TBS IMPROVES THE DETECTION OF SUBJECTS AT RISK OF FRACTURE IRRESPECTIVELY TO THE BMD STATUS: a Spanish population-based study.

L. Del Rio, S. Di Gregorio, R. Winzenrieth(*)
CETIR Grup Mèdic, Barcelona. (*) Medimaps, Pessac, France

INTRODUCTION

Vertebral fractures produced by low-energy impacts, can be a consequence of a bone with low bone density and / or with altered structural quality. Today, the determination of bone mineral density - as assessed by DXA - can identify subjects at increased risk of fracture when density measurements are found below certain ranges.

The Trabecular Bone Score (TBS) is a texture parameter assessing pixel gray-level variations DXA images. TBS evaluation is derived from experimental variogram and linked to bone microarchitecture status.

The software for TBS computation (TBS Insight, Medimaps, France) is installed directly on DXA machines, and TBS is automatically calculated consecutively to BMD measurement. A low TBS value is intuitively interpreted as a low quality of bone texture.

OBJECTIVE:
The aim of this study was to test TBS, BMD and their combination for discriminate patients with vertebral fracture in normal, osteopenic and osteoporosis subjects.

PATIENTS AND METHODS

We included 946 patients (860 women and 86 males) whose were remitted to our facility for evaluate the bone mineral status. In all subjects were assessed the bone mineral density (d/cm2) by DXA (GE Healthcare GE, Madison, WI, Software version 12.3) at lumbar spine (L1-L4) and hip (total hip, femoral neck).

Bone density results were categorized using the T-score for lumbar spine bone mineral density (BMD) into 3 categories according to the WHO recommendation: normal (T-score >1), osteopenic (T-score 2-1 and ≥2.5), and osteoporosis (T-score ≤-2.5).

Questionnaires collected information on demographics, personal and family history of major osteoporotic fracture and/or osteoporosis, history of other comorbidities, gynaeologic and obstetric history, and lifestyle, as well as a validated questionnaire on calcium intake.

Patients with vertebral fracture were evaluated by vertebra fracture assessment software on the DXA device and were classified using the Genant semiquantitative approach. TBS was obtained after reanalysis of DXA lumbar spine (L1-L4) scan with TBS Insight software version 1.8.2.0 (Med-imaps, Pessac, France). We didn’t exclude vertebral fractured to the analysis.

Statistical Analysis:

Descriptive statistics, including mean and 95% confidence intervals, were estimated for patients with and without vertebral fracture. Differences between both groups were analyzed by means of parametric Student T test or non parametric Mann-Whitney test, depending upon distribution normality of the tested parameter. The prevalence of different bone status category, vertebral fracture and osteoporotic fractures (hip, wrist, vertebral or humerus) were calculated.

All database management and statistical analyses were performed using the SPSS 16.0 statistical software. A p<0.05 was considered statistically significant.

RESULTS

According to the WHO classification, the 31.01% were classified as normal subjects by BMD. Of 946 patients studied, 63 have been had at least a vertebral fracture or combined with another fracture (wrist: 0.85% to 0.11% hip), representing a total prevalence of 6.67% vertebral fractures. Fracture patients had significant lower bone mineral density and TBS.

Although there is a significant agreement between the results of the two types of measurements, changes in image texture (TBS) are more prevalent in subjects fractured

CONCLUSIONS

• TBS bone quality parameters measured non-dependent, but related to BMD.
• TBS software is a complement to DXA BMD measurements, which provides a significant improvement in diagnostic performance.
• The segment of the population classified densitometry situation “Normal” or “osteopenia” is one that has a larger display to complement your exploration with TBS Assessment.