CHANGE IN TRABECULAR BONE SCORE (TBS) AFTER ZOLEDRONIC ACID INFUSION OR TDF SWITCH

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Introduction

- In a randomized controlled trial in 85 people with HIV (PWHIV) with low bone mass (T score <-1.0), zoledronic acid (ZOL) 5mg annually was more effective than switching tenofovir disoproxil fumarate (TDF) at increasing bone mineral density (BMD) over 144 weeks
- ZOL resulted in larger decreases in markers of bone turnover than did TDF-switch
- TBS is an indirect measurement of bone trabecular microarchitecture and an independent predictor of fracture risk
- The aim of this analysis was to determine the impact of TDF switch versus ZOL while remaining on TDF on TBS over 24 months follow-up.

Methods

- Uncalibrated TBS scores were derived from annual lumbar spine dual-energy x-ray absorptiometry (DXA) images following extraction of the raw data using TBS insight software (Medimaps SA, France).
- TBS was calculated as the mean value of the L1-L4 vertebral images, corrected for weight.
- All participant's BMI between 15-37 kg/m^2
- Change in TBS between the ZOL arm and TDF switch arm over 24 months follow-up was compared using regression models in a post-hoc, per-protocol analysis.
- Pearson's coefficients were used to assess the association between change in BMD and change in TBS
- TBS ≥1.31 defined normal bone architecture, <1.23 defined degraded bone architecture

Results

Baseline Trabecular Bone Score

- All 80 participants randomized to TDF switch (n=40) or annual ZOL infusion at baseline, M12, M24 (n=40) with available DXA data
- At baseline, 48.8% had TBS ≥1.31 and 25% had TBS <1.23 (degraded bone architecture)

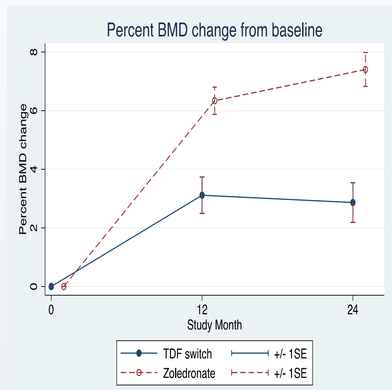
Change in Trabecular Bone Score

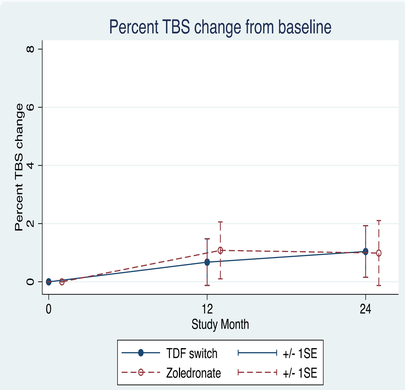
No significant mean (SD) increase in TBS from baseline

Change in TBS	ZOL	TDF switch
Month 12	1.1 (6.1)%	0.7 (5)%
Month 24	1 (6.8)%	1 (5.5)%

Mean difference (95%CI) in change from baseline (ZOL vs TDF switch)

	L1-L4 BMD Absolute change	TBS Absolute change
Mth 12	0.030 (0.015–0.045); P<0.001	0.004 (-0.029 to 0.036); P=0.83
Mth 24	0.039 (0.022–0.055); P<0.001	-0.002 (-0.037 to 0.034); P=0.93
	L1-L4 BMD percent change	**TBS percent change**
Mth 12	3.2 (1.7 – 4.7); P<0.001	0.4 (-2.1 to 2.9); P=0.75
Mth 24	4.5 (2.8 – 6.3); P<0.001	-0.05 (-2.9 to 2.8); P = 0.97





There was no significant correlation between changes in BMD and changes in TBS, either within or between arms

Conclusions

- Both TDF switch and ZOL treatment were associated with small increases in TBS that were not significantly different by treatment arm (unlike the increase in BMD)
- Bisphosphonates inhibit bone resorption. Denser bone is due to increased calcium accretion, not new bone trabeculae, resulting in increased BMD and maintenance of TBS
- TDF containing ART associated with greater reduction in BMD but not TBS. Magnitude of BMD increase much greater than TBS increase on cessation of TDF
- Large studies with fracture endpoints needed to understand the contribution of TBS in PWHIV and low bone mass

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