

Huff? You May Fracture. An Unusual Case of Skeletal Fluorosis

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Introduction

- Skeletal fluorosis is a rare metabolic bone disease caused by massive bone fixation of fluoride
- It is prevalent in areas with fluoride water contamination, fluoride air pollution in industrial areas, and in areas with increased tea consumption
- In the United States, skeletal fluorosis is not a public health issue, however, it has been reported in individuals who inhale and "huff" fluoride containing aerosols recreationally

Clinical Case

- A 40-year-old male with past medical history of substance use disorder on Suboxone and bipolar disorder was hospitalized with a right midshaft femur fracture after a ground-level fall
- He reported all his teeth were extracted and he had dental implants
- Upon his hospital admission, imaging revealed diffuse sclerotic changes involving all cervical and upper thoracic vertebral bodies, hip, femur and ribs
- patient endorsed "huffing" compressed air duster for the past 3 years

Clinical Case (continued)

- Patient reported huffing up to 10 containers a day and only stopped two months prior after completing a stay in a rehabilitation facility for inhalation abuse
- It is important to note that air duster contains chemicals such as hydrofluoric acid and carbonyl fluoride
- Given his presentation of a fragility fracture with worsening diffuse osteosclerosis along with his history of inhalant abuse, serum fluoride levels were obtained. The patient's serum fluoride levels were significantly elevated at 23.0 (Reference value <4.1 mcmol/L)
- Furthermore, it became clear that the presence of diffuse osteosclerosis in conjugation with elevated serum fluoride levels, fragility fractures and a history of compressed air dust inhalant abuse strongly supported the diagnosis of skeletal fluorosis
- These changes had progressed since his prior studies from about one year prior when he had been admitted with a contralateral femur fragility fracture
- His labs this admission were significant for an elevated serum alkaline phosphatase level to 342 (46 - 116 U/L), PTH level of 112.6 (18.4 - 80.1 pg/mL) and Vitamin D, 25-Hydroxy level of 20 (30 - 100 ng/mL)



Image (a) X-Ray of Femoral Fracture



Image (b) X-Ray of Femur, post-operative repair

Discussion

- Skeletal fluorosis is a rare disease in the United States and can present with nonspecific findings (e.g., fragility fractures, nonspecific bone pains etc.), as seen in our case
- Fragility fractures and diffuse sclerosis on imaging in patients, particularly without significant risk factors for osteoporosis, should prompt clinicians to include skeletal fluorosis in their differential diagnosis
- This case further highlights the importance of thorough history taking



Image (c) Generic compressed air duster