Bilateral stress fracture of the malleolus medialis of a team handball player – an extraordinary case report

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History:
27 years old team handball player with pain over the left medial malleolus after high intensity training with multiple jump series. There was no significant accident.

Further investigations showed the suspected stress fracture (image 1).

Two and a half years later the patient suffered from a persistent pain over the right medial malleolus. On x-ray and MRI there were signs of stress reaction (bone bruise) but no fracture (image 8+9). After a another month with conserverative treatment he experienced a similar pain after a push off during a handball game.

Clinical findings:
After both events moderate swelling and pain over medial malleolus occoured. In standing position pes plano valgus on both sides.

On the left side the posterior Tibial showed a luxation with a significant loss of function. A tendency for subluxation was found on the right side as well.

Radiological findings:
The fracture on the left ankle was easily diagnosed by x-ray (image 1), an additional MRI showed the partial rupture and subluxation of the posterior Tibial tendon (image 4).

On the MRI of the right ankle one month before appearance of the stress fracture a large bone bruise zone (image 8+9) was detected on the medial malleolus, on plain x-ray there was no pathology in bone stock visible. Further x-ray and MRI on persistent symptoms 4 weeks later presented the fracture site (image 10).

Therapy:
Surgical therapy by osteosyntheses with canulated screws (image 5, 6, 7, 11) was choosen on both sides because of the involved posterior tibial tendon (image 3) and the possibility for functional aftertreatment with faster rehabilitation duration.

The posterior tibial tendon had to be revised and reconstructed in suturing technique (image 3) on the left side, on the right side the tendon was not involved and a reconstruction of the tendon sheet was performed with a suture anchor (image 11).

6 month after each operation the screws were removed.

Result:
The fractures healed in anatomic position (image 5, 6, 7) and the patient recovered very well after both operations and was able to play handball on the same level as before.

Discussion:
Stress fractures in sports are very common with an incidence of 0.12 - 4.4% (5, 12). They happen sports specifically on typical anatomical locations. Most common sites are metatarsus and tibial shaft. The involvement of the medial malleolus is rare but often found in runners or jumping activities (12, 14, 15, 16).

Risk factors are malnutrition, metabolism disorders, decreased bone density, statical changes and muscle dysfunction (3), which was found in our patient by pes plano valgus and posterior tibial tendon dysfunction.

Diagnosis is based on the typical history, clinical findings and stepwise imaging with x-ray, scintigraphy, MRI and computer tomography. MRI and scintigraphy detect early signs and are very useful but especially the findings in the scintigraphy can be quiet un specific.

MRI Classification (12, 14, 15):
1) periosteal edema
2) bone marrow edema in T2 weighted images
3) bone marrow edema also in T1 weighted images (image 8+9)
4) fracture line (image 2)

Studies showed (3, 12) a risk of a delayed diagnosis of stress reactions when only using plain x-rays or clinical findings of 4 to 6 weeks. Delay sometimes is due to a late appearance of the patient to the physician, mean delay is noted by 60 days (16). In our case the patient showed up by the physician 4 weeks before the first stress reaction with unsppecific pain around the ankle, x-rays didn't show any changes and after a rest of two weeks the patient was asymptomatic and returned to play.

On the right side after onset of pain in the malleolus a MRI was performed and a stress reaction was seen (image 8+9) and treated by NSAR, local injection with steroids and rest. Retrospectively we had to recognize that the conservative treatment and time of rest was too short.

The time for complete healing of stress reaction can be very long (4.2 month for operative therapy and 6.7 month after conservativo treatment (6)). Beside this knowledge the sporting activity can be slowly restarted after a mean of 4.5 weeks after operation and 6 weeks after non-operative therapy (6). Non-unions are very rare (14). Our case was healed complely 3 month after the operation (image 4).

In conclusion operative treatment of medial malleolus stress fractures should be prioritized in high level sportsmen not only because of a faster and safer rehabilitation but also because of combined severe injuries for example to the posterior tibial tendon (16).

Literature: