The prospective relationship between low muscle mass and thyroid hormones among 198,069 euthyroid men and women; comparing different definitions of low muscle mass

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Abstract

Objective: The impact of thyroid hormones within normal range on muscle mass remains unknown. We examined the association between new onset of low muscle mass (LMM) and thyroid hormones among euthyroid men and women with three different definitions of LMM in prospective cohort study. Methods: We performed a cohort study of 198,069 Korean adults (mean age of 39.2 years), free of LMM at baseline, who participated in a repeated screening examination and were followed-up annually or biennially for up to 6.3 years. Thyroid-stimulating hormone (TSH), free triiodothyronine (FT3) and free thyroxin (FT4) levels were measured by an electrochemiluminescent immunoassay. Muscle mass was assessed using a bioelectrical impedance analyzer. LMM was defined as the appendicular skeletal muscle mass (ASM) by body weight (ASM/weight, LMM-W), height squared (ASM/height2, LMM-H) and BMI (ASM/BMI, LMM-B) of one standard deviation below the sex-specific mean for young reference group. Results: During a median follow-up of 3.1 years (interquartile range, 2.0-4.1 years), new-onset LMM-W, LMM-H, and LMM-B occurred in 17,856 (incident rate, 27.8 per 1,000 person-years), 8,307 (incident rate, 13.4 per 1,000 person-years), and 13,990 participants (incident rate, 24.5 per 1,000 person-years) in each. In euthyroid men, FT4 was inversely and FT3 positively associated with incident LMM-W in a dose-response manner. TSH and FT4 had inverse dose-response relationship with incident LMM-B. Incident LMM-H of euthyroid men has no apparent associations with any thyroid hormones. Euthyroid women had no dose-response relationship between thyroid hormones and any definition of LMM. Conclusions: Among euthyroid men, FT4 had inverse dose-response association with new onset of LMM defined with weight (LMM-W) and BMI (LMM-B). Height squared LMM (LMM-H) had no apparent relationship with any thyroid hormones. Euthyroid women had no dose-responsive association between thyroid hormones and incident LMM. Key words: appendicular skeletal muscle mass, low muscle mass, thyroid hormones, Cohort study

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