



Bone mineral density and glycaemic control in children and adolescents with Type 1 Diabetes Mellitus

Gitte B. Fuusager, Henrik T. Christesen, Nikolaj R. Milandt & Anders J. Schou
Hans Christian Andersen Children's Hospital, Odense University Hospital, Denmark

Conclusion

- HbA1c and poor glycaemic control were negatively correlated to bone mineral density (BMD) and BMD Z-scores in children and adolescents with type 1 diabetes mellitus
- Elevated blood glucose levels may affect bone health already before adulthood in patients with type 1 diabetes mellitus

Background

- Patients with Type 1 Diabetes Mellitus (T1DM) have an increased risk of fracture throughout life
- Adults with T1DM have an increased risk of osteopenia, and biomarkers in bone metabolism have found to be altered
- Even though T1DM mainly has its onset in childhood, not much is known about bone involvement in children and adolescents with T1DM

Objective

To (I) evaluate bone mineral density (BMD) in children and adolescents with T1DM and (II) to identify risk factors associated with lower BMD

Method

- We studied 85 patients, 46 males, with T1DM. Median (range) age 13.2 (6-17) years; disease duration 4.2 (0.4-15.9) years; latest year mean HbA1c 61.8 (41-106) mmol/mol.
- DXA to estimate BMD and Z-score
- Puberty Tanner stage, HbA1c, disease duration and age at diabetes onset were investigated for associations to BMD Z-score and BMD in multiple regression analyses



TBLH scan from DXA GE Lunar Prodigy

Results

- Boys had a Z-score significantly higher than expected, 0.38 (95%CI 0.13 ; 0.62)*, while girls trended towards a lower Z-score than expected, -0.27 (-0.53 ; 0.00)*. The Z-score was significantly different between the sexes
- When stratified by puberty, boys had a significantly higher than normal Z-scores after reaching puberty (Tanner 2-5), while this was not the case for pre-pubertal boys
- A negatively correlation between Z-score and the latest year HbA1c was found in both sexes, β -0.019 (95%CI -0.034;-0.004, p=0.01)*
- Poor glycaemic control (HbA1c > 58 mmol/mol) within the latest year was likewise negatively correlated with BMD Z-score, β -0.35 (95%CI -0.69;-0.014, p=0.04)*
- A similar negative correlation was found between HbA1c and BMD**

*adjusted for height SD and BMI SD
** adjusted for age, height and BMI

