What do we mean by complex PCI ?
Its all about risk

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Disclosure of Relevant Financial Relationships

I, Mamas Mamas DO NOT have any relevant financial relationships to disclose relevant to this talk.

Why is it important to define complex PCI

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Table 11 Risk criteria for extended treatment with a second antithrombotic agent

High thrombotic risk (Class IIa)	Moderate thrombotic risk (Class IIb)
Complex CAD and at least 1 criterion	**Non-complex CAD and at least 1 criterion**
Risk enhancers	
Diabetes mellitus requiring medication	Diabetes mellitus requiring medication
History of recurrent MI	History of recurrent MI
Any multivessel CAD	Polyvascular disease (CAD plus PAD)
Polyvascular disease (CAD plus PAD)	CKD with eGFR 15–59 mL/min/1.73 m^2
Premature (<45 years) or accelerated (new lesion within a 2-year time frame) CAD	
Concomitant systemic inflammatory disease (e.g. human immunodeficiency virus, systemic lupus erythematosus, chronic arthritis)	
CKD with eGFR 15–59 mL/min/1.73 m^2	
Technical aspects	
At least 3 stents implanted	
At least 3 lesions treated	
Total stent length >60 mm	
History of complex revascularization (left main, bifurcation stenting with ≥2 stents implanted, chronic total occlusion, stenting of last patent vessel)	
History of stent thrombosis on antiplatelet treatment	

In line with guideline recommendations, CAD patients are stratified into two different risk groups (high vs. moderately increased thrombotic or ischaemic risk). Stratification of patients towards complex vs. non-complex CAD is based on individual clinical judgement with knowledge of patients' cardiovascular history and/or coronary anatomy. Selection and composition of risk-enhancing factors are based on the combined evidence of clinical trials on extended antithrombotic treatment in CAD patients[162,212,214] and on data from related registries.[228–230]

CAD = coronary artery disease; CKD = chronic kidney disease; eGFR = estimated glomerular filtration rate; MI = myocardial infarction; PAD = peripheral artery disease.

What is complex PCI ?

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Do PCI operators agree on what is complex PCI?

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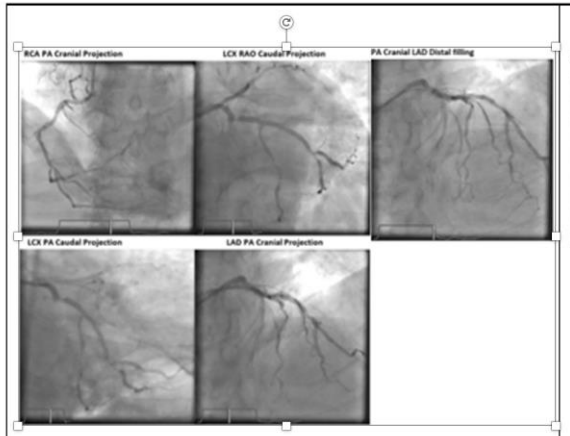
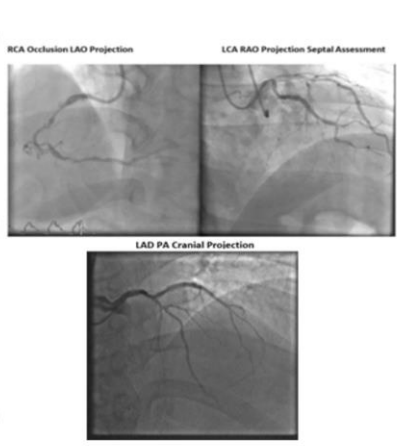


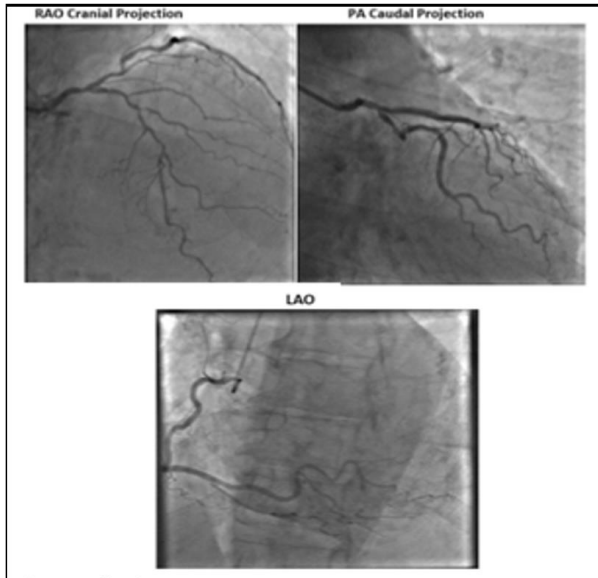
Scenario 1

- A 79 year-old man.
- Troponin negative acute coronary syndrome.
- Angina mobilising on ward.
- EF 20%.
- Moderate Aortic stenosis in context of severe LV dysfunction AVvmax 2.57m/s.
- Mean gradient 16.14mmHg.
- Dimensionless index 0.34. Aortic valve area 1.1cm2.
- Cardiac MRI confirmed limited subendocardial infarction in all coronary territories but with viability in all segments.
- eGFR >60mls/min.
- Hb 122g/L.
- Marked pressure damping engaging RCA ostium.



