

Correlation between cardiovascular risk and total urate volumes by DECT

¹건국대학교 의과대학 건국대학교병원 내과, ²건국대학교 의과대학 건국대학교 병원 류마티스내과*류세리¹, 이상현², 김해립², 이경연²

Introduction: Hyperuricemia and gout are associated with increased risk of cardiovascular disease. The aim of the study was to evaluate the correlation between cardiovascular risk and total urate volumes measured by dual energy computed tomography (DECT). **Method:** DECT datasets from 91 crystal-proven gout patients were analyzed retrospectively. The total volumes of uric acid deposition were quantified using automated volume assessment software. The 10-year cardiovascular risk using Framingham risk score (FRS) and metabolic syndrome (MS) based on National Cholesterol Education Program were estimated. **Result:** Fifty five patients with positive results of DECT and 36 patients with negative results of DECT were assessed. Patients with positive DECT showed significant higher systolic blood pressure, diastolic blood pressure, and fasting glucose and higher prevalence of chronic kidney disease, compared with those with negative DECT. The total urate volumes were significantly correlated with FRS and the number of component of metabolic syndrome ($r=0.22$, $p=0.036$ and $r=0.373$, $p<0.001$, respectively). **Conclusion:** This study showed the correlation between cardiovascular risk and total urate volumes. A high urate burden could affect unfavorable cardiovascular profiles.

| | Total (N=91) | Positive DECT (N=55) | Negative DECT (N=36) | P value |
|---|--------------------------|--------------------------|-------------------------|--------------------|
| Age (years), mean±SD | 48.42±5.0 ^a | 48.39±5.1 ^a | 47.61±3.3 ^a | 0.703 ^a |
| Male sex, n (%) | 89 (97.8) ^a | 55 (100) ^a | 34 (94.4) ^a | 0.154 ^a |
| Duration of gout (years), mean±SD | 5.0±5.4 ^a | 5.7±6.0 ^a | 4.0±4.0 ^a | 0.301 ^a |
| Uric acid, (mg/dL), mean±SD | 8.3±1.8 ^a | 8.5±1.7 ^a | 8.0±1.9 ^a | 0.170 ^a |
| Blood pressure (mmHg), mean±SD | | | | |
| - Systolic | 131.3±14.4 ^a | 134.8±15.1 ^a | 126.1±11.6 ^a | 0.002 ^a |
| - Diastolic | 77.8±10.1 ^a | 79.7±11.6 ^a | 74.9±6.4 ^a | 0.018 ^a |
| Body mass index (kg/m ²), mean±SD | 26.5±4.6 ^a | 26.5±4.6 ^a | 26.3±4.1 ^a | 0.833 ^a |
| Cholesterol (mg/dL), mean±SD | | | | |
| - Total | 188.0±60.3 ^a | 182.7±62.5 ^a | 187.0±56.6 ^a | 0.342 ^a |
| - LDL | 98.3±38.5 ^a | 96.8±42.3 ^a | 99.9±32.3 ^a | 0.629 ^a |
| - HDL | 43.4±14.3 ^a | 42.5±12.7 ^a | 44.8±16.4 ^a | 0.394 ^a |
| Triglycerides (mg/dL), mean±SD | 214.5±136.1 ^a | 216.9±150.7 ^a | 210.9±11.9 ^a | 0.718 ^a |
| Plasma glucose (mg/dL), mean±SD | 104.8±34.0 ^a | 109.3±40.1 ^a | 97.4±19.2 ^a | 0.005 ^a |
| MDRD GFR, mL/min/1.73 m ² | 69.2±22.8 ^a | 66.9±22.4 ^a | 74.1±26.7 ^a | 0.061 ^a |
| Medication, n (%) | | | | |
| - Statins | 8 (8.8) ^a | 5 (9.1) ^a | 3 (8.3) ^a | 1.00 ^a |
| - Diuretics | 7 (7.7) ^a | 5 (9.1) ^a | 2 (5.6) ^a | 0.699 ^a |
| - Hypertension, n (%) | 32 (35.2) ^a | 24 (43.6) ^a | 8 (22.2) ^a | 0.036 ^a |
| - Diabetes, n (%) | 12 (13.3) ^a | 4 (7.3) ^a | 8 (22.2) ^a | 0.339 ^a |
| - Chronic kidney disease, n (%) | 19 (20.9) ^a | 16 (29.1) ^a | 3 (8.3) ^a | 0.017 ^a |
| - Ever Smoker, n (%) | 42 (46.2) ^a | 23 (41.8) ^a | 19 (52.8) ^a | 0.305 ^a |
| - Ever drinker, n (%) | 53 (58.2) ^a | 32 (58.2) ^a | 21 (58.3) ^a | 0.989 ^a |
| - Metabolic syndrome, n (%) | 48 (52.7) ^a | 38 (69.1) ^a | 10 (27.8) ^a | 0.002 ^a |
| Number of components of metabolic syndrome, n (%) | | | | |
| - 0 | 4 (4.4) ^a | 2 (3.6) ^a | 2 (5.6) ^a | |
| - 1 | 15 (16.5) ^a | 7 (12.7) ^a | 8 (22.2) ^a | |
| - 2 | 24 (26.4) ^a | 12 (21.8) ^a | 12 (33.3) ^a | |
| - 3 | 25 (27.5) ^a | 14 (25.5) ^a | 11 (30.6) ^a | |
| - 4 | 18 (19.8) ^a | 15 (27.3) ^a | 3 (8.3) ^a | |
| - 5 | 5 (5.5) ^a | 5 (9.1) ^a | 0 (0) ^a | |
| Volume by DECT (cm ³), mean±SD | 4.9±16.7 ^a | 8.1±21.0 ^a | | |

