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Bilateral distal fibula stress fractures in late pregnancy: A case report

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In this case report we describe an unusual case of bilateral distal fibula stress fractures during late pregnancy. The predisposing and precipitating factors for development of stress fractures were examined, and an evaluation of the impact of pregnancy related factors were completed. Our patient presented at 32 weeks of her pregnancy when the stress fractures developed and was evaluated both in the Emergency Department and orthopaedic outpatient clinic. She was diagnosed with bilateral distal fibula stress fractures which were managed conservatively due to their stable nature and monitored until union.

Keywords: stress fractures, fibula stress fractures, pregnancy, bilateral

Stress fractures are caused by repetitive cyclical loading of bone. They are often caused by a sudden increase in exercise, smoking, glucocorticoid intake, alcohol abuse, or by metabolic and hormonal imbalances. Stress fractures during pregnancy are rare. Studies have reported that pregnant females with macrosomic infants, an increase in activity, or a vaginal delivery may run a higher risk of stress fractures

Case Report

A 42-year old lady who was 1-month postpartum was referred by her general practitioner to the orthopedic outpatient clinic with bilateral ankle pain. She reported that a month before delivery (at 32 weeks), she developed severe pain in her left ankle. This was then followed by the same pain experienced in her right ankle. The pain was over her lateral malleolus and she attended her local Emergency Department. She underwent clinical and radiological assessment but no cause for the pain was visualized on x-rays. She did not have any co-morbidities and there was no history of smoking or excessive alcohol intake.

On examination she had bilateral pes planus with valgus heels. She had a full range of movement and there was no neurovascular deficit. The repeat x-rays obtained in the clinic at 8 weeks demonstrated stress fractures of the distal fibula at the level of the syndesmosis of both ankles. There was no suggestion of osteoporosis or osteopenia.

The fractures were nondisplaced and the patient was managed conservatively with bilateral "aircast" boots. At week 4, the fractures had healed clinically and radiologically (Figure 1) and she was able to remove the boots. She was given medial arch supports for her pes planus deformity.

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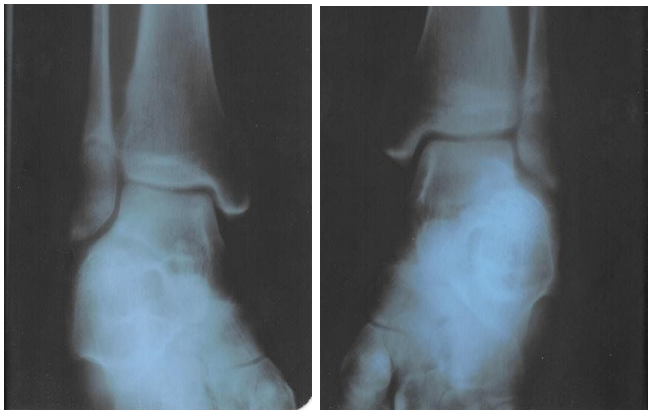

Figure 1 Right and left ankle fractures.

Discussion

Stress fractures were first described by Aristotle in 200 BC and initially recorded in the literature as a syndrome of painful swollen feet in Prussian soldiers by Breithaupt in 1855, as described by Bucholz, et al. [1]. These are fractures that occur in normal bone when it is subjected to abnormal or uncommon stresses which are in the form of repetitive loading. In repetitive loading, there is an imbalance between bone resorption and formation which engenders a resorption-dominated accelerated remodeling process that reduces the strength of bone. Stress fractures can occur in any bone in the body and a study of 320 athletes by Matheson, et al., found that the most common bones affected were the tibia (49.1%) and the fibula (6.6%) with bilateral stress fractures in 16.6% of cases [2].

During pregnancy numerous hormonal, anatomical and physiological changes occur. As a result, neuromechanical adaptations to gait, postural parameters and sensory feedback gradually occur throughout. Weight gained during pregnancy may impact the ability to maintain balance which leads to an increase in stresses at the ankle. A biomechanical study by Ogamba, et al., evaluated the changes in gait with an anteriorly added mass [3]. In this study, a kinematic analysis was performed on healthy female volunteers with a pseudopregnancy sac with a gradual increase in weight. This study found that the volunteers modified their gait biomechanics and this resulted in kinematic changes in the lower limb which increased joint stresses and may contribute to musculoskeletal pain.

Metabolic and hormonal imbalances may also confer an increased risk to fracture and the entity of pregnancy-associated osteoporosis has been described in the literature. A review article by Kovacs, et al., suggested that genetics were a contributing factor such that deficiency of calcitonin or its receptor and elevated levels of parathyroid hormone-related protein enhance osteoclastic activation resulting in a local reduction of bone mineral density.

Our patient had a bilateral pes planus deformity which may also have contributed to the development of a stress fracture. A biomechanical study by Takebe, et al., found that with the ankle in a neutral position the fibula receives between 6.4 – 17.2% of the load applied to the lower extremity [4]. Cheng, et al., reported a stress fracture of the distal fibula occurring in a patient with pes planus deformity and suggested that this may be due to increased loading of the fibula due to lateralization of the load axis during weight bearing [5]. These factors combined with the biomechanical changes seen in pregnancy may account for the development of a stress fracture.

In 1948, Burrows divided stress fractures of the distal fibula into two groups: the first involving young male athletes with fractures 5-6cm proximal to the tip of the lateral malleolus and the second involving middle-aged females with fractures occurring 3-4cm proximal to the tip of the distal fibula [6]. This study also suggested that radiographic findings were often not evident until 3 weeks post injury. Tavakkolizadeh, et al., described bilateral distal fibula stress fractures in a 38-year old lady and suggested that these injuries were more likely to occur in cancellous bone in the second group of patients as previously described by Burrows [7]. The majority of stress fractures may be treated conservatively with splinting in the form of an aircast boot which provides support during ambulation. In this case arch supports were also utilized for the underlying pes planus deformity.

Conclusion

Stress fractures in pregnancy are very rare and to date there have been no reports of bilateral distal fibula fractures occurring in late pregnancy. The hormonal and physiological changes that occur during pregnancy may result in increased joint contact stresses, transient osteoporosis and ligamentous laxity.

These changes may predispose individuals to stress fractures.

There is always a hesitancy to expose pregnant patients to radiation, however localized joint pain should be investigated as this may be attributed to a stress fracture. These injuries are inherently stable as the bone is under compression so they may be managed conservatively without any adverse effects.

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