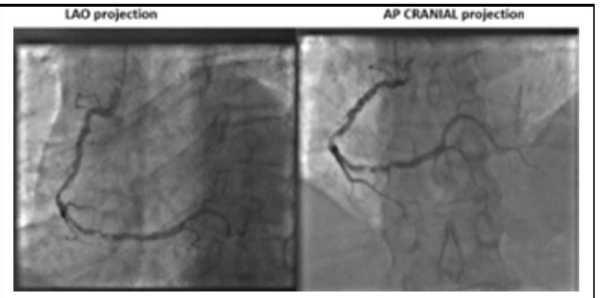
Scenario 2

- A 64 year-old male, 110kg.
- CCS3 Stable angina on 2 anti-anginals.
- Previous history of medically managed MI 1999.
- LV function normal, no valvular disease.
- eGFR >60mls/min and Hb 130g/L. LAD FFR 0.75



Scenario 3

- An 86-year-old man admitted with NSTEMI with a background of severe LV dysfunction, severe aortic stenosis and eGFR of 37mls/min



Scenario 4

- A 64-year-old man with stable angina came for PCI to the RCA.
- He has a background of previous PCI to the LAD and OM1 with widely patent stents.
- He has normal renal function and normal LV function.

EAPCI Survey

272 interventional cardiologists surveyed

Mean interventional experience 14.7±8.3 yrs

Do PCI operators agree on what is complex PCI?

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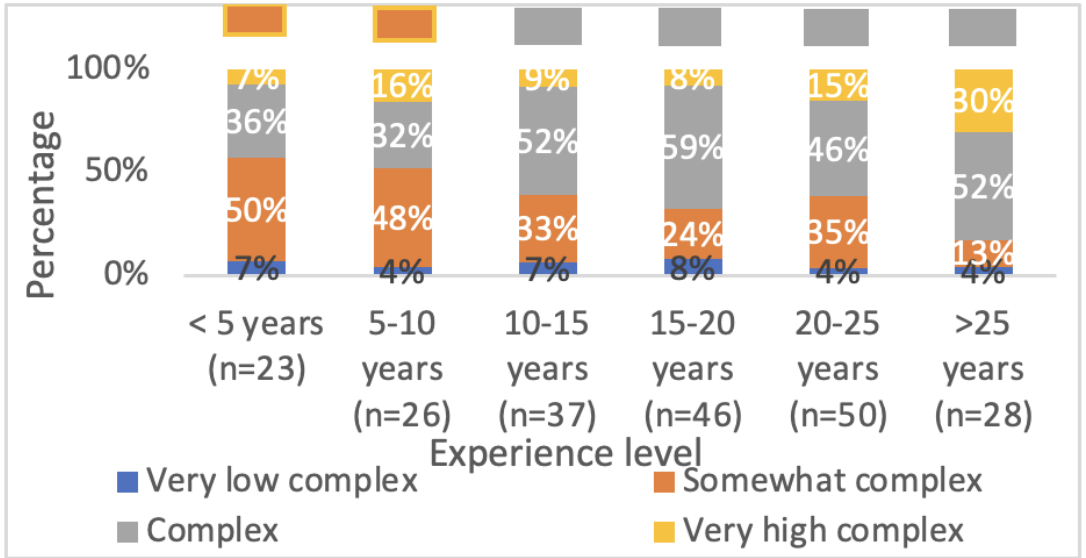
1.



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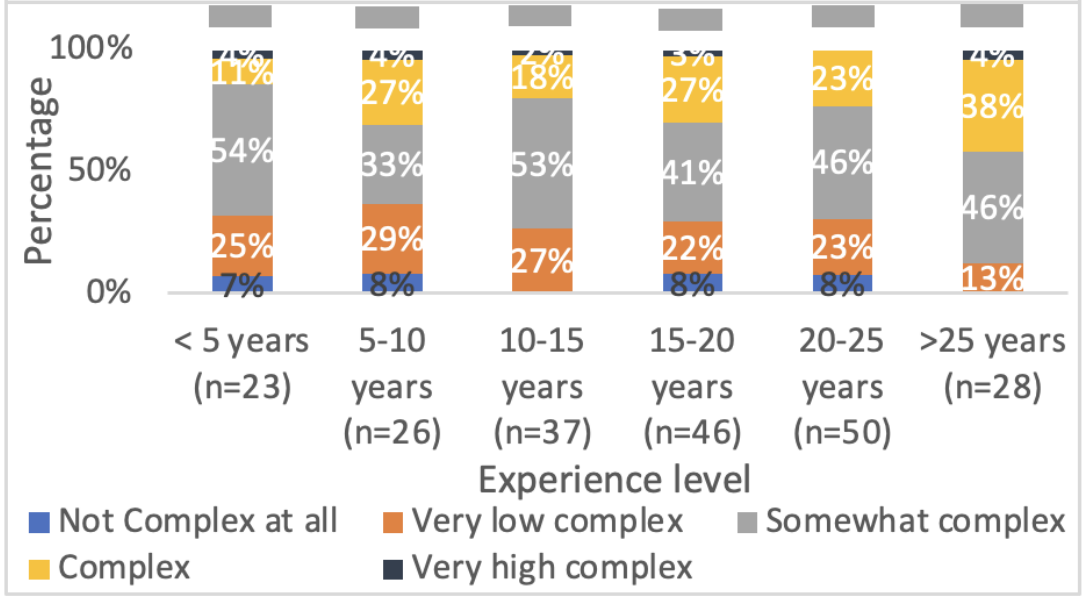

