Hip Structure Associated with Hip Fracture in Women Data from the Geelong Osteoporosis Study (GOS)

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ABSTRACT

Introduction	Aging leads to changes in bones to be highly fragile causing fractures. In this research, changes in the dimensions of the hip structure can be measured by using a computer program called Hip Structural Analysis (HSA). The objective of this study is to estimate the association between hip geometries in Femoral Neck (FN) and the risk of hip fracture in older women.
Methods	A case control study was performed to explore the objective respectively using the data of participants from population cohort and fracture cohort of the Geelong Osteoporosis Cohort Geelong, Southern Victoria, Australia. Simple and multiple logistic regressions were performed.
Results	Of the total 598 participants, comparing Fracture group (44 subjects) and non-fracture group (454 subjects) aged over 63 years, the odds of hip fracture increased by approximately 2 fold for each 1 SD increase in width, endocortical diameter, and buckling ratio and for each 1 SD decrease in BMD and average cortical thickness controlling for age, height, weight and menopausal status. Subsequently, after additional adjustments were performed by including hip structural geometries which was not highly correlated with each other, an increased cross sectional moment of inertia (OR=4.33, p=0.002), average buckling ratio (OR=3.35, p=0.001) and endocortical thickness (OR=1.94, p=0.003) and a decreased BMD (OR=6.19, p=0.001) and average cortical thickness (OR=7.91, p=0.001) were found to be independently and strongly associated with risk of hip fracture.
Conclusions	These results provide additional insights that the geometrics of FN is associated with fracture neck of femur in older women and strongly suggest its potential value, either as single or combined parameters, as clinical predictors for assessing the risk of hip fracture in older women. In addition to this, utilization of some combined parameters of bone geometrics in FN might be a more effective method in screening than case findings to reduce the burden of hip fracture in the future. Hopefully, Indonesia could learn from this study to deal with future burden of ageing population.