CE - THE CUTTING EDGE: RESEARCH UPDATE

Is coronary CT angiography useful in diagnosing acute coronary syndromes in the Emergency Department?

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Summary

Recent observations showed that contrast enhanced coronary CT angiography (CCTA) has high sensitivity and specificity for the detection of clinically significant coronary artery disease, and may facilitate triage of low-risk patients with typical acute chest pain and inconclusive biomarkers or ECG testing results [1, 2].

Rule Out Myocardial Infarction/Ischemia Using Computer Assisted Tomography (ROMICAT)-II Study [3] is a randomized, controlled multicenter trial that compared the effectiveness of a diagnostic strategy including early CCTA with that of standard evaluation in Emergency Department(ED) in stable patients with chest pain.

The primary study end point was the length of stay in the hospital, defined as the time from ED presentation to discharge order. Secondary end points included time to diagnosis, rates of direct discharge from the ED, resource utilization, and cumulative costs. Safety end points were undetected acute coronary syndromes (ACS) (defined as an unexpected cardiovascular event within 72 h after hospital discharge in patients with a hospital stay of <24 h), and major adverse cardiovascular events (death, myocardial infarction, unstable angina, or urgent coronary revascularization) at 28 days.

Of 1,000 patients (aged 54 ± 8 years, male 53 %, more than half with 2 or 3 cardiovascular risk factors), enrolled

during weekday daytime hours at nine centers, 501 were randomly assigned to CCTA and 499 to a standard evaluation. All patients were included in the intention to treat analysis. CCTA was performed in 473 patients. Complete follow-up at 28 days was achieved in 99 % of patients. Seventy-five patients (8 %) had a final diagnosis of ACS. Average length of stay was significantly decreased by 7.6 h in patients randomized to CCTA (23.2 ± 37 vs. 30.8 ± 28 h, $P < 0.001$). In addition, patients in the CCTA group had significantly shorter time to diagnosis (10.4 ± 12.6 vs. 18.7 ± 11.8 h, $P < 0.001$) and were more often directly discharged from ED (47 vs. 12 % $P < 0.001$) as compared with standard evaluation group. No cases of undetected ACS were identified in both study groups. Eight major adverse cardiovascular events were recorded at 28 days follow-up, two in the CCTA group. In both cases, CCTA detected clinically significant coronary artery disease but patients were initially treated with medical therapy because of negative stress test results.

Regarding resource utilization, significantly more diagnostic tests were performed in CCTA group than in standard evaluation group ($P < 0.001$). Both overall rate of coronary angiography and revascularization were higher among patients in the CCTA group, without significant differences as compared with standard evaluation group. Since almost all patients in CCTA group underwent computed tomography, cumulative radiation exposure was significantly higher in this group ($P < 0.001$). Detailed costs analysis was available only for a subgroup of patients. The mean cost of care from initial ED visit through 28 days follow-up was similar in the two groups ($4,289 \pm 7,110$ vs. $4,060 \pm 5,452$ \$, $P = 0.65$). Authors conclude that incorporating early CCTA in ED evaluation strategy improves the efficiency of clinical decision making process for triage of patients with suspect ACS, without increased risk of undetected cardiovascular events.

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Strengths of the study

- The study issue is clinically relevant.
- Costs and benefits analysis was performed.

Weaknesses of the study

- The primary effectiveness end point is a surrogate end point.
- There was not a real sample size calculation. The authors decided to enroll 500 patients per arm, without any a priori assumption on the minimum clinically important difference. Then, they showed that with that size they would have been able to detect, with 83 % power, a difference in length of hospital stay of at least 8.3 h [4].
- The inclusion criteria are very restrictive since patients enrolled were aged 40–74 years and had no history of known coronary artery disease. Therefore, the external validity of the study could be low.

Question marks

- As authors stated, patients were enrolled not consecutively, only in weekday hours; timing of decisions to discharge or admit patients after ED evaluation would probably be different if tests were performed during the night, when their interpretation could not be promptly accessible.
- In addition, CCTA was compared with a diagnostic strategy including SPECT, a functional test that requires long performance time; it would be interesting to know if the CCTA group benefit would have been maintained in comparison with a faster test to perform, such as the stress test.
- Finally, in CCTA group, there were more diagnostic tests and cardiac revascularizations. It is not specified if a second test was indicated because of CCTA inconclusive results and in how many cases CCTA results were not confirmed at subsequent diagnostic tests.

Clinical bottom line

The study showed that early CCTA-based evaluation strategy in a selected population without prior known coronary artery disease may improve the efficacy of ED triage for patients with suspected ACS by reducing length of hospital stay. However, this approach leads to increased diagnostic testing and higher radiation exposure and no overall reduction in the cost of care. The net benefit of this novel approach in the management of patients with suspected acute coronary syndrome in ED is yet to be clarified.

Conflict of interest   None.

References

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