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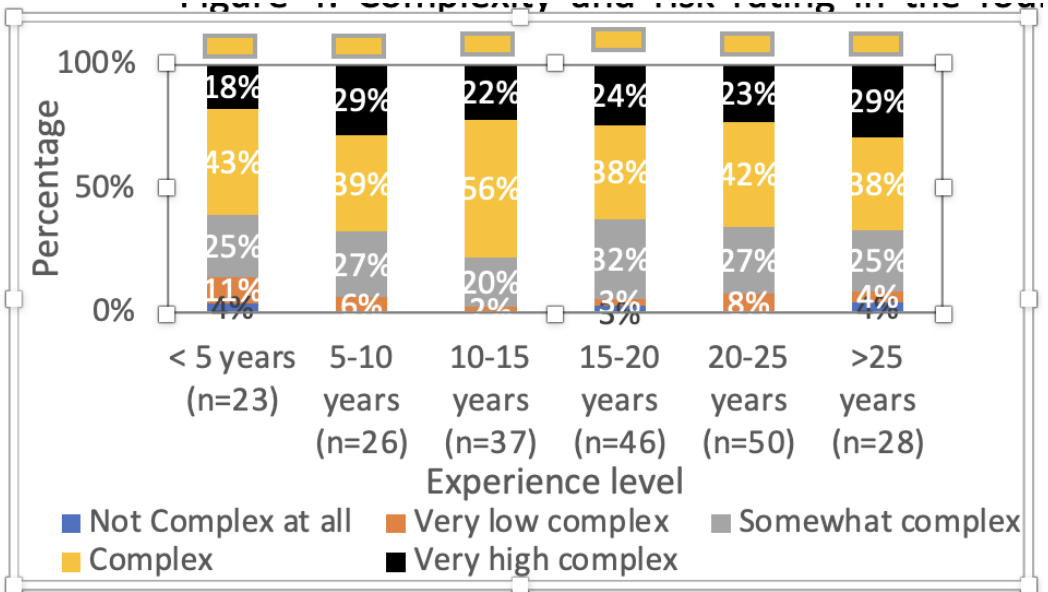

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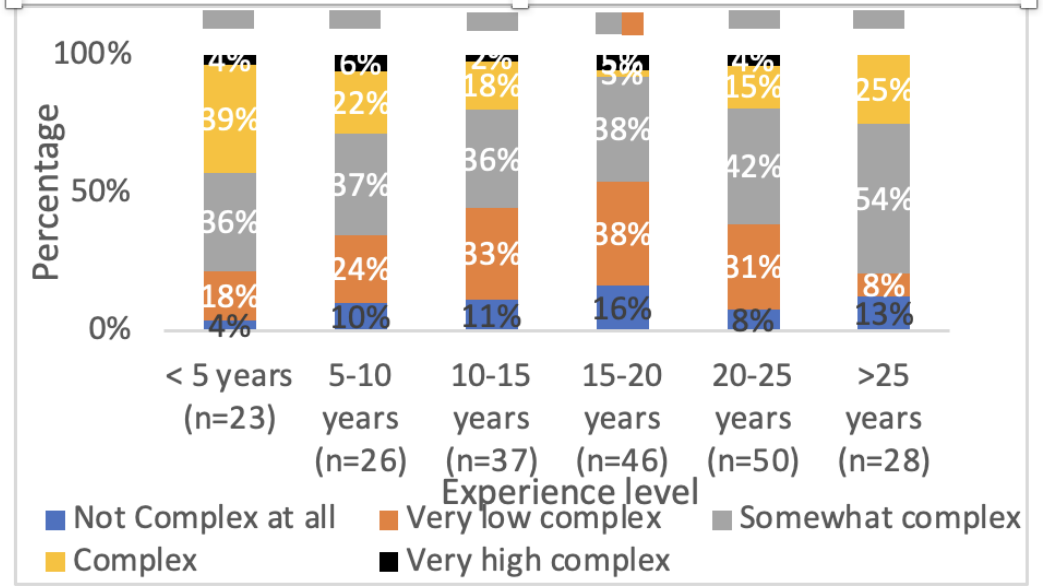

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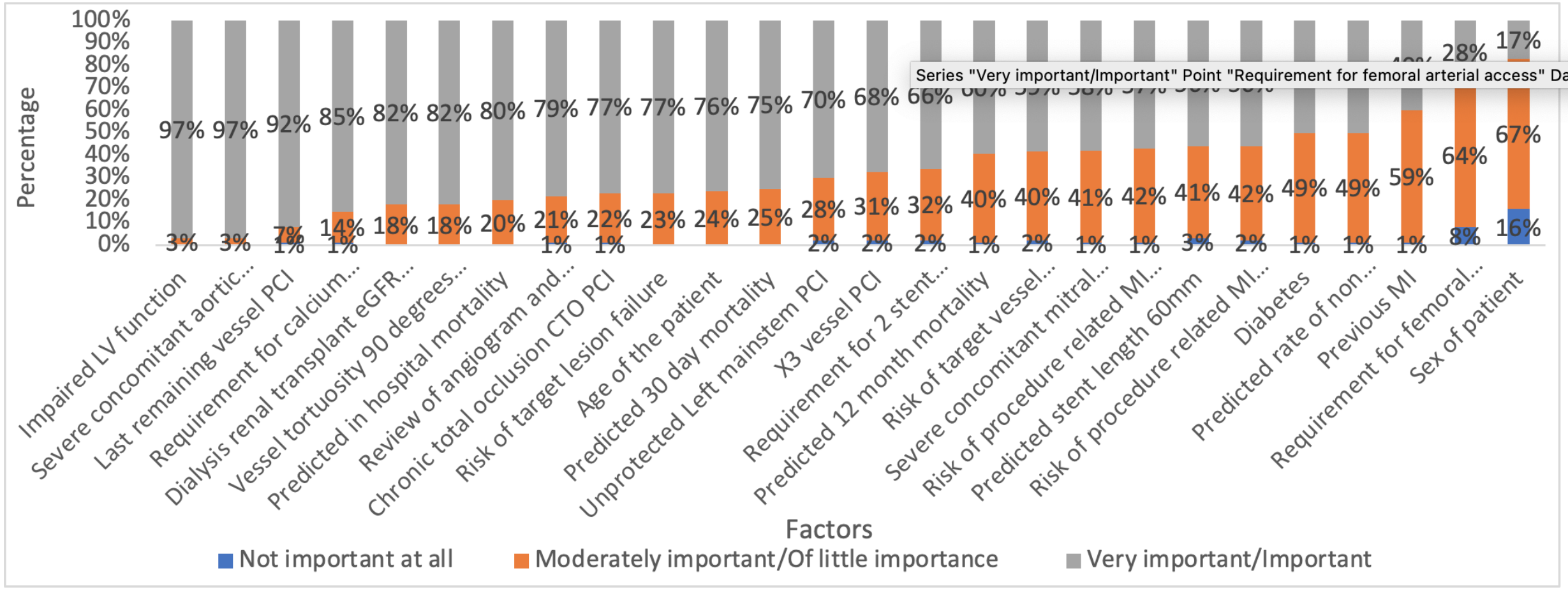
Figure 8: Rating the factors for classifying CHIP-PCI procedures. a represents rating the factors



