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Abstract 26: Coronary Artery Calcification quantification in Chest Computed Tomography Imaging



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Introduction: Evaluation of Coronary Artery calcification (CAC), scoring and cardiovascular disease (CVD) risk assessment on non-gated CT scans is recommended in the guidelines. However, there are few studies comparing visual versus Agatston scoring. This study aimed to determine the applicability of using CAC Data and Reporting System (CAC-DRS) on non-gated CT chest scans performed for lung disease or a lung cancer screening programme.

Methods: Retrospective assessment of 102 (Age 65.1 ± 12.6 years) non-gated and non-enhanced CT chest scans. Visual and Agatston scoring, CVD risk assessment and treatment recommendations were independently evaluated by two radiologists blinded to clinical details, according to CAC-DRS guidelines: Qualitative CAC DRS V (Visual scores), 0 (none), 1 (mildly increased), 2 (moderately increased) and 3 (moderately to severely increased). Quantitative CAC DRS A (Agatston scores), 0 (none), 1-99 (mildly increased), 100-299 (moderately increased) and > 300 (moderately to severely increased). CAC DRS V and A techniques and CAC adjusted coronary age versus actual age were compared. χ^2 statistic was used to assess nominal variables. Interobserver agreement was calculated using Cohen's kappa statistic and Intraclass Correlation Coefficient (ICC).

Results: CAC was observed in 77 (75.5%) cases. Number of calcified vessels were: none - 25 (24.5%), 1 = 16 (15.7%), 2 = 13 (12.7%); 3 = 22 (21.6%), 4 = 16 (25.5%). CAC DRS V score: none 25 (25.4%), mild 28 (27.5%), moderate 27 (26.5%), severe 22 (21.6%), $k = 0.521$, $p < 0.05$. CAC DRS A score: none 22 (21.6%), mild 28 (27.5%), moderate 19 (18.6%), severe 33 (32.4%), $k = 0.748$, $p < 0.05$. Average Agatston score was 583, ICC = 0.971, (CI 0.957 - 0.98). Visual grading scores were significantly lower compared to Agatston based risk assessment ($\chi^2 = 249.418$, $df = 9$, $p < 0.05$). There was moderate interobserver agreement ($k = 0.521$, $p < 0.05$) on CAC DRS V scoring but high ($k = 0.748$, $p < 0.05$) agreement for CAC DRS A based risk assessment. The presence of CAC was reported in only 5 (4.9%) cases with 0 (0%) guideline-based recommendations. Comparing estimated coronary age to patients real age, increased age reclassification was observed in 19 (18.6%) cases.

Conclusions: CAC is a frequent finding in a chest CT scans, yet is only reported in 5% of cases. Visual CAC scoring is lower compared to Agatston score based risk assessment, and has lower levels of reproducibility. Age and risk reclassification occurs in 18.6% of cases, with potential changes patient medical treatment.

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