TBS VARIATION IN BREAST CANCER WOMEN COMPLETING AI-THERAPY: A PROSPECTIVE STUDY OF THE B-ABLE COHORT

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PURPOSE

The trabecular bone score (TBS) is a new additional texture parameter postulated to reflect bone microarchitecture, being able to capture roughly one third of fractures misclassified using BMD alone. The purpose of the study is to characterize TBS variation at the end of aromatase inhibitor (AI) therapy in postmenopausal women with breast cancer.

METHODS

B-ABLE is a prospective cohort of 735 women treated with AIs according to the American Society of Clinical Oncology recommendations: 5 years of AI starting within 6 weeks post-surgery or 1 month after the last cycle of chemotherapy (5y-AI group) or alternatively switching to an AI after taking tamoxifen for 2 to 3 years (pTMX-AI group). TBS and BMD changes and their correlation at the end of AI-therapy were evaluated.

RESULTS

AI treatment completion was achieved by 277 women. Of these, 70 (25.3%) were allocated to BP therapy (Table 1). Significant TBS decreases were observed in BP-non-treated patients at the end of AI-therapy, both in pTMX-AI (-2.94%) and 5y-AI (-2.93%) groups. An inter-group comparison did not reveal significant differences in TBS decreases between pTMX-AI and 5y-AI patients. As regards BMD, significant decreases were also detected in both pTMX-AI (-4.14%) and 5y-AI (-2.28%) patients. In this case, pTMX-AI patients experienced significantly greater BMD decline when compared to 5y-AI patients. Regarding BP-treated patients, the TBS remained stable in both pTMX-AI and 5y-AI groups at the end of treatment. Compared to baseline, there was a significant increase in BMD at the end of treatment in both groups, reaching +2.30% in pTMX-AI and +5.33% in 5y-AI patients. There were not statistically significant differences between both groups (Figure 1 and Table 2).

Table 1. Baseline patient characteristics

Patient characteristic	Non-BP-treated (n=207; 74.7%)	BP-treated (n=70; 25.3%)
Mean age (years)± (SD)	59.8 ± 8.4	62.0 ± 8.3
Mean BMI ± (SD)	29.2 ± 5.2	26.9 ± 4.3*
Prior tamoxifen n (%)	120 (58.0%)	47 (67.1%)
Mean LS TBS (unit less) ± (SD)	1.221 ± 0.130	1.126 ± 0.114*
Mean LS BMD (g/cm^2) ± (SD)	0.958 ± 0.104	0.790 ± 0.104*

Abbreviations: BP (Oral bisphosphonates); SD (Standard deviation); LS (Lumbar spine); BMI (Body mass index); BMD (Bone mineral density); TBS (Trabecular bone score). In t-test compared with Non-BP-treated group: * p<0.001.

