

CASE REPORT

Atypical chest pain

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KEY WORDS

chest pain,
osteoporosis,
vertebral compression

ABSTRACT

Chest pain is a common reason why patients seek medical consultation. Chest pain can be caused by life-threatening diseases and requires extensive diagnostic evaluation, especially to exclude acute cardiac pathologies. However, in the case of atypical chest pain with a normal electrocardiogram and serum levels of myocardial necrosis markers within the reference ranges, non-cardiac causes of chest pain should be considered. This report describes the case of a 90-year-old female patient with recurrent chest pain who was eventually diagnosed with osteoporotic vertebral fractures of the thoracic spine.

INTRODUCTION Chest pain may be induced by various diseases commonly including different forms of coronary artery disease. However, when the pain is of a typical nature, and is not associated with elevated serum levels of myocardial necrosis markers or acute ischemic changes on electrocardiogram (ECG), it is necessary to pay special attention to its potential non-cardiac causes. Clinical evidence indicates that 50% of all patients admitted to the hospital with an initial diagnosis of unstable angina have non-cardiac diseases. Other causes which should be considered in differential diagnosis of chest pain include aortic dissection or penetrating aortic ulcers, pulmonary embolism, pericarditis, pneumonia or pleuritis, pneumothorax, mediastinal emphysema, esophageal spasm, esophagitis or rupture of the esophagus, gastroesophageal reflux disease, gastric ulcers with imminent ulcer perforation, biliary tract diseases, acute pancreatitis, herpes zoster, Tietze's syndrome, fractured ribs, compression vertebral fractures, intercostal neuralgia, pectoral muscle pain, sickle cell crisis, and psychiatric disorders.^{1,2}

CASE REPORT A 90-year-old patient was admitted to the Department of Cardiology, Division of Cardiac Critical Care of the Ministry of Interior and Administration Hospital in Lublin because of pain in the anterior chest wall. The patient self-reported that the pain had occurred periodically for several months, while walking and at rest (the patient used a walker because of generalized muscle

weakness and advanced gonarthrosis), and since the night before the admission the pain had been more intense and had become steady. It did not radiate to other regions of the body, was not position related and did not enhance with inspiration. The pain was partly relieved with nitroglycerin administered by the emergency doctor. Concomitant diseases included long-term arterial hypertension, paroxysmal atrial fibrillation, chronic heart failure. Several years before the admission the patient underwent surgery and radiotherapy for tongue cancer. During the previous 1–2 years, the patient was several times hospitalized in the departments of cardiology for similar signs and symptoms, each time acute myocardial necrosis or new-onset ischemic ECG changes were excluded; emergency computed tomography of the thoracic aorta during one of the hospitalizations showed calcified aortic plaques and cardiac enlargement. The diameter of the aorta was normal with no signs of wall dissection. The patient was taking on a long-term basis such medications as furosemide, losartan, isosorbide mononitrate, molsidomine, verapamil and potassium supplementation, and since her most recent hospitalization, also a proton pump inhibitor. Physical examination showed that the patient was in a relatively good condition; her weight was normal, she had a normal size thyroid gland, a 102/min irregular heart rate, with a pulse deficit, and a silent systolic cardiac murmur upon auscultation of the mitral region, single crepitations on auscultation of the base of both lungs. The peripheral pulse rate

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was irregular, about 95 beats/min. The volume and strength of the pulse wave were normal. On palpation the bilateral mammary glands were normal, the abdomen was soft, not tender, and there was a slight edema of the ankles and lower extremities. The arterial blood pressure measured on the upper left extremity was 130/75 mmHg, and 125/70 mmHg, on the right. Rapid atrial fibrillation was present on the ECG. Left axis deviation, intermediary position of the heart, and features of subendocardial ischemia in leads I, aVL, V5, V6 were revealed. Laboratory examinations excluded acute myocardial ischemia. The results of other laboratory examinations were: total peripheral blood count – normal, erythrocyte sedimentation rate after 1 hour (32 mm), glucose (138 mg/dl), sodium (140 mmol/l), potassium (3.48 mmol/l), chlorides (104 mmol/l), creatinine [(1.37 mg/dl), glomerular filtration rate according to MDRD 38 ml/min/1.73 m²], total cholesterol (160 mg/dl), low-density lipoprotein cholesterol (97 mg/dl), high-density lipoprotein cholesterol (55 mg/dl), triglycerides (140 mg/dl), bilirubin (0.17 mg/dl), aspartate transaminase (16 U/l), alanine transaminase (12 U/l), serum thyroid-stimulating hormone (0.979 μ IU/ml). The urinalysis showed: specific gravity (1015 g/l), acidic, transparency (cloudy), protein (0.033%), normal urobilinogen; glucose, ketone and bilirubin absent; the microscopic analysis demonstrated numerous polygonal epithelial cells, 1–2 round cells/HPF, white blood cells covering HPF, 20–25 dysmorphic and isomorphic RBC/HPF, abundant bacteria and numerous yeast cells. Posteroanterior chest radiograph showed mild cardiac enlargement, perihilar vascular densities, atherosclerotic plaques within the aortic arch, and no pulmonary parenchymal infiltrations.

