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CT or MRI diagnostic procedures for suspected chronic coronary heart disease: an evidence map¹

Extract

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Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen
Im Mediapark 8
50670 Köln
Germany

Phone: +49 221 35685-0

Fax: +49 221 35685-1

E-mail: berichte@iqwig.de

Internet: www.iqwig.de

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IQWiG employees

- Katrin Dreck
- Corinna Kiefer
- Martina Markes
- Inga Overesch

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Executive summary

As part of the general commission for diagnostic procedures using cardiac computer tomography (CT) and cardiac magnetic resonance imaging (MRI), the topic “CT or MRI diagnostic procedures in suspected chronic coronary heart disease: an evidence map” was addressed.

Research question

The aim of the present investigation is to map the evidence on non-invasive diagnostic procedures using coronary computed tomography angiography (CTA) and MRI

- compared with invasive coronary angiography (ICA), potentially with fractional flow reserve (FFR) measurement, as well as compared with non-invasive procedures using myocardial perfusion single photon emission CT, stress echocardiography, stress electrocardiogram, and CT-FFR measurement – based on randomized controlled trials (RCTs) – or
- compared with ICA, potentially with FFR measurement or with clinical follow-up as a reference test – based on diagnostic accuracy studies

in persons with suspected chronic coronary heart disease (CHD) with regard to selected patient-relevant outcomes or other outcomes.

Methods

The evidence map was prepared on the basis of systematic reviews. Evidence-based guidelines were used as a supplementation. The target population of the evidence map was persons with suspected chronic CHD.

In systematic reviews based on RCTs, non-invasive diagnostic procedures using CTA and stress MRI represented the test interventions. Non-invasive functional diagnostic procedures and ICA, potentially with FFR measurement, represented the comparator interventions. The patient-relevant outcomes of all-cause mortality, myocardial infarction and the need for downstream ICA were selected for presentation in this evidence map.

In systematic reviews based on diagnostic accuracy studies, non-invasive diagnostic procedures using CTA and stress MRI represented the index tests. The reference test was the ICA, potentially with FFR measurement, or clinical follow-up. Sensitivity and specificity were as examples selected as other outcomes for presentation in this evidence map. Additional measures were extracted into tables without further consideration.

A focused search for systematic reviews was conducted in the MEDLINE database and on the websites of the National Institute for Health and Care Excellence and the Agency for Healthcare Research and Quality. The search was restricted to a publication date from 2015 onwards. In addition, an exploratory search for evidence-based guidelines was conducted. The selection of

relevant systematic reviews and evidence-based guidelines was performed by one person. The relevant documents were then reviewed by a second person.

Within the framework of this evidence map, a maximum of 8 systematic reviews were used per test intervention or index test. The results were presented in tables and summarized descriptively. The recommendations of selected guidelines were also presented.

No conclusions on benefit and harm were drawn.

Results

The focused search identified 24 systematic reviews as relevant to the research question of the evidence map. From these, 9 were selected for presentation of the aggregate results. The results for the selected patient-relevant outcomes and other outcomes were presented from 4 systematic reviews based on RCTs and 5 systematic reviews based on diagnostic accuracy studies. Three guidelines were selected from the exploratory search; from these, recommendations relevant to the research question were presented regarding the test strategy for the diagnosis of chronic CHD.

Three systematic reviews based on RCTs showed that myocardial infarctions occurred statistically significantly less often after a CTA-based diagnosis than after a standard care-based diagnosis (i.e. non-invasive functional procedures or standard care not further defined). In addition, one systematic review showed that an ICA was required statistically significantly more often after a CTA than after functional procedures. One systematic review showed that statistically significantly fewer ICAs were performed after an MRI than after standard care. An effect on all-cause mortality was found neither for CTA nor MRI. The reasons why no effect was found for the two interventions are different, but explaining this here would be beyond the scope of the executive summary.

The systematic reviews based on diagnostic accuracy studies showed sensitivities of 90% and more for the CTA as an index test. The specificities determined were 78% and 79% versus the ICA and 39% to 53% versus the invasive FFR as a reference test.

Sensitivities of 82% to 91% and specificities of 74% to 80% were shown for the stress MRI as an index test versus the ICA as a reference test. Sensitivities ranged from 87% to 90% versus the invasive FFR as a reference test; specificities ranged from 85% to 94% and were thus in some cases higher than the sensitivities.

The 3 selected evidence-based guidelines unanimously recommend non-invasive procedures as the first test for the diagnosis of CHD.

Conclusion

Informative evidence is available on the benefit and harm of non-invasive CTA and stress MRI diagnostic procedures in persons with suspected CHD. Therefore, a benefit assessment of one or both procedures would be possible in a meaningful way. In particular, the results of the

systematic reviews based on RCTs, in which effects of CTA on patient-relevant outcomes were shown, suggest that a conclusion on the benefit and harm of the interventions could be drawn in a benefit assessment.

The full report (German version) is published under
<https://www.iqwig.de/en/projects-results/projects/non-drug-interventions/ga20-01-ct-or-mrt-diagnostics-for-suspected-chronic-coronary-heart-disease-an-evidence-mapping.12797.html>