During AI-therapy a large number of BP-non-treated patients (approximately 30%) decreased by one TBS category. No significant differences were detected in the frequency distribution throughout TBS categories in BP-treated patients (Figure 2 and 3). Only moderate (r=0.4; P<0.001) and weakly (r=0.1, P<0.01) correlations were detected between BMD and TBS values and between their variations, respectively.
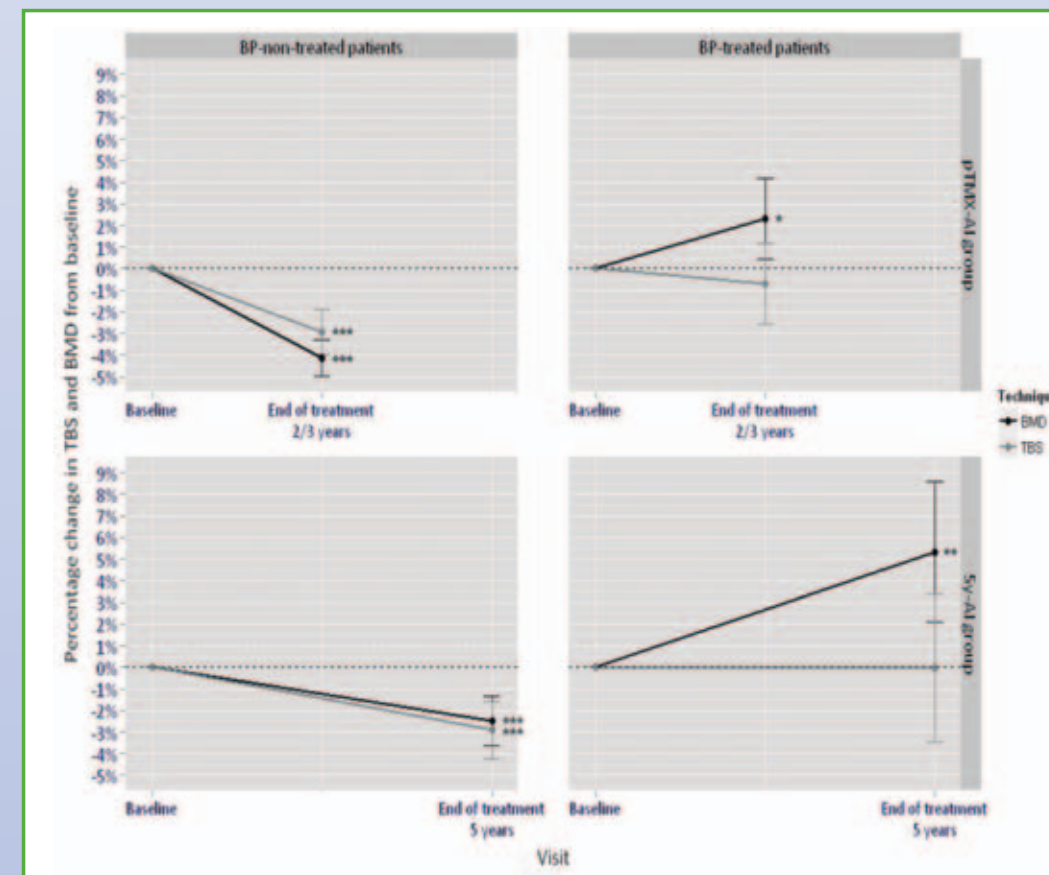

Figure 1: Individual percent change in TBS and LS-BMD at the end of AI treatment according to BP and previous tamoxifen treatment. Mean ± 95%CI are reported. In paired t- test from baseline: * (P<0.05), ** (P<0.01); *** (P<0.001). Abbreviations: AI (Aromatase inhibitors); TBS (Trabecular Bone Score); BMD (Bone mineral density); BP (Oral bisphosphonates).

Table 2: Absolute TBS and LS-BMD values (Mean ± SD) in postmenopausal woman with breast cancer at baseline and at the end of AI treatment according to BP treatment and previous TMX use.

Measure	Lenght of follow-up	Non-BP-treated patients		BP-treated patients	
		pTMX-AI	5y-AI	pTMX-AI	5y-AI
TBS	Baseline	1.239 ± 0.130	1.203 ± 0.124	1.150 ± 0.104	1.078 ± 0.122*
	End of treatment	1.200 ± 0.119	1.165 ± 0.116*	1.141 ± 0.115	1.075 ± 0.133*
BMD	Baseline	0.963 ± 0.101	0.965 ± 0.106	0.808 ± 0.103	0.755 ± 0.098*
	End of treatment	0.923 ± 0.105	0.942 ± 0.110	0.825 ± 0.098	0.793 ± 0.103

