A young male with bilateral chest pain

A 20-year-old male presented to the pulmonary medicine outpatient services with the complaint of chest pain for 3 months. The pain was diffuse, bilateral, dull aching, and nonpleuritic in nature without any radiation. It was associated with easy fatigability and generalized weakness. He had no history of cough, shortness of breath, hemoptysis, weight loss, or appetite loss. He was a lifelong nonsmoker without any significant past history. On examination, heart rate was 80 beats/min, respiratory rate was 18/min, blood pressure was 186/93 mmHg, and room air pulse oxygen saturation was 96%. He had pallor, and the rest of the examination was unremarkable. On blood investigations, hemoglobin was 8.6 g%, blood urea was 146 mg/dL, and serum creatinine was 8.7 mg/dL. A chest radiograph was performed [Figure 1] which showed cardiac enlargement with clear lung fields. Serum calcium level was 7.5 mg/dL, phosphate was 6.5 mg/dL, and serum parathormone (PTH) level was 456 pg/mL. Abdominal ultrasound demonstrated bilateral shrunken kidneys with the loss of corticomedullary differentiation. Thus, the likely cause of this patient's chest pain was deemed to be osteosclerosis related to renal osteodystrophy. The chest radiograph in Figure 1 demonstrates the chalky white ribs and spine, suggesting a diagnosis of osteosclerosis secondary to chronic kidney disease (CKD). This patient was diagnosed as CKD which presented with bilateral chest pain related to metabolic bone disease. It is essential for a chest physician to understand basic bony abnormalities visible on chest radiograph to investigate and diagnose the patient in the correct way.[1] Common bony abnormalities visible on chest radiograph may be seen in the spine, ribs, clavicle, scapula, or the upper part of the humerus. The sternum is usually not seen clearly on a posteroanterior chest radiograph though it may be seen on a lateral chest radiograph. While reading a chest radiograph, it is essential to screen the bony cage for any fracture, callus, increased density, or increased lucency. Lytic or
sclerotic bony metastasis to the ribs can also be seen on chest radiograph. Diffuse bony abnormalities such as sclerosis (as in this patient) or increased lucency (such as in osteoporosis) may provide an important diagnostic clue toward metabolic bone disease on a plain chest radiograph, as it did in this patient. Erosion of the lower borders of the ribs can be seen in the coarctation of the aorta. Vitamin D metabolism disturbance is primarily implicated in renal osteodystrophy. Hydroxylation of 25-hydroxycholecalciferol to convert it into its active form occurs in the kidney. Reduced activated Vitamin D in CKD leads to the increased production of PTH, leading to secondary hyperparathyroidism. Renal osteodystrophy may have different manifestations such as osteomalacia, osteitis fibrosa cystica, osteosclerosis, and soft-tissue calcifications. Osteosclerosis is a common manifestation of renal osteodystrophy and is secondary to high PTH levels. The treatment involves the use of low-phosphate diet, phosphate binders, and supplementation with calcitriol.

This case highlights the importance of conventional reading of a chest radiograph (from soft tissue, bony cage till lung fields) to identify abnormalities not apparent at first glance.

**Declaration of patient consent**
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**
There are no conflicts of interest.

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1. Kelly B. The chest radiograph. Ulster Med J 2012;81:143-8.
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