

A productive cough

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CASE REPORT

A 48-year-old man with a history of mild asthma presented to the emergency room with intense coughing, progressive over a period of three weeks. In the last week, he has a worsening chest pain while breathing and coughing. He smokes 15 cigarettes and consumes four alcoholic drinks per day. There was no history of a previous trauma. Physical examination revealed no abnormalities except a painful chest on palpitation. Auscultation revealed no abnormal lung sounds. Peripheral oxygen saturation was 99% while breathing ambient air. Laboratory investigations revealed slightly elevated liver enzymes (gamma-glutamyl transferase 95 U/l and lactate dehydrogenase 269 U/l) and a leucocytosis of $17.1 \times 10^9/l$. A chest radiograph was obtained (*figure 1*).

WHAT IS YOUR DIAGNOSIS?

See page 155 for the answer to this photo quiz.

Figure 1. Chest radiograph on admission



DIAGNOSIS

The chest radiograph (*figure 1*) demonstrated multiple fractures of the ribs on both sides, see also the reconstructed 3D-image of the computer tomography scan of the thorax (*figure 2*).

On suspicion of whooping cough, we performed pertussis serology, which was positive.

The rib fractures were considered to be induced by severe coughing secondary to pertussis infection.

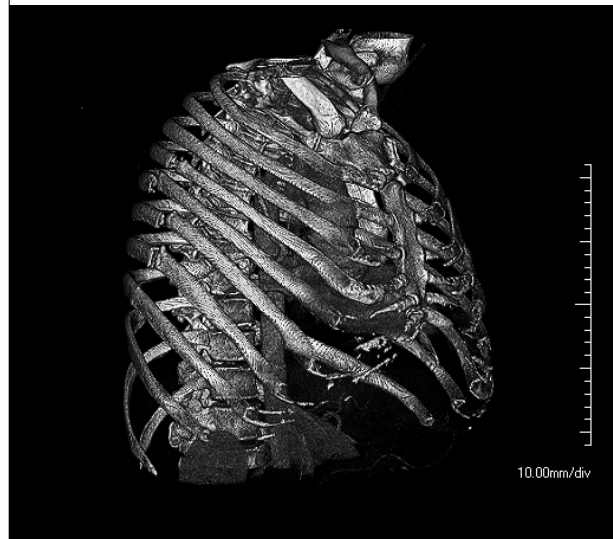
Supplementary laboratory investigations revealed a very low level of vitamin D, 25-hydroxy vitamin D 16 nmol/l (30 to 150 nmol/l) and low testosterone, 3.2 nmol/l (6.9 to 28.1 nmol/l). Calcium, phosphate and parathyroid hormone were within normal limits. There were no other hormonal deficiencies. Dual-energy X-ray absorptiometry (DXA) demonstrated severe osteoporosis adjusted for age with a T-score of -3.0. Abdominal ultrasonography showed liver steatosis. The patient had developed severe osteoporosis with hypovitaminosis D and testosterone deficiency due to chronic alcoholic ingestion. His whooping cough was the cause of this revelation.

Case reports about rib fractures due to pertussis are extremely rare. Just one was published in 2001 about an 11-year-old boy with a fracture of the first rib due to pertussis.¹ This is the first report of an adult with multiple rib fractures due to pertussis. Further investigations revealed severe osteoporosis due to chronic alcoholism.

Alcohol is known for its impairment of vitamin D metabolism leading to vitamin D deficiency and its depressing effects on bone mineral density. Furthermore chronic alcoholism is related to poor nutrition, malabsorption and alcoholic liver disease. All these factors contribute to the development of osteoporosis and the risk of fractures. The exact pathogenesis is still unclear. There is some evidence for inhibition of bone formation and higher bone resorption rates.²

Alcohol also affects the hypothalamic-pituitary-gonadal axis and may have a toxic effect on the testis, resulting in decreased serum testosterone levels and hypogonadism,

Figure 2. Reconstructed 3D image of the CT thorax



independently of cirrhosis or nutritional factors. Hypogonadism contributes to the development of osteoporosis too.^{3,4}

Referring to this case report, we advise to look for osteoporosis and its underlying causes if patients without a previous trauma present themselves with rib fractures.

REFERENCES

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