The BONDY Study: Bone density in youth living with perinatally acquired HIV

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BACKGROUND

- Youth living with perinatally acquired HIV (YPaHIV) have multiple risk factors for low bone mineral density (BMD); early years malnutrition, impaired growth, delayed puberty, and the cumulative effects of antiretroviral therapy (ART) including tenofovir disoproxil fumarate (TDF).
- Tenofovir alafenamide (TAF) is recommended as an alternative to TDF in those <25 years, prior to achieving peak bone mass, due to an improved safety profile.
- We present longitudinal data on BMD accrual in YPaHIV

130 Youth with Perinatal HIV; median age 21 years, 82% of black ethnicity, 57% female

44% had osteopenia/osteoporosis and 76% were vitamin D deficient (<50 nmol/L)

85 were followed for 26 months. Reassuringly longitudinal BMD accrual was in keeping with that of an age, ethnicity and sex matched population.

METHODS

- A longitudinal, observational study (London, U.K.) evaluated bone health in YPaHIV aged 15-19 years (n=50), 20-24 (n=50) and 25+ (n=30) by dual-energy X-ray absorptiometry, bone biochemistry and turnover markers, vitamin D and parathyroid hormone (PTH) with 2-year follow up evaluation in 15-19 years (n=42) and 20-24 (n=43).
- Abnormal BMD was described as osteopenia (Z/T score <-1) or osteoporosis (Z/T score <-2). T-tests compared results between TAF and non-TAF ART. Linear regression identified factors associated with low BMD and 2-year BMD accrual.

PARTICIPANTS

- 130 YPaHIV; 74 (57%) female, 106 (82%) of black ethnicity, median age 21 IQR 18-24) years and CD4 count 707 (IQR 485-925) cells/µL.
- 85 YPaHIV were subsequently followed up at a median of 26 (IQR 25-28) months; 44 (52%) on TAF-ART.

RESULTS

- At baseline, BMD matched for age, sex and ethnicity at L2-4 and/or femur was abnormal in overall 57/130 (44%); 13 (26%) 15-19 years, 25 (50%) 20-24 and 19 (63%) 25+ (Table 1).
- Vitamin D levels were <50nmol/l in 99 (76%); 42 (84%), 36 (72%) and 21 (70%), with a raised PTH (>7.2 pmol/l) in 12 (24%), 24 (48%) and 11 (37%), respectively by age group (Table 1).
- There was no difference in BMC delta change with TAF, bar lumbar spine (LS) BMC in 15-19 years (Δ=0.70±0.48 TAF vs 2.18±0.48 non-TAF; p=0.038; all other p>0.25).
- Predictive factors of LS BMD change were baseline calcium (β=-0.16 per 1 higher; 95% -0.32, -0.01;p=0.04); no association was seen with TAF use/duration, age, gender, BMI, mobility, bone markers (NTX, P1NP), PTH, vitamin D or alkaline phosphatase (ALP).
- LS BMC change was weakly associated with TAF duration (β=+0.04 per month longer; 95%CI -0.01, +0.10;p=0.09) and ALP (β=+0.76 per 10 higher; 95%CI +0.01,+0.15;p=0.04).
- In those 20-24 years, greater BMD hip change was associated with PTH (β=-0.01 per 10 higher;-0.02,0.00;p=0.01).

Figure 1 LS BMC over follow-up, according to TAF use

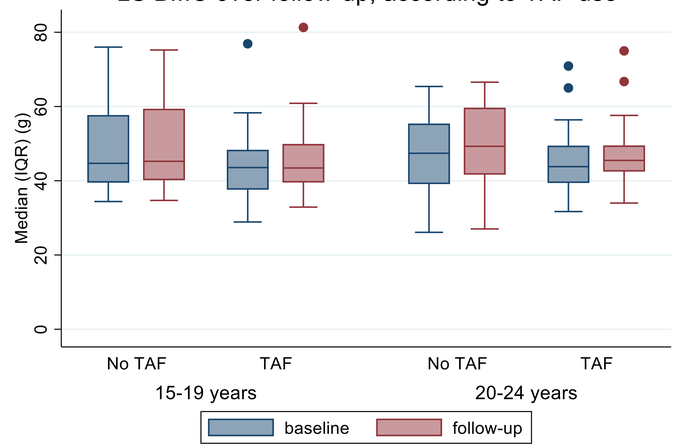


Figure 2 LS BMD over follow-up

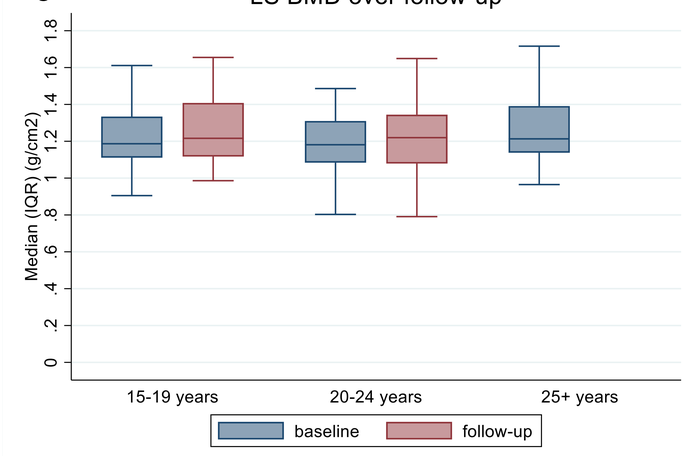


Table 1. Abnormal bone mineral density and biochemical markers stratified by age

Age group (years)	15-19, n=50	20-24, n=50	25+, n=30	Total cohort, n=130
Osteopenia/osteoporosis, n (%)	13 (26)	25 (50)	19 (63)	57 (44)
Vitamin D deficiency (<50 nmol/l), n (%)	42 (84)	36 (72)	21 (70	99 (76)
Raised PTH (>7.2 pmol/l), n (%)	12 (24)	24 (48)	11 (37)	47 (36)

Abbreviations: PTH parathyroid hormone

ADDITIONAL INFORMATION

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CONCLUSIONS

- Reassuringly longitudinal BMD accrual was in keeping with that of an age, ethnicity and sex matched population.
- We found limited evidence of a difference in bone mineral accrual favouring those receiving TAF-ART compared to non-TAF, non-TDF containing regimens.