LEFT ATRIAL, PULMONARY VEIN AND DURAL CALCIFICATION IN A PATIENT WITH ARRHYTHMIA AND CHRONIC RENAL FAILURE

M. Koroglu¹, P.-S. Keven Chen¹, A. Oto¹, B. Kale Koroglu²

Left atrial and dural calcification in chronic renal failure is very rare. Massive atrial calcification can lead to arrhythmia and diagnosis of this condition is important to take prophylactic measures in dialysis patients. Noninvasive diagnosis of left atrial calcification is also important as it can complicate surgical procedures. We report a patient with chronic renal failure presenting with arrhythmia in whom left atrial calcification involving interatrial septum is diagnosed by thorax CT examination.

Key-words: Kidney, failure.

Case Report

A 40-year-old male was admitted to our hospital for recent onset atrial flutter. Patient’s medical history revealed end-stage renal disease requiring maintenance hemodialysis, uncontrolled hypertension, chronic hepatitis due to hepatitis C, and aortic and mitral valvular disease. Patient’s laboratory workup revealed an ionized calcium of 5.53 mg/dL (4.5-5.3), total serum calcium of 11 mg/dL (8.6-10.6), phosphorus of 7 mg/dL (2.5-5), alkaline phosphatase of 126 U/L (34-122), 25-hydroxy vitamin D of <5 (20-57), intact-PTH of 707 pg/mL (7-53), and PTH related peptide of <0.3. Thyroid function tests were normal.

Transthoracic echocardiography revealed heavily calcified aortic valve leaflets with a calculated aortic valve area of 0.92 cm² (2-4), a mean gradient across the aortic valve of 35 mmHg (<20), and a peak gradient of 54 mmHg (<20). The mitral valve contained heavy mitral annular calcification with a calculated mitral valve area of 1.9 cm² (4-6), a mean gradient across the mitral valve of 5 mmHg (<5) and peak gradient of 18 mmHg (<10). The systolic pulmonary pressure was calculated to be approximately 32-37 mmHg (25-30). The findings confirmed aortic and mitral stenosis and mild aortic and mitral regurgitation. On chest X-ray, a pulmonary nodule was suspected and a CT of the thorax without intravenous contrast was obtained. The CT examination did not reveal any pulmonary nodules but showed an enlarged heart with severe calcifications of the aortic and mitral valves. Endocardial calcifications along the left atrium and endoluminal calcification of the pulmonary veins were noted with a markedly dilated left upper lobe pulmonary vein (Fig. 1A). Calcifications were also noted along the trachea, around medial aspects of bilateral clavicles and the dura in the spinal cord (Fig. 1B).

Upon admission, the patient was anticoagulated with heparin and warfarin. Acute myocardial ischemia...
was discharged on the eighth day of hospitalization, the patient spontaneously reverted back to sinus rhythm. After remaining in normal sinus rhythm, the patient was discharged on the eighth day of hospitalization.

Discussion

We report a case of mitral valve, aortic valve, total left atrial, pulmonary vein, tracheal and dural calcification presenting with arrhythmia in the setting of chronic renal failure. Metastatic extraskeletal calcium deposits secondary to chronic renal failure is estimated in nearly 80% of the patients with dialysis dependent chronic renal failure (9).

Soft tissue calcifications occur in arterial, ocular, periarticular, subcutaneous and visceral locations. Most commonly involved visceral locations are kidney, stomach, lungs and heart. Calcification of heart valves especially mitral and aortic valves are relatively frequent and may contribute to heart failure. Myocardial calcification has been occasionally reported except at autopsy where it is commonly found microscopically (10). Myocardial calcification has been found in 60% of patients with extraskeletal calcium deposition at autopsy. Pathologically calcium is infiltrating and displacing the normal myocardium. In severe cases conduction system can also be involved and may lead to arrhythmia such as complete atrioventricular block (11). Imaging of metastatic calcification of the heart is difficult; such calcifications may be suspected in patients with chronic renal failure with unexplained cardiac disease and conduction abnormalities. Transesophageal echocardiography (TEE) and CT are useful in demonstrating location, extent of calcification and involvement of interatrial septum (10, 12). Quality of transesophageal imaging can be significantly impaired in the presence of calcified walls of the left atrium (13, 14). CT can define location and extend of calcification. Multidetector CT may be more effective in detecting cardiac calcifications than conventional CT because of fast scanning techniques. In the future improvement in the technology can make it possible to detect even tiny calcifications. Coronary artery calcification is also common in end-stage renal disease (15, 16). Electron-beam computed tomography makes it possible to detect the presence and monitor the progression of coronary calcification in those undergoing long-term dialysis (17).

Although the pathogenesis of metastatic calcification in end stage renal disease is not completely understood, elevated calcium phosphate product is an important factor and medical measures such as optimal dialysis, dietary phosphate restriction and administration of phosphate binding agents can be taken into account. Dialysis is usually insufficient for serum phosphate control. Low calcium dialysate can be used in chronic renal failure patients with soft tissue calcification. Parathyroidectomy is reserved for the patients who fail with such medical measures (5, 9, 10).

Preoperative diagnosis of the condition is an important topic. During mitral valve replacement in the setting of massive left atrial calcification there are major surgical problems such as complex approach to left atrium and mitral valve, embolisation during the operation and hemostatic closure of atriotomy. Total endoatriectomy remains the procedure of choice in this setting (3-6).

To the best of our knowledge asymptomatic dural calcification of the spine is described twice in the literature (7, 8).

This unique case with arrhythmia and total left atrial calcification emphasize the importance of prevention and treatment of extraskeletal calcification in chronic renal failure. This case will enhance the importance of the diagnosis of extensive cardiac calcification which is both preventable and treatable and life threatening complication of chronic renal failure.

References