Abbreviations: LS-BMD (Lumbar spine-Bone mineral density); TBS (Trabecular bone score); SD (Standard deviation); BP (Oral bisphosphonates); TMX (Tamoxifen); AI (Aromatase inhibitors). In t-test compared with pTMX-AI t.* (p<0.05).
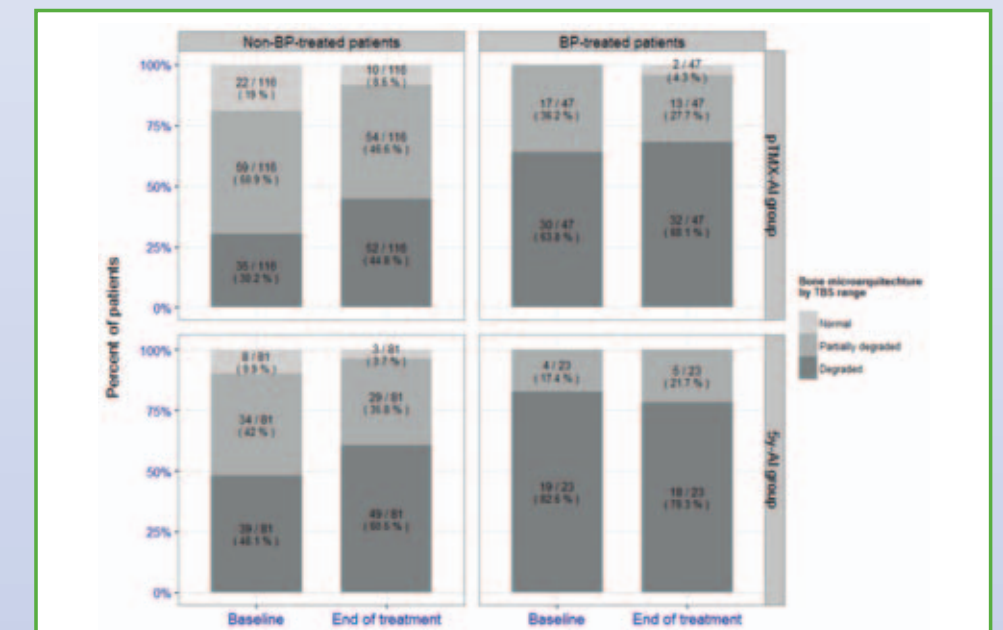

Figure 2: Percentages of patient distribution across TBS range at baseline and at the end of treatment, according to BP and previous tamoxifen treatment. Abbreviations: TBS (Trabecular Bone Score); BP (oral bisphosphonates).
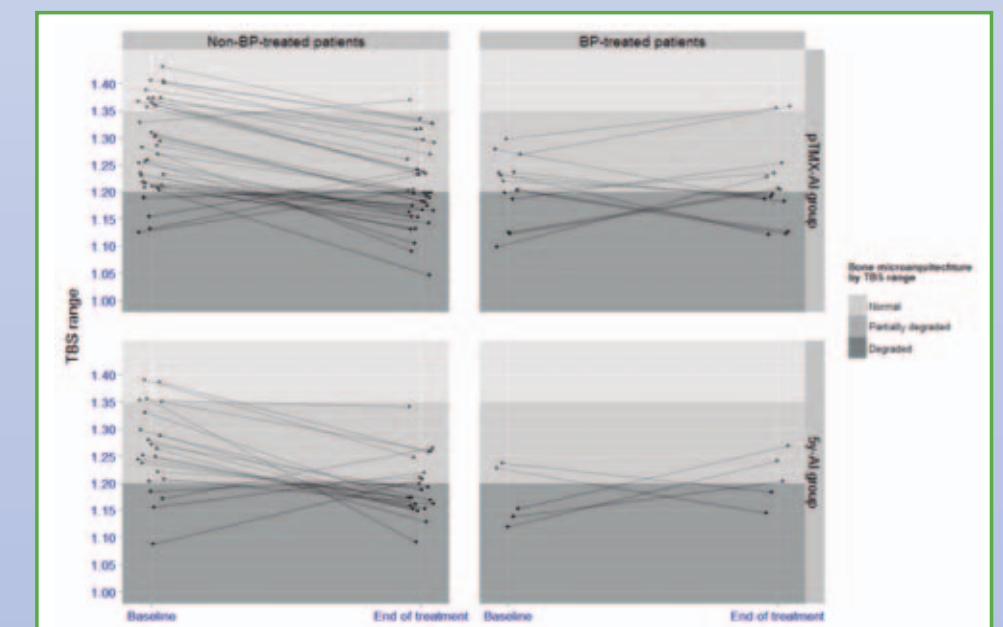

Figure 3: Patients who changed TBS category from baseline to end of treatment according to BP treatment and previous tamoxifen use. Abbreviations: TBS (Trabecular Bone Score); BP (oral bisphosphonates).

CONCLUSIONS

AI-therapy induces significant decreases in TBS, comparable to those in BMD. On the other hand, maintenance, rather than major improvements in TBS was observed in BP-treated patients. AI treatment leads to bone microarchitecture deterioration, which seems to be partially dimmed by BPs.