A: Mann Whitney test, B: chi-square test, C: Fisher's exact test.

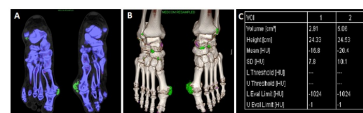


Figure 1. Dual-energy CT images from a chronic tophaceous gout patient (A). Three-dimensional DECT image (B). Automated urate volume measurement using software (C).

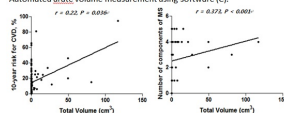


Figure 2. Correlation between total volume and (A) 10-year cardiovascular disease (CVD) risk estimated by the Framingham risk score and (B) number of components of metabolic syndrome (MS) by Spearman rank correlation.

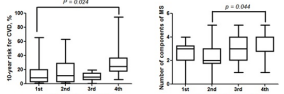


Figure 3. The 10-year cardiovascular disease (CVD) risk estimated by the Framingham risk score (a) and Number of components of metabolic syndrome (MS) (b) in relation to quartiles of total volume by DECT.

Trabecular bone score in assessing fracture risk of patients with Ankylosing Spondylitis

한양대학교병원

*남보라, 김태환

Background: Ankylosing spondylitis (AS) is a disease characterized by spinal osteoproliferation (syndesmophytosis) and the general trabecular bone loss with increased fracture risk. Syndesmophytes in spine leads overestimation of the anteroposterior (AP) lumbar spine BMD measured by dual-energy X-ray absorptiometry (DXA) which is a gold standard of diagnostic tool for osteoporosis. Thus, more accurate fracture risk assessment tool is needed in AS patients. **Objectives:** We aimed to compare various fracture risk assessment tools according to modified Stoke AS Spine Score (mSASSS), and to identify the tool which can best reflect the risk of fracture in AS patients. **Methods:** Total of 215 AS patients were enrolled from Hanyang university hospital. Demographic and clinical information was collected by questionnaires and physical exams. They completed simple X-ray of L-spine, AP and lateral BMD by DXA. FRAX was measured and TBS was obtained from DXA using TBS iNsight software. Quantification of spine ankyloses were determined by mSASSS. We classified patients into two groups: 1) high mSASSS group with mSASSS ≥ 19 , which is median value of study population, and 2) low mSASSS group with mSASSS < 19 . We compared the clinical characteristics and fracture risk assessment tools between two groups. In addition, fracture risk assessment tools were compared according to history of fracture, which is known to be the strongest risk factor for fracture, using ANCOVA. **Results:** The 109 patients (50.7%) were classified to high mSASSS group. Female patients were more in low mSASSS group ($p<0.01$), and smoking history were more prevalent in high mSASSS group ($p<0.01$). L-spine lateral BMD and TBS were lower, while right hip and L-spine AP BMD were significantly higher in high mSASSS group. After adjustment, mean TBS of L2-L3 was significantly lower and L-spine AP BMD was significantly higher in high mSASSS group ($p=0.02$ and $p<0.01$, respectively). **Conclusion:** TBS was lower in patients with advanced syndesmophytes, and it was significantly associated with history of fracture. TBS can be a useful method in measuring bone strength and also predicting fracture risk in AS patients.