SYNTAX III REVOLUTION

Trial

Press briefing conference

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Title: Coronary Computed Tomography Angiography for Heart Team Decision-making in Multivessel Coronary Artery Disease: the SYNTAX III REVOLUTION trial

Objectives: The trial was designed to determine the agreement between two heart teams (cardiac surgeon, cardiologist and radiologist) on treatment recommendation and planning based either on coronary CTA (with and without \( \text{FFR}_{\text{CT}} \)) or conventional angiography.
Methods

• The trial was an international, multicenter study, randomizing two heart teams to make a treatment decision between CABG and PCI, using either coronary CTA or conventional angiography while blinded to the other imaging modality.

• Each heart team calculated the anatomical SYNTAX score based solely on their allocated imaging modality and subsequently integrated the clinical information to compute the SYNTAX score II risk prediction model providing a treatment recommendation i.e. CABG, PCI or equipoise between CABG and PCI.

• Any anatomical SYNTAX score was eligible for screening and patients with anatomical SYNTAX score >33 were not exclude. However, patients with prior revascularization were excluded.

• Coronary CTA was performed with the GE Revolution CT scanner that has a nominal spatial resolution of 230 microns along the X-Y planes, a rotational speed of 0.28 sec and a Z-plane coverage of 16 cm enabling to image the heart in one heartbeat.
Presence of LM or 3VD on conventional angiography (223 patients)

CCTA (GE Revolution)

2 Heart Teams

Heart Team A Angio first
Heart Team B CCTA first

*Each Heart Team was randomized to one of 2 diagnostic algorithms

Angio first (invasive CA)
- Information solely on Angio

1st Decision making and treatment strategy based on:
- Anatomic CA SYNTAX Score
- SYNTAX Score II (anatomy and comorbidities)

Information on Angio + CCTA + FFR_{CT}

Primary Endpoint

Secondary Endpoint

CT first (noninvasive CA)
- Information solely on CCTA

1st Decision making and treatment strategy based on
- Anatomic CCTA SYNTAX Score
- SYNTAX Score II (anatomy and comorbidities)

2nd Decision making and treatment strategy based on
- CCTA with FFR_{CT} (functional anatomic SYNTAX Score)
- SYNTAX Score III (functional anatomy + comorbidities)

Unblinding

Information on CCTA + Angio + FFR_{CT}
## Results

<table>
<thead>
<tr>
<th>Heart team treatment recommendation based on coronary computed tomography angiography</th>
<th>CABG</th>
<th>PCI/Equipoise CABG and PCI</th>
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<tbody>
<tr>
<td>Heart team treatment recommendation based on conventional angiography</td>
<td>23.4% (52/222)</td>
<td>2.7% (6/222)</td>
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<tr>
<td>CABG</td>
<td>4.5% (10/222)</td>
<td>69.4% (154/222)</td>
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<tr>
<td>PCI/Equipoise CABG and PCI</td>
<td>27.9% (62/222)</td>
<td>72.1 (160/222)</td>
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Cohen’s kappa 0.82 (95% CI 0.73 to 0.91)
Importance and relevance

- In patients with left main or three-vessel coronary artery disease, a heart team treatment decision-making based on coronary CTA showed an almost perfect agreement with the decision derived from conventional coronary angiography suggesting the potential feasibility of a treatment decision-making and planning based solely on this non-invasive imaging modality.

- Using the new GE CT-Revolution scanner physicians are able to identify which patients need heart surgery without the need for invasive cardiac catheterization
Abstract

Aims: Coronary computed tomography angiography (CTA) has emerged as the preferred diagnostic method for patients with suspected coronary artery disease but its usefulness in patients with complex coronary artery disease remains to be investigated. The present study sought to determine the agreement between two heart teams on treatment decision-making based on either coronary CTA or conventional angiography.

Methods and Results: Two heart teams composed of an interventional cardiologist, a cardiac surgeon and a radiologist were randomized to assess the coronary artery disease with either coronary CTA or conventional angiography in patients with de novo left main or three-vessel coronary artery disease. Each heart team, blinded for the other imaging modality, quantified the anatomical complexity using the SYNTAX score and integrated clinical information using the SYNTAX score II to provide a treatment recommendations based on mortality prediction at 4 years: coronary artery bypass grafting (CABG), percutaneous coronary intervention (PCI) or equipoise between CABG and PCI. The primary end point was the agreement between the two heart teams on the revascularization strategy. The secondary end point was the impact of fractional flow reserve derived from coronary CTA (FFR\textsubscript{CT}) on treatment decision and procedural planning. Overall, 223 patients were included. A treatment recommendation of CABG was made in 28% of the cases with coronary computed tomography angiography and in 26% with conventional angiography. The agreement concerning treatment decision between coronary CTA and conventional angiography was almost perfect (Cohen’s kappa 0.82; 95% CI 0.74 to 0.91). The heart teams agreed on the coronary segments to be revascularized in 80% of the cases. FFR\textsubscript{CT} was available for 869/1108 lesions (196/223 patients). FFR\textsubscript{CT} changed the treatment decision in 7% of the patients.

Conclusion: In patients with left main or three-vessel coronary artery disease, a heart team treatment decision-making based on coronary CTA showed an almost perfect agreement with the decision derived from conventional coronary angiography suggesting the potential feasibility of a treatment decision-making and planning based solely on this non-invasive imaging modality.

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