

Repetition of an unusual stress fracture in an anorexic man: A case report

S Myers, D Bell, J Gorman

Orthopaedic Department, Prince of Wales Hospital, Randwick, New South Wales 2031, Australia

J Best

Orthosports, Randwick, New South Wales 2031, Australia

J Rooney

Orthopaedic Department, St Vincents Hospital, Darlinghurst, New South Wales 2010, Australia

ABSTRACT

Stress fractures of the fibula commonly occur distally in runners, whereas stress fractures of the proximal fibula are uncommon and typically occur in jumpers. Furthermore, it is rare for a stress fracture to be repeated in the same bone. We report a case of a repeated stress fracture of the proximal fibula in a male runner with abnormal gait that primarily involved excessive pronation. Unusual risk factors in this case were anorexia nervosa and use of an inhaled corticosteroid. The patient was treated conservatively, and healing of the fracture was completed at 12 weeks.

Key words: *anorexia nervosa; corticosteroid; fibula; risk factor; runner; stress fracture*

INTRODUCTION

The incidence of stress fracture among athletes is 4%.¹ About 12% of cases occur in the fibula,² and most of these occur in the distal fibula, usually in runners.³ In

contrast, stress fractures of the proximal fibula are rare and typically occur in jumpers.^{4,5} It is uncommon for stress fractures to be repeated in the same bone.² This report illustrates a case of repeated stress fracture in the proximal fibula that involves unusual risk factors.

CASE REPORT

A 35-year-old male recreational jogger presented to the Department of Orthopaedic Surgery at the Prince of Wales Hospital, Randwick in June 2000, with a one-week history of pain in the lateral side of his left leg on weightbearing. Clinical examination and radiography at presentation yielded unremarkable results, and the man was sent home with non-steroidal anti-inflammatory drugs and instructions to rest. Two weeks later, he presented again with a continuing history of pain in his left leg.

The patient had been following the same jogging and walking routine for 15 years—namely, a weekly 25-km jog and 15-km walk. 13 years previously, he had sustained a stress fracture to the left proximal fibula, which had been treated conservatively. In addition, anorexia nervosa had been diagnosed 6 years previously, for which he had been admitted to hospital



Figure (a) Anteroposterior and (b) lateral radiographs of left tibia and fibula, showing stress fracture of the fibula at the junction of middle and distal thirds.

for 3 times, during which he was also found to be osteoporotic. During each admission, the patient had achieved his target body weight on discharge. Dependent and compulsive traits were also noted.

The patient reported having had asthma since childhood, for which he had used inhaled corticosteroids (beclomethasone dipropionate 500 µg twice daily for 2–3 months per year, for the last 5 years) and inhaled salbutamol (200 µg pre- and post-exercise for 6 months per year, for the last 15 years). He had required hospital admission at least once, previously, during which thalassaemia minor was diagnosed incidentally as a result of routine blood tests.

Physical examinations revealed tenderness and swelling over the junction of the middle and distal thirds of the left fibula. No mass was palpable and there were no other signs of inflammation. There was significant bilateral hindfoot eversion on stance, with prolonged excessive pronation during gait. No other clinical signs were found except for decreased power with eversion on the right foot with peroneal muscle testing.

Radiographs showed an undisplaced fracture at the junction of the middle and distal thirds of the left

fibula. There was also residual bone deformity at the junction of the proximal and middle thirds from the previous stress fracture (Fig.).

The patient was treated conservatively with crutches and a support bandage for 3 weeks, and weightbearing as tolerated. He presented to the clinic 4 days later, fully weightbearing with and experiencing minimal pain. At a follow-up visit 4 weeks later, he was pain-free and fully weightbearing. Results of a physical examination were unremarkable, and radiographs revealed good callus formation. We recommended the use of orthoses and strengthening exercises for the appropriate muscle group and referred him to a sports physician for gait analysis and training advice. Healing of the fracture was slow but completed at 12 weeks.

