Answers

1. There is an irregular fracture line in the navicular bone in the medial of the right midfoot on the radiograph (Figure 2).
2. Diagnosis is a traumatic tarsal navicular fracture.
3. Stabilization with cast immobilization, rest, pain management, and follow-up examination.

Discussion

It is difficult to identify tarsal navicular fractures on plain radiographs (1-3). This often leads to a delay in diagnosis, which may result in prolonged disabling foot pain in patients (1).

Navicular fractures can be traumatic or stress related (1-4). Navicular avulsion fractures, which are caused by planter flexion, are a type of traumatic fractures. On the other hand, navicular tuberosity fractures are often caused by eversion with simultaneous contraction of the posterior tibial tendon. Another type of traumatic fractures is a navicular body fracture, which is caused by axial loading (2, 3).

Chronic use is the most common cause of stress-related navicular fractures. These injuries are often seen in sportspersons who run on hard surfaces (3, 5). Because of the risk of development of avascular necrosis, stress fractures are considered high-risk injuries. Two of the most common complications of these injuries are delayed union and nonunion (3-5).

Symptoms of navicular fractures include indistinct midfoot pain and swelling. Midfoot swelling and tenderness to palpation might be seen during the physical examination (1, 2). Full range of motion of ankle and subtalar joint are usually present (3).

Diagnosis of suspected navicular fractures presents various challenges. Navicular fractures are often missed on plain radiographs because they may be difficult to see on radiographs (1, 3, 5). Computed tomography is more sensitive for identification of fractures than radiographs. Ultrasonographic examinations provide limited benefit but can be used (6).

Navicular fractures can be treated using nonoperative or operative methods. Cast immobilization and nonweight bearing for 6-8 weeks comprise initial treatment options for navicular stress fractures (3). Operative management, which includes open reduction and internal fixation, is required in cases of nonunion of a navicular stress fracture or when cast immobilization and non-weight-bearing options fail, especially in high-level sportspersons (3-5).

Acute avulsion fractures, most tuberosity fractures, and minimally displaced navicular body fractures can be stabilized with cast immobilization in the emergency department (4). Operative fragment excision is recommended for avulsion fractures that fail to improve with nonoperative treatment and for tuberosity fractures that progressed to symptomatic nonunion (3, 4).

Pain management should be included in the treatment regimen, as with all fractures. Often, acetaminophen or a nonsteroid anti-inflammatory drug (e.g., ibuprofen) suffices for acute pain of a navicular stress fracture, along with immobilization and rest (6).

Figure 2. Tarsal navicular fracture in anteroposterior foot radiograph of the patient

Question: p. 1

Correspondence to: Betül Akbuğa Özel; Department of Emergency Medicine, Başkent University Faculty of Medicine, Ankara, Turkey
Phone: +90 312 212 68 68 e-mail: bakbuga2000@yahoo.com

DOI: 10.5152/jaem.2015.27048

Informed Consent: Written informed consent was not obtained from the patient, because no information or photograph was shared in this paper that could identify the patient.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the author.

Financial Disclosure: The author declared that this study has received no financial support.

References

1. Thordarson DB. Fractures of the midfoot and forefoot. In: Myerson MS, Leonard ME, Editor. Foot and Ankle Disorders. 2 nd ed. Orlando, Fla: Harcourt; 2000. p. 1265-85.
2. Sangeorzan BJ, Benirschke SK, Mosca V, Mayo KA, Hansen ST. Displaced intra-articular fractures of the tarsal navicular. J Bone Joint Surg Am 1989; 71: 1504-10.
3. Moore D. Tarsal navicular fractures. Updated: February 2014 (cited 2014 June 17). Available from: http://www.orthobullets.com/foot-and-ankle/7033/tarsal-navicular-fractures.
4. Torg JS, Moyer J, Gaughan JP, Boden BP. Management of tarsal navicular stress fractures: conservative versus surgical treatment: a meta-analysis. Am J Sports Med 2010; 38: 1048-53. **[CrossRef]**
5. Brockwell J, Yeung Y, Griffith JF. Stress fractures of the foot and ankle. Sports Med Arthrosc 2009; 17: 149-59. **[CrossRef]**
6. Ameres MJ, Montalbano G. Navicular fracture medication. Updated: April 2014 (cited 2014 June 17). Available from: http://emedicine.medscape.com/article/85973-medication.