

The importance of CT angiography in the diagnosis of cardiovascular diseases

Toshboyev Jahongir Normengliyevich

Samarkand State Medical University

Relevance: Cardiovascular diseases remain the leading cause of mortality and disability worldwide. Early diagnosis and timely treatment are essential for reducing complications and improving patient outcomes. In recent years, Computed Tomography Angiography (CTA) has become a widely used non-invasive imaging modality for the assessment of coronary arteries, the aorta, and major vascular structures. CTA provides high-resolution visualization of vascular anatomy and pathological changes, enabling accurate detection of stenosis, atherosclerotic plaques, and congenital vascular anomalies. Therefore, evaluating the diagnostic value of CTA in cardiovascular diseases is of considerable clinical importance.

Objective: to assess the diagnostic significance of Computed Tomography Angiography (CTA) in the detection of cardiovascular diseases and to compare its findings with those of invasive coronary angiography.

Materials and Methods: A total of 96 patients with suspected coronary artery disease were included in this study. The study population consisted of 58 men (60.4%) and 38 women (39.6%), with a mean age of 58.7 ± 9.4 years.

All patients underwent CTA using a 128-slice multidetector computed tomography scanner. The obtained results were compared with invasive coronary angiography findings, which served as the reference standard. Coronary artery stenosis greater than 50% was considered hemodynamically significant.

Statistical analysis was performed using SPSS 26.0 software. Quantitative variables were expressed as mean $\pm$ standard deviation ($M \pm SD$). Diagnostic performance was evaluated by calculating sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy. A p-value < 0.05 was considered statistically significant.

Results: Invasive coronary angiography confirmed hemodynamically significant coronary stenosis in 68 of 96 patients (70.8%). CTA correctly identified 65 of these cases.

The sensitivity of CTA was 95.6% (95% CI: 87.6–99.1%), while specificity reached 89.3% (95% CI: 71.8–97.7%). The positive predictive value was 94.2%, and the negative predictive value was 91.0%.

The overall diagnostic accuracy of CTA was 93.8%. A strong agreement was observed between CTA and invasive coronary angiography findings ($\kappa = 0.86$, $p < 0.001$).

Atherosclerotic plaques were detected in 72 patients (75.0%), while multivessel coronary artery disease was identified in 31 patients (32.3%). The highest frequency of significant stenosis was observed in the left anterior descending (LAD) coronary artery, accounting for 47.9% of cases.

Conclusion: Computed Tomography Angiography is a highly effective non-invasive imaging modality for the diagnosis of cardiovascular diseases. CTA demonstrates excellent sensitivity, specificity, and overall diagnostic accuracy in detecting coronary artery stenosis, atherosclerotic plaques, and vascular anatomical abnormalities. Due to its high diagnostic performance and non-invasive nature, CTA can serve as an important alternative or preliminary screening tool before invasive coronary angiography.

Keywords: computed tomography angiography, CTA, cardiovascular diseases, coronary artery disease, coronary stenosis, atherosclerosis, diagnostic accuracy, coronary angiography, statistical analysis.