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Case Report

Pathologic fracture of the thoracic spine in a male master ultra-marathoner due to the combination of a vertebral hemangioma and osteopenia

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ABSTRACT

Vertebral hemangiomas are the most common benign vertebral neoplasms and are generally asymptomatic. In the present study, we report the case of a 52-year-old male master ultra-marathoner suffering from a pathologic fracture of the thoracic spine due to a vertebral hemangioma. A further examination in the athlete revealed an accompanying osteopenia, which was most likely due to a deficiency in both vitamin D and testosterone. The treatment of the fracture consisted of percutaneous vertebroplasty. Shortly after the operation the athlete was able to continue running. The most likely reason for the pathologic fracture of the vertebral body was the combination of the vertebral hemangioma and osteopenia. The further treatment consisted of supplementation of both vitamin D and testosterone. Athletes and physicians should be aware that male master ultra-marathoners older than 50 years might suffer from osteopenia, where a deficiency in vitamin D and testosterone could be contributing factors for osteopenia development in general.

1. Introduction

Primary intraosseous hemangiomas are most frequently seen in the vertebrae or in the skull [1,2]. Vertebral hemangiomas are the most common benign vertebral neoplasms and incidentally detected due to their characteristic features on imaging for other reasons. They usually occur in the lower thoracic and upper lumbar region.

We present the case of a 52-year-old male master ultra-marathoner who suffered from a pathologic fracture of his thoracic spine while running. Radiological imagining revealed

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an intraosseous hemangioma as the main reason for the fracture. The most likely reason for the fracture of the vertebral body with the hemangioma was an accompanying osteopenia most likely due to a combination of low vitamin D and low testosterone.

2. Case presentation

The 52-year-old highly experienced male ultra-marathoner went with his 64-year-old run comrade on a routine long training run. The two athletes had planned to complete their usual running distance of 40 km. Shortly after takeoff, the athlete under examination felt a sharp pain between his shoulder blades. He ignored the pain and thought it was a muscular strain after he had changed from the sidewalk across the street. Over the kilometers the pain became stronger and by the time he could hardly breathe and had to let his colleague running alone to the turning point (~20 km). On the way back both ran slowly together to the starting point. Back home, breathing became more severe and the pain increased steadily. From a recent operation he had available some painkillers and could sleep for a while after high-dose ingestion.

Over the next few weeks the pain between the shoulder blades remained and each step caused pain. While the pain remained for several weeks, the athlete visited his primary care physician who performed a radiograph of the thoracic spine showing a compression fracture in the mid thoracic spine (Fig. 1). For a more precise clarification, a magnetic resonance imaging (MRI) scan (3.0 Tesla, Achieva, Release 3.2.3.2; Philips Medical System, Best, the Netherlands) of the thoracic spine was performed using coronal, sagittal, and axial T1-weighted and T2-weighted sequences. Since the suspicion had been expressed on osteopenia in the X-ray of the spine, a DEXA (Dual-Energy X-ray Absorptiometry) followed the MRI.

In the MRI of the thoracic spine (Figs. 2–4), the vertebral body 5 showed a reduction in height in the anterior part with an increase in signal in the whole vertebra in all sequences with a loss of signal in the caudal part of the vertebra in the T1 and T2 sequences so that a relatively fresh fracture of this vertebra was diagnosed with an underlying vertebral hemangioma. Apart from vertebral body 5, further hemangiomas were found in vertebral bodies 6 and 10 of the thoracic spine and in vertebral body 1 of the lumbar spine.

