Relationship among plasminogen activator inhibitor-1, bone mineral density, metabolic and bone turnover markers in postmenopausal women with type 2 diabetes mellitus

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BACKGROUND

Women with type 2 diabetes mellitus (T2DM) have a higher risk of fractures despite increased bone mineral density (BMD). In experimental studies a potential role of plasminogen activator inhibitor-1 (PAI-1) in bone remodeling is suggested but studies in humans are lacking.

OBJECTIVE

This is a first study in humans investigating whether circulating levels of PAI-1 in postmenopausal women with T2DM are related to BMD and adiposity.

RESULTS

Diabetic patients with normal BMD had significantly higher BMI, greater waist circumference and lower bone turnover markers than diabetics with osteopenia and osteoporosis (p<0.01). PAI-1 was lower in diabetics with osteoporosis and osteopenia compared with diabetics with normal BMD (p<0.05). In the multiple regression models the strongest determinants of PAI-1 among metabolic parameters were triglyceride and insulin levels and the duration of T2DM, among therapy beta blockers, and among bone markers pyrillin (p<0.05). Final regression analysis model revealed insulin (p=0.003), triglycerides levels (p=0.0002) and pyrillin (p=0.0002) to be the strongest predictors of PAI-1 levels in all patients.

CONCLUSION

Conclusions: Our findings suggest that the PAI-1 has a protective effect on bone loss by suppression of bone turnover in obese diabetic patients, and the effect is primarily mediated through the influence of metabolic factors, hyperinsulinemia, hypertriglyceridemia and obesity. However, the fact that pyrillin is also independently correlated to PAI-1 implies its direct involvement in bone metabolism influencing bone mass and strength.