DISCUSSION

A stress fracture occurs when excessive stress is applied to normal bone. Most stress fractures occur 4.5 weeks after the onset of a new exercise,¹ when muscles have adjusted to the new stress but bone remodelling is not complete. Muscle fatigability can also affect shock-absorbing ability: when the muscle is fatigued, more force is transmitted directly to the bone. Furthermore, the incidence of stress fractures increases with age.¹ Fibular stress fractures usually occur in the middle and distal thirds⁶ and commonly present with lateral leg pain, swelling, pain to palpation, tenderness on percussion, antalgic gait, and local oedema.¹ Differential diagnoses include exertional compartment syndrome, biceps femoris tendinitis, and peroneal nerve entrapment syndrome.¹

Risk factors for stress fracture include genetic predisposition, low bone mass, a history of overuse injuries, low calcium intake, smoking, and alcohol use.⁷ The patient in this case had had anorexia nervosa and was currently taking drugs for asthma. Anorexia nervosa predisposes to osteoporosis through hypothalamic dysfunction⁸ and, if untreated, is associated with a loss of trabecular and cortical bone at a rate of 4% to 10% per year.⁹ The risk of fracture may persist well after improvement in the anorexia nervosa.⁸ In addition, lower bone density is associated with the use of inhaled corticosteroid and seems to be more related to the daily dose than the duration of treatment.¹⁰ Bone density at the hip declines by 0.44 mg/cm² per number of daily doses of inhaled corticosteroid, per year of treatment.¹¹ Corticosteroid therapy may similarly affect the bone density at the fibula.

Treatment consists of 2 stages. Stage 1 involves modified rest (weightbearing during activities of daily living), use of non-steroidal anti-inflammatory drugs, cryotherapy, stretching exercises, and cross-training to maintain cardiovascular fitness. Stage 2 involves the gradual reintroduction of sport and modification of risk factors.¹

Two-thirds of initial radiographs are negative for

any sign of fractures. Diagnosis of a stress fracture is made on the basis of a technetium-99m triple-phase isotope bone scan.² Changes may be seen as soon as 48 to 72 hours after injury and may remain positive for 6 months to 2 years.¹ If the scan shows a focal area of increased uptake, computed tomography or magnetic resonance imaging can confirm the diagnosis.²

REFERENCES

1. Monteleone GP. Stress fractures in the athlete. *Orthop Clin N America* 1995;26:423–32.
2. Bennell KL, Malcolm SA, Thomas SA, Wark JD, Brukner PD. The incidence and distribution of stress fractures in competitive track and field athletes: a twelve-month prospective study. *Am J Sports Med* 1996;24:211–7.
3. Devas MB, Sweetnam R. Stress fractures of the fibula. *JBJS* 1956;38B:818–29.
4. Newberg AH, Kalisher L. Case report: an unusual stress fracture in a jogger. *J Trauma* 1978;18:816–7.
5. Symeonides PP. High stress fractures of the fibula. *JBJS* 1980;62B:192–3.
6. Lacroix H, Keeman JN. An unusual fracture of the fibula in a long-distance runner. *Arch Orthop Trauma Surg* 1992;111:289–90.
7. Myburgh KH, Hutchins J, Fataar AB, Hough SF, Noakes TD. Low bone density is an etiologic factor for stress fractures in athletes. *Ann Intern Med* 1990;113:754–9.
8. LaBan MM, Wilkins JC, Sackeyfio AH, Taylor RS. Osteoporotic stress fractures in anorexia nervosa: etiology, diagnosis, and review of four cases. *Arch Phys Med Rehabil* 1995;76:884–7.
9. Maugars YM, Berthelot JM, Forestier R, Mammari N, Lalande S, Vensisse JL, et al. Follow-up of bone mineral density in 27 cases of anorexia nervosa. *Eur J Endocrinol* 1996;135:591–7.
10. Toogood JH, Baskerville JC, Markov AE, Hodsman AB, Fraher LJ, Jennings B. Bone mineral density and the risk of fracture in patients receiving long-term inhaled steroid therapy for asthma. *J Allergy Clin Immunol* 1995;96:157–66.
11. Israel E, Banerjee TR, Fitzmaurice GM, Kotlov TV, LaHive K, LeBoff MS. Effects of inhaled glucocorticoids on bone density in premenopausal women. *N Engl J Med* 2001;345:941–7.