The Latest Update on Non-Invasive Imaging

SYNTAX I, SYNTAX II, SYNTAX III: From Invasive to Non-invasive Aassessment of Coronary Stenosis

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21st CardioVascular Summit

TCTAP2016

Erasmus MC University Mathetic Contrast Returns 2 a fung

Tuesday 27th April 2016 Time 3:12 – 3:27 pm Presentation Theatre Level 1

From anatomy to comorbidities, to functional assessment, to non invasive assessment, to virtual Heart Team (Syntax II).



Cappodano EHJ

From anatomy to comorbidities, to functional assessment, to non invasive assessment, to virtual Heart Team (Syntax II).



Cappodano EHJ

Overview of the talk

- What is the functional Syntax Score?
- Anatomical Syntax score combined with clinical variables: Syntax score II, decision making score based on interaction
- How reliable is the Syntax Score? (Site vs. Corelab)
- How to make the anatomical syntax score more objective and quantitative? Noninvasive Syntax score
- How to make it functional and noninvasive? Syntax Score III



Functional SYNTAX Score for Risk Assessment in Multivessel Coronary Artery Disease



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Stanford, California; Daegu, Korea; Aalst, Belgium; and Eindhoven, the Netherlands

Objectives	This study was aimed at investigating whether a fractional flow reserve (FFR)-guided SYNTAX score (SS), termed "functional SYNTAX score" (FSS), would predict clinical outcome better than the classic SS in patients with multi- vessel coronary artery disease (CAD) undergoing percutaneous coronary intervention (PCI).
Background	The SS is a purely anatomic score based on the coronary anglogram and predicts outcome after PCI in patients with multivessel CAD. FFR-guided PCI improves outcomes by adding functional information to the anatomic information obtained from the anglogram.

Recalculating SYNTAX Score by incorporating ischemiaproducing lesions as determined by FFR decreases the number of higher-risk patients and better discriminates risk for the adverse events in patients with multivessel disease undergoing PCI.

Functional SYNTAX Score For Risk Assessment in MVD





Nam et al. JACC Sep 2011

Without Hyperemia

iFR



Hyperemia

FFR





Pd (mean of entire cardiac Cycle)

FFR =

Pa (mean of entire cardiac Cycle)

Hybrid iFR-FFR decision-making strategy: implications for enhancing universal adoption of physiology-guided coronary revascularisation





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12-06899R2 S0140-6736(13)60141-5 Embargo: [add date when known]

Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial

€

Friedrich W Mohr, Marie-Claude Morice, A Pieter Kappetein, Ted E Feldman, Elisabeth Ståhle, Antonio Colombo, Michael J Mack, David R Holmes Jr, Marie-angèle Morel, Nic Van Dyck, Vicki M Houle, Keith D Dawkins, Patrick W Serruys

THELANCET-D-12-08421

50140-6736(13)60108-7

Anatomical and clinical characteristics to guide decision making between coronary artery bypass surgery and percutaneous coronary intervention for individual patients: development and validation of SYNTAX score II

Vasim Farooq*, David van Klaveren*, Ewout W Steyerberg, Emanuele Meliga, Yvonne Vergouwe, Alaide Chieffo, Arie Pieter Kappetein, Antonio Colombo, David R Holmes, Michael Mack, Ted Feldman, Marie-Claude Morice, Elisabeth Ståhle, Yoshinobu Onuma; Marie-Angèle Morel, Hector M Garcia-Garcia, Gerrit Anne Van, Keith D Dawkins, Friedrich W Mohr, Patrick W Serruys

SYNTAX Score II

EVCEI





Findings that were validated in the multinational DELTA Registry...

SYNTAX Score II Variables

SYNTAX Score II was developed by applying a Cox proportional hazards model to the results of SYNTAX trial obtaining a combination of clinical and anatomical independent predictors of 4 years all-cause mortality:



1. Farooq V et al. Lancet 2013; 381: 639–50

SYNTAX trial LM cohort



Favored CABG Overall 50.1% >95%CI 11.5%

Favored PCI Overall 49.9% >95%CI 8.8%

79.7% within 95%PI **Equipoise**

Farooq and Serruys Lancet 2013;381:639-50

Calibration plots for the sSS based SS II

Calibration plots are shown for the sSS based SS II model predicting 4-year risk of mortality. The triangles indicate the observed frequencies by quintile of predicted probabilities. Good agreement was found between the observed and predicted mortality for each group.



Tools and Techniques - Clinical: SYNTAX score II calculator



To be made public at EuroPCR 2016!

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SYNTAX Trial II

Inclusion: All-Comers, angiographic, de-novo 3-vessel disease without left main involvement (visual % diameter stenosis ≥50%)





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Correlation between the 'Corelab' and 'Site' SS



Non-invasive assessment of SYNTAX score from MSCT

- Segment with disease
- Length of disease
- Tortuosity
- Calcification
- Diffuse disease etc.

anatomic Syntax score 24 functional Syntax score 19



According to the ESC/ACC/AHA guideline



Correlation between angiographic Syntax Score vs. MSCT Syntax Score II



From anatomy to comorbidities, to functional assessment, to non invasive assessment, to virtual Heart Team (Syntax II).



Cappodano EHJ

Algorithm of Heart Team decision making based on noninvasive and invasive imaging



Which lesion is causing myocardial ischemia?

Angiography

KOR 63



Which lesion is causing myocardial ischemia?



No significant lesion

Angiographic assessment Lesion 1 – mid RCA Seg 2: 2 (1x2) Invasive FFR No significant lesion

A subtotal Score of lesion: 2

Which lesion is causing myocardial ischemia?



KOR 63

Which lesion is causing myocardial ischemia?



1.Lmain (5 x2) 2.Trifurcation (1,1,0,0) 4 3. LAD ,Segment 6 (3.5 x2) calcified 1 4.Intermediate (1 x2) Lesion>20 mmm (1),calcified, 1 =Functional SxS 24



Lesion – LAD and Intermediate		
Seg 6:	7 (3.5x2)	
Seg 12:	2 (1x2)	
Trif 0,1,1,0	4	
Lesion >20mm	1	
Angiographic SSx:	14	

Dream Diagnostic tool #1: non-invasive FFR

Treatment planning prior to invasive procedures Virtual PCI and post-PCI FFR_{CT}





Thank You!

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