In the DEXA, bone density showed a transition to osteopenia (*T*-score of −1.0 and lower) at the left wrist (*T*-score of −1.0), at the left femoral neck (*T*-score of −1.1) and at the lumbar spine (*T*-score of −1.6). A laboratory examination showed a decreased total testosterone (7 nmol/L, reference 9.5–30 nmol/L), a decreased free testosterone (20.8 pmol/L, reference range 22.9–104.1 pmol/L), an increased estradiol (181 pmol/L, reference 40–162 pmol/L), a decreased vitamin D (42 nmol/L, reference 50–100 nmol/L), an increased bone specific alkaline phosphatase (35.5 μg/L, reference 5.7–32.9 μg/L), and a decreased phosphate (0.67 mmol/L, reference 0.87–1.45 mmol/L). Sex-hormone binding globulin (31.7 nmol/L, reference 13.1–49.4 nmol/L), calcium (2.49 mmol/L, reference 2.1–2.6 mmol/L), and parathyroid hormone (2.0 pmol/L, reference 1.0–6.8 pmol/L) were within the reference range. Immunoassays analyzed the concentrations of sex hormones. Serum concentrations of testosterone and sex hormone-binding globulin were obtained using radioimmunoassay.

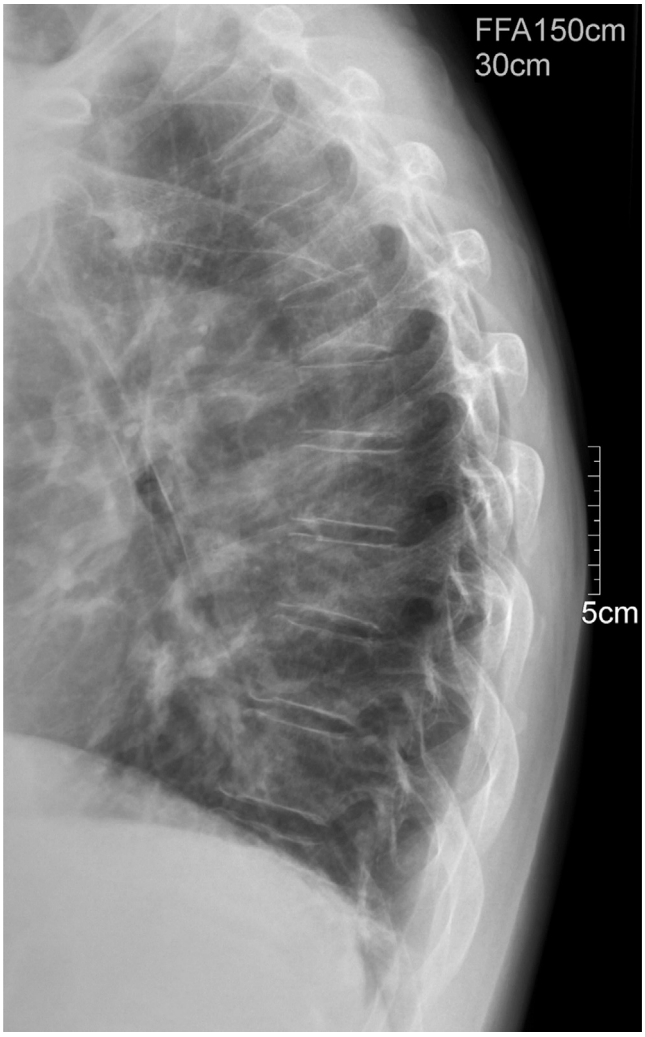

Fig. 1 – X-ray of the thoracic spine with compression fracture of vertebral body 5.

The fracture of the vertebral body was treated with vertebroplasty (Fig. 5) and the deficiency of testosterone and vitamin D was treated with parental supplementation of testosterone (Testosteronienantas, Testoviron®, 250 mg every 3 weeks) and vitamin D (Calciicarbonas et Cholecalciferolum, Calcimagon®-D_3/-Forte, 1 tablet per day with 1000 mg calcium and 800 I.U. cholecalciferol), respectively. A few days after the operation, the athlete started again his running training without pain or any other discomfort.

The family history of this athlete showed that his aunt (*i.e.*, sister of his father) and his great aunt (*i.e.*, sister of the mother of his father) suffered from severe osteoporosis with multiple fractures. His aunt had a fracture of the hip and the forearm, and his great aunt died of multiple fractures of the thoracic spine. An actual DEXA of the mother of the athlete showed also severe osteoporosis but without fractures.

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