ESC European Society of Cardiology
European Heart Journal (2019) 40, 87–165
doi:10.1093/eurheartj/ehy394
ESC/EACTS GUIDELINES

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)

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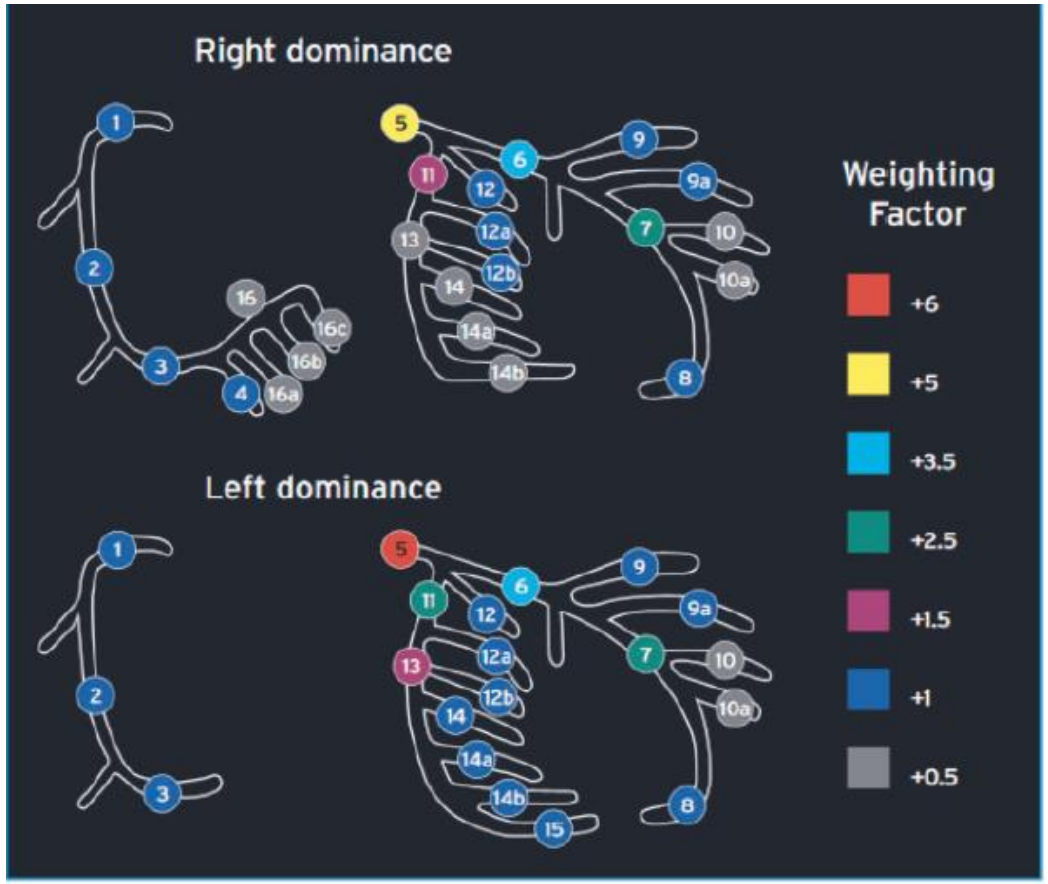

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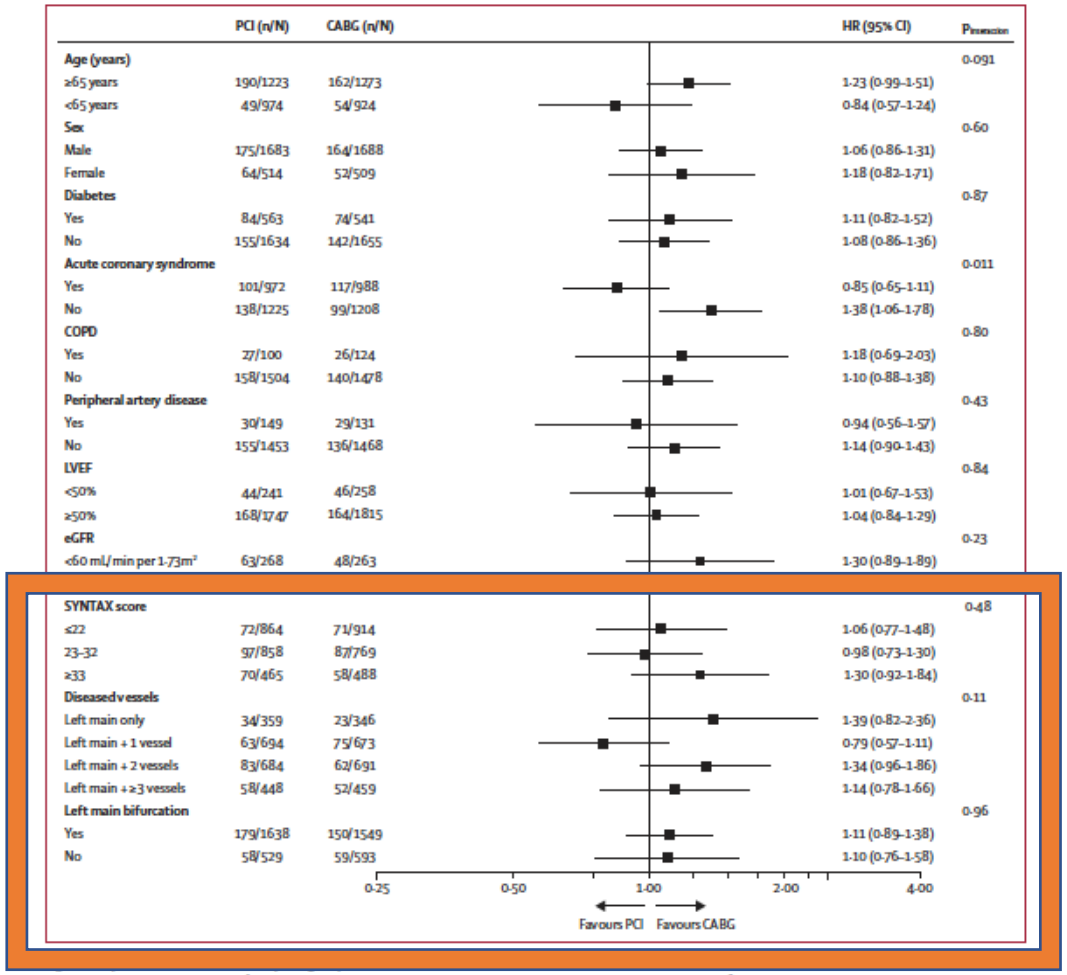
Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis

Marc S Sabatine, Brian A Bergmark*, Sabina A Murphy, Patrick T O'Gara, Peter K Smith, Patrick W Serruys, A Pieter Kappetein, Seung-Jung Park, Duk-Woo Park, Evald H Christiansen, Niels R Holm, Per H Nielsen, Gregg W Stone, Joseph F Sabik, Eugene Braunwald*



CABG=coronary artery bypass grafting. COPD=chronic obstructive pulmonary disease. eGFR=estimated glomerular filtration rate (calculated using the Chronic Kidney Disease Epidemiology Collaboration formula). HR=hazard ratio. LVEF=left ventricular ejection fraction. PCI=percutaneous coronary intervention.

ESC European Society of Cardiology
European Heart Journal (2018) 39, 213–254
doi:10.1093/eurheartj/ehx419
ESC GUIDELINES

2017 ESC focused update on dual antiplatelet therapy in coronary artery disease developed in collaboration with EACTS

The Task Force for dual antiplatelet therapy in coronary artery disease of the European Society of Cardiology (ESC) and of the European Association for Cardio-Thoracic Surgery (EACTS)

By lesion characteristics

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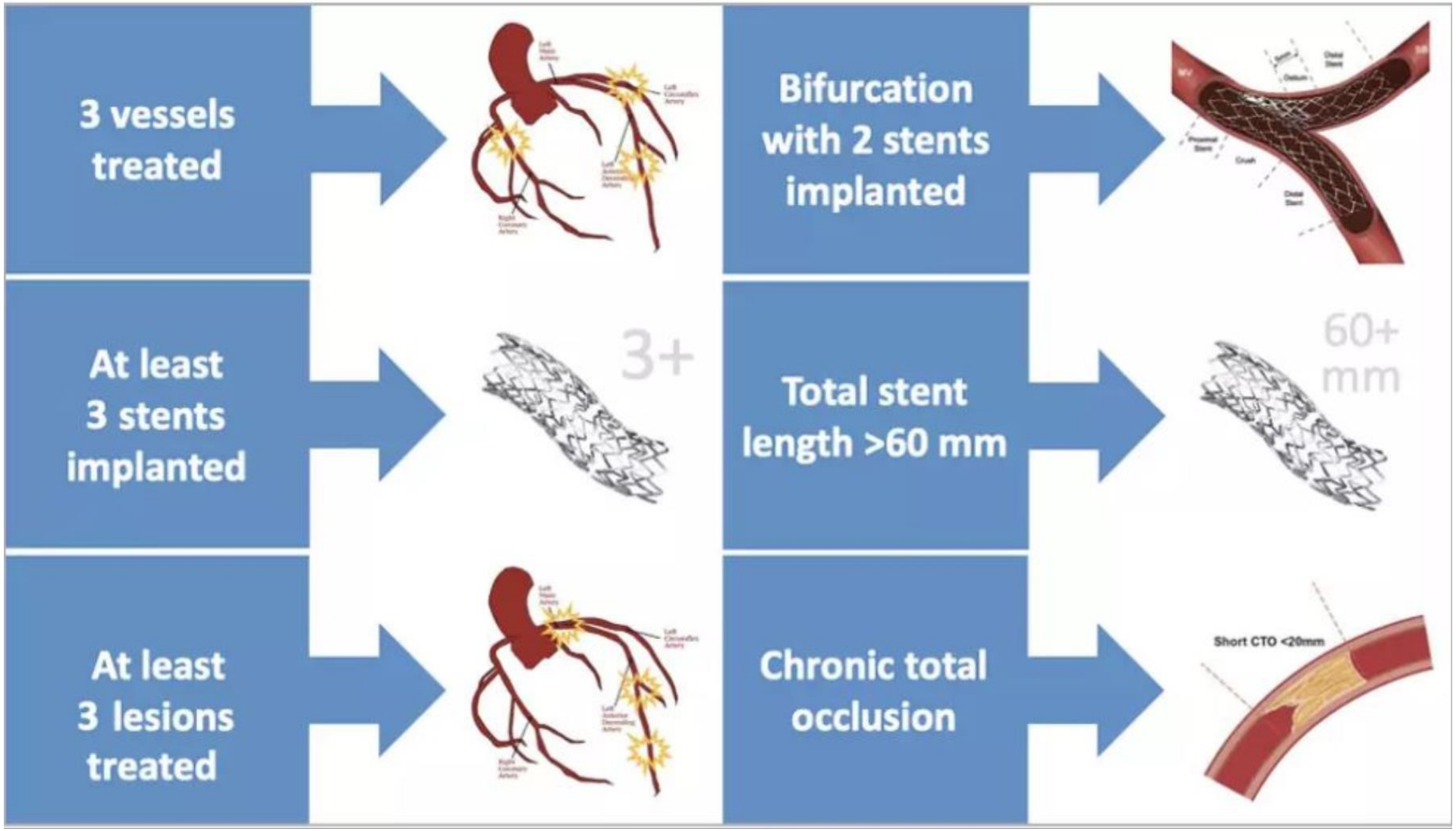
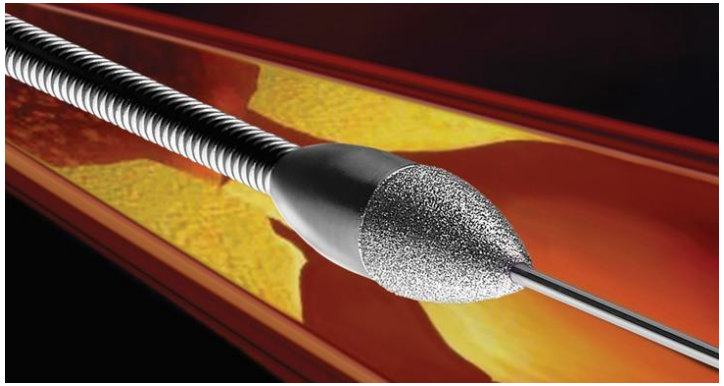
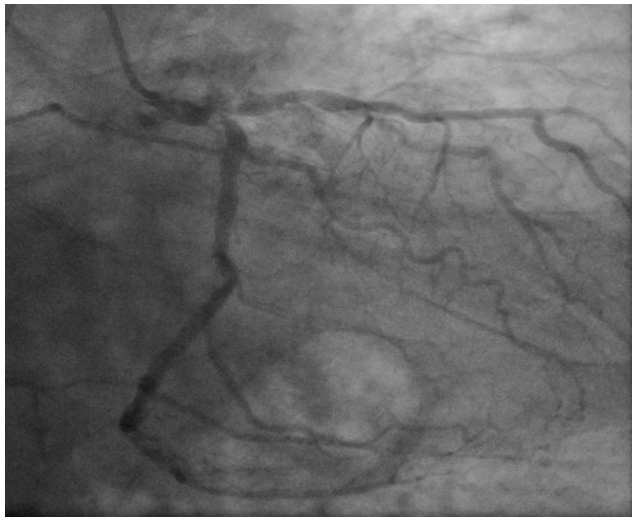


