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Sensitivity and specificity of calcaneal quantitative ultrasonometry for diagnosis of Charcot foot in patients with diabetic neuropathy

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Background and Aims: Calcaneal quantitative ultrasonometry (QUS) seems to have a good potential to help in diagnosis of Charcot osteoarthropathy (CO) whereas the role of densitometry measured by dual energy X-ray absorptiometry (DEXA) of spine and femur is still unclear. The aim of our study was to compare sensitivity, specificity and other statistical parameters of calcaneal QUS, DEXA of spine, DEXA of femur and their combinations for diagnosis of CO in patients with diabetic neuropathy (DN). **Patients and methods:** In the single centre cross-sectional study 64 consecutive patients with DN who underwent calcaneal QUS and DEXA of spine and femur during 1/2013-12/2013 were enrolled. Individual osteological examination was rated as abnormal if osteoporosis or osteopenia were diagnosed. Patients were divided into a group with CO (37 persons, mean age 50.8 ± 11.4 years) and a control group with neuropathy without CO (27 persons, mean age 61.7 ± 11.2 years). Non-active stage of CO was diagnosed on the history of acute attacks, presence of typical deformities or radiological signs. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were used to assess the diagnostic accuracy of individual osteological examinations and their combinations. **Results:** Sensitivity of calcaneal QUS (100%) was significantly higher ($p < 0.001$) than sensitivity of DEXA of spine (35.1%) and femur (40.5%). In contrast, specificity of calcaneal QUS (14.8%) was significantly lower ($p < 0.001$) than specificity of DEXA of spine (63%) and femur (77.7%). Specificity of calcaneal QUS was increased by combining it with both DEXA of spine and femur (85%), DEXA of femur (77.8 %) or DEXA of spine (63%). NPV of calcaneal QUS (100%) was significantly higher ($p < 0.001$) than NPV of DEXA of spine (41.5%) and femur (48.8%). PPV of calcaneal QUS, DEXA of spine and femur did not differ significantly (61.7, 56.5, 71.4%). **Conclusion:** High sensitivity of calcaneal QUS for diagnosis of CO suggests that this examination is better for screening patients suspected from CO than DEXA of spine and femur. Low specificity of calcaneal QUS is increased by combining it with DEXA of spine and femur.

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