerveld et al. 2008). Bony growths on the front and lateral surfaces of the vertebral bodies for a long time may not be detected and asymptomatic. The growths on the back surface, protruding into the spinal canal, are the cause of severe neurological disorders (Bobrov 2009; Matgé 2005). In the clinical picture, the phenomena of dysphagia, dysphonia, dyspnea prevail due to a more frequent lesion of the cervical spine (Boachie-Adjei & Bullough 1987; Bobrov 2009; Dioré et al. 2005; Hartel et al. 2011; Ohki 2012; Rodríguez et al. 2002; Di Martino et al. 2006; Constantoyannis et al. 2008; Alcázar et al. 2008; Krishnarasa et al. 2011; Aydin et al. 2006). Dysphonia syndrome in asthma with comorbid hyperostosis requires a correct interpretation, and not just an appeal to the known effect of inhaled glucocorticosteroids. Complaints develop gradually, gradually progress, intensify with extension of the neck. Their development is based on various mechanisms: direct compression by osteophytes of the esophagus and larynx, a secondary inflammatory reaction in the surrounding tissue with the development of edema and fibrosis and muscle spasm (Ohki 2012; Rodríguez et al. 2002). Patients complain of a foreign body sensation in the throat and hypersalivation, the likelihood of aspiration of nasopharyngeal mucus and food is increased, night apnea syndrome, shortness of breath and suffocation are formed (Dutta et al. 2014; Kawauchi et al. 2011). In the presented patient, DISH contributed to the strengthening of AD symptoms and the formation of an uncontrolled course of the disease. Other manifestations of the disease are limited mobility of various segments of the spine, acute and chronic pain, paresis and paralysis (Bobrov 2009; Hartel et al. 2011; Ohki 2012; Rodríguez et al. 2002; Krishnarasa et al. 2011; Shahbazi & Ardalani 2018).

A number of authors indicate the relative rarity of dysphagia, compared with respiratory symptoms, linking this with a more frequent lesion of the middle and lower spine (Ohki 2012; Papakostas et al. 1999).

The diagnosis is established on the basis of an x-ray picture. Changes more often appear on the right side, which is probably due to an obstruction of tissue ossification by the pulsating aorta located on the left (Underberg-Davis & Levine 1991). At the early stage, the formation of small osteophytes occurs, as with deforming spondylitis. Further, the connective tissue between the anterior and posterior longitudinal ligaments and the vertebral bodies calcifies, followed by ossification of the anterior longitudinal ligaments. All this leads to progressive ankylosis. In accordance with the existing consensus, the following diagnostic criteria for the disease are used: 1. continuous damage to at least 4 adjacent vertebrae in the form of calcification or hyperostosis of the longitudinal ligament; 2. the relative intactness of the intervertebral discs in the affected segments, the absence of degenerative changes in them and the facet syndrome; 3. the absence of clinical or radiological signs of sacroileitis and ankylosis of the arched joints characteristic of ankylosing spondylitis (Palmer & Ball 2000; Hwang et al. 2013; Cassim et al. 1990; Starkova & Ehrdes 2016; Resnick & Niwayama 1976).

A more complex diagnostic and therapeutic task is presented by situations where DIG is combined with BA, suggesting not only the correct interpretation of the reasons for the increase in the severity of the pulmonological disease, but also the search for a compromise in the choice of basic anti-asthma drugs with less osteoporetic activity.

## CONCLUSION

Thus, DYSG, in cases of combination with BA, becomes an independent factor in the severity of the course and relapse, an additional condition for the difficulty in achieving control of respiratory pathology in the elderly, acting as a component of the pathogenetic constellation of the metabolic syndrome. Considering the complexity of diagnosis in the absence of specific clinical signs of spinal hyperostosis, the leading research methods in such situations are radiological imaging methods.

## CONFLICT OF INTEREST

None

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