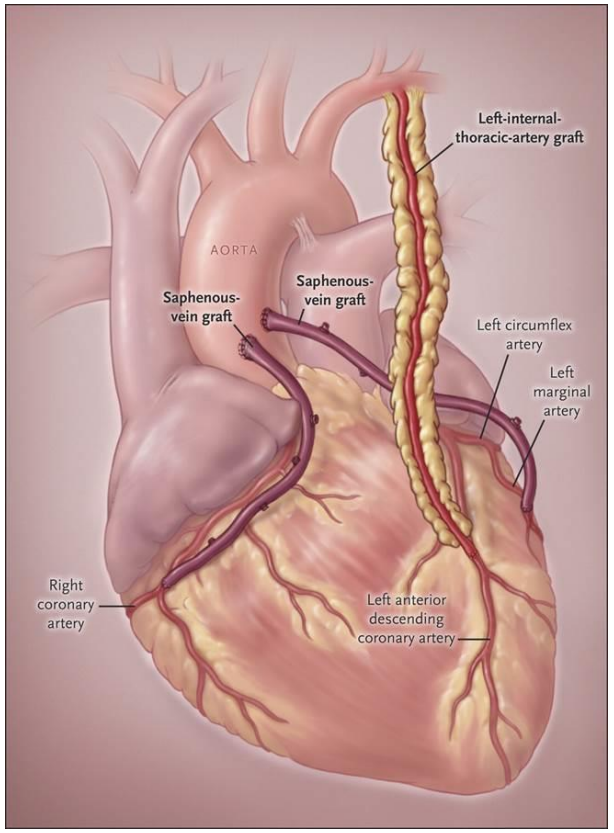
Complex PCI



Rotablation



Left main



SVG disease

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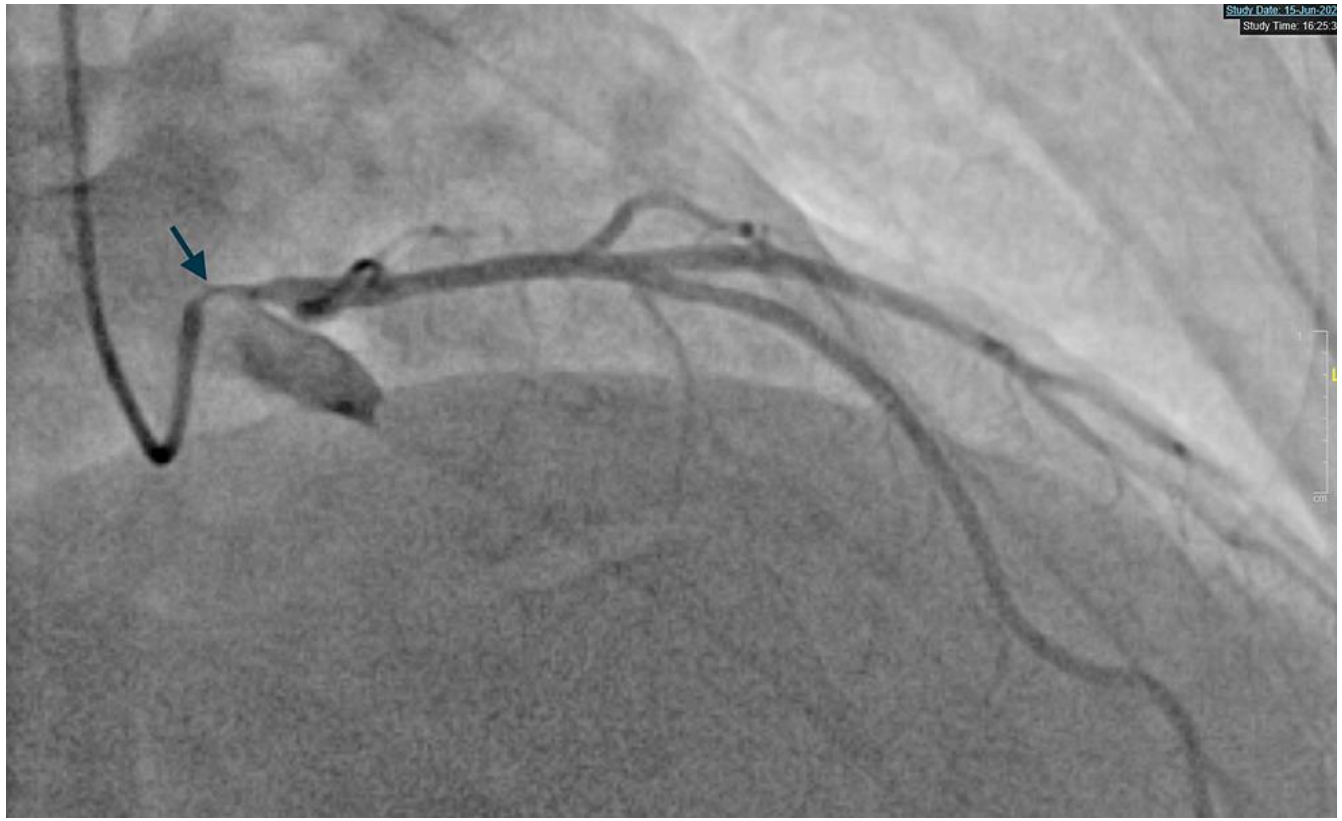
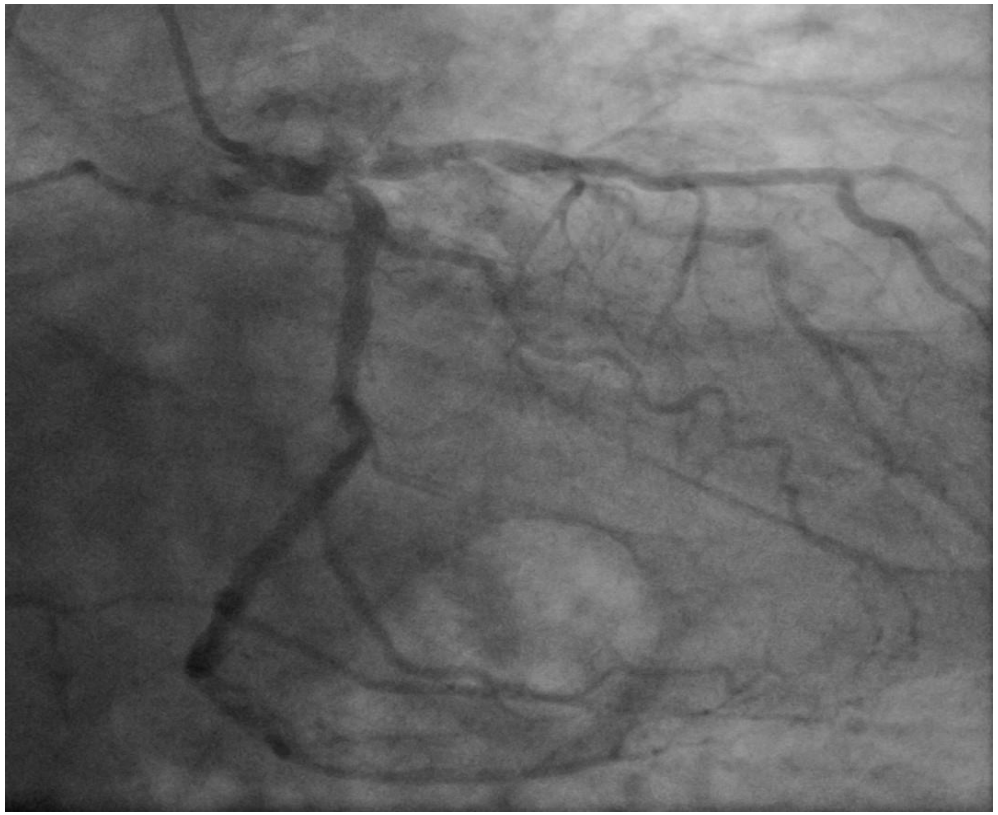
There are left mains and there are left mains !