On admission the sinus rhythm returned spontaneously, the subendocardial ischemia features present on the ECG taken during arrhythmia episode significantly subsided, however the chest pain persisted. Because of normal troponin T levels, and creatine kinase-MB serum activity, and the atypical character of pain, special attention was given to the differential diagnosis of anterior chest wall pain reported by the patient. Considering tenderness of the costosternal osteochondral junction region on palpation, and the absence of thoracic spine tenderness on percussion, a suspicion of Tietze's syndrome as a potential cause of complaints was taken into account, and a nonsteroidal anti-inflammatory drug was administered (the proton pump inhibitor treatment being continued) with a pain relief effect. Treatment for urinary tract infection was also introduced and potassium deficiency was supplemented. The ECG traces performed regularly did not show features of acute ischemia. The pain increased significantly on the third day and was resistant to nonsteroidal anti-inflammatory drugs and paracetamol. The patient underwent a thoracic spine X-ray. It showed osteoporosis with a marked decreased height of thoracic corpora vertebrae, and, moreover,

massive degenerative productive lesions of vertebral edges. As suggested by the radiologist there was a suspicion of an osteolytic lesion of the Th9 vertebral corpus, but abdominal and breast ultrasonography did not show any abnormalities. Paracetamol and tramadol administered as the pain relieving treatment resulted in a significant alleviation in pain sensation. After the consultation with a specialist, the patient was referred to the Orthopedic Outpatient Clinic of the Ministry of Interior and Administration Hospital in Lublin for anti-osteoporosis treatment.

DISCUSSION Pain characteristics may be useful in making decisions regarding potential causes of atypical chest pains. Constrictive, squeezing or burning pain or that described as an uncomfortable chest pressure, in response to exercise, cold air, a meal or emotional stress, localized behind the sternum, penetrating through the chest interior, radiating to the shoulders, both arms, intrascapular area, forearms, the neck, jaws, teeth, associated with nausea, vomiting or excessive sweats, indicates an ischemic nature of the signs.^{1,2} Additional risk factors including systolic arterial blood pressure below 110 mmHg, lung crepitations, stable ischemic heart disease, myocardial infarction, and previous percutaneous transluminal coronary angioplasty or coronary artery bypass surgery, and pain the nature of which resembles that of the previous myocardial infarction, suggests ischemic etiology.³ Pain relief after nitroglycerin administration is not specific for retrosternal pain. The prospective study of 270 patients who reported to the hospital emergency department because of chest pain demonstrated that the sensitivity of nitroglycerin administration test in diagnosing the chest pain was 72%, while its specificity was only 37%.⁴ There is evidence suggesting that up to 20% of chest pain may be caused by the musculoskeletal diseases. The most common include prolapsed cervical intervertebral disc, restriction of the intervertebral joints or costal mobility and intercostal neuralgia. Shoulder joint degenerative lesions, spondylitis, osteoporotic fractures and bone tumors are the causes that less commonly are manifest in this manner. In some cases these diseases may also be manifested by chest pain radiating to the upper left extremity.⁵ Compression of the nerve roots by intervertebral disc herniation or vertebral osteophytes may result in pain radiating to the chest, with occasionally accompanying arrhythmias or non-specific ST-T segment abnormalities.⁶ Compression vertebral fractures may lead to a wide spectrum of clinical symptoms. One of the studies reported nausea in 26% of the study participants with osteoporotic vertebral fractures, abdominal pain in 20%, and chest pain in 13%.⁷ Pain localization also depends on the segment of the spine in which the compression vertebral fractures occur.⁸ Only in 60% of the cases pain exacerbates with movement; it may however relieve in the supine position, when sitting or less commonly

in the standing position.⁷ In the literature, there has been evidence for myocardial infarction-like, intense pain of the anterior chest wall, caused by osteoporotic sternal fractures. Both described female patients had a significantly pronounced thoracic kyphosis because of thoracic compression vertebral fractures which could have led to transferring the mechanical load effect from the spine along the ribs to the sternum, when bending the back.⁹ Moreover, there has been a case of an 83-year-old man admitted to the hospital in a relatively serious condition, with hypotension, elevated neutrophil count and respiratory insufficiency signs, who complained about recurrent retrosternal pain, linked by the patient's family with his fall when climbing up the stairs several weeks earlier. The patient's ECG tracings did not show features indicating ischemia; the levels of myocardial necrosis markers and the chest radiograph were normal. As confirmed by autopsy, the symptoms resulted from a fractured sternum with a large abscess caused by methicillin-resistant *Staphylococcus aureus*.¹⁰

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