Prevalence and Impact of Co-morbidity Burden as Defined by the Charlson Co-morbidity Index on 30-Day and 1- and 5-Year Outcomes After Coronary Stent Implantation (from the Nobori-2 Study)

Mamas A. Mamas, BM BCh, DPhil[a,b,c,*], Farzin Fath-Ordoubadi, MD[d], Gian B. Danzi, MD[e], Erik Spaepen, MSc[f], Chun Shing Kwok, MBBS[c], Iain Buchan, MD[a,b,c], Niels Peek, PhD[a,b,c], Mark A. de Belder, MD[g], Peter F. Ludman, MD[h], Dragica Paunovic, MD[i], and Philip Urban, MD[j]

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Table 1
Charlson co-morbidity index

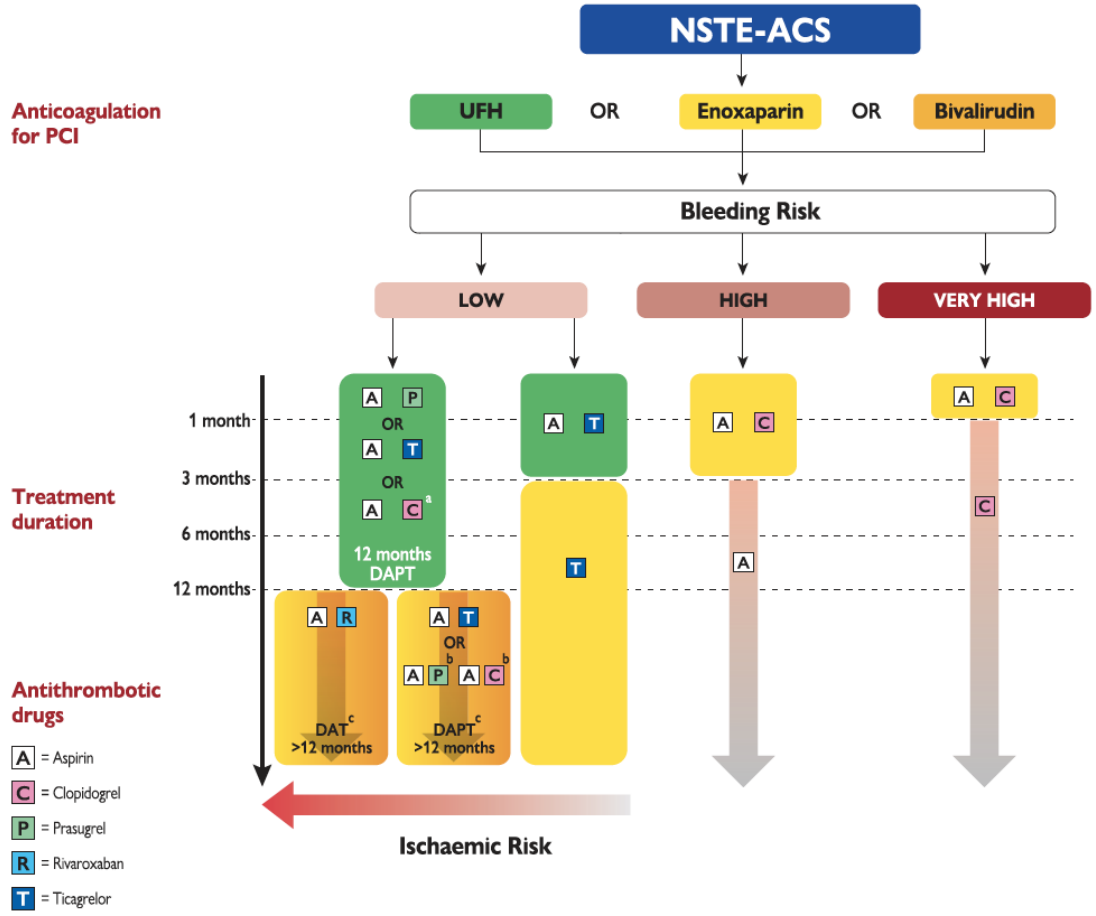
Variable	Points
Myocardial infarction	1
Congestive heart failure	1
Peripheral vascular disease	1
Cerebrovascular disease	1
Dementia	1
Chronic obstructive pulmonary disease	1
Connective tissue disease	1
Peptic ulcer disease	1
Diabetes mellitus	1 if uncomplicated 2 if end-organ damage
Moderate to severe chronic kidney disease	2
Hemiplegia	2
Leukemia	2
Malignant lymphoma	2
Solid tumour	2 6 if metastatic
Liver disease	1 if mild 3 if moderate to severe
AIDS	6

Influence of Charlson co-morbidity index (per unit score increase) on cardiac death and major adverse cardiovascular events at 30 days, 1-year and 5-years

Endpoint	Unadjusted OR (95%CI)	Adjusted OR (95%CI)*
30-days		
Cardiac death	1.47(1.20-1.80), P=0.0002	1.47(1.20-1.80), P=0.0002
Major adverse cardiovascular event	1.29 (1.14-1.47), P≤0.0001	1.27 (1.11-1.44), P=0.0005
1-year		
Cardiac death	1.48 (1.32-1.67), P<0.0001	1.46 (1.30-1.65), P<0.0001
Major adverse cardiovascular event	1.33 (1.24-1.43), P<0.0001	1.32 (1.23-1.42), P<0.0001
5-years		
Cardiac death	1.51 (1.39-1.64), P<0.0001	1.38 (1.24-1.53), P<0.0001
Major adverse cardiovascular event	1.29 (1.22-1.37), P<0.0001	1.29 (1.22-1.36), P<0.0001

Why are we trying to define complexity?

- The reason to identify **complexity** is to identify **risk**
- In high risk cases treatment can be personalized (ie more potent DAPT regimes, prolonged DAPT)
- Complexity is subjective, risk via scoring systems isnt



Defining Percutaneous Coronary Intervention Complexity and Risk

An Analysis of the United Kingdom BCIS Database 2006-2016

Majd Protty, MD,[a] Andrew S.P. Sharp, MD,[a] Sean Gallagher, MD,[a] Vasim Farooq, MD,[a] James C. Spratt, MD,[b] Peter Ludman, MD,[c] Richard Anderson, MD,[a] Margaret M. McEntegart, MD,[d] Colm Hanratty, MD,[e] Simon Walsh, MD,[f] Nick Curzen, PhD,[g] Elliot Smith, MD,[h] Mamas Mamas, DPhil,[i,j] Tim Kinnaird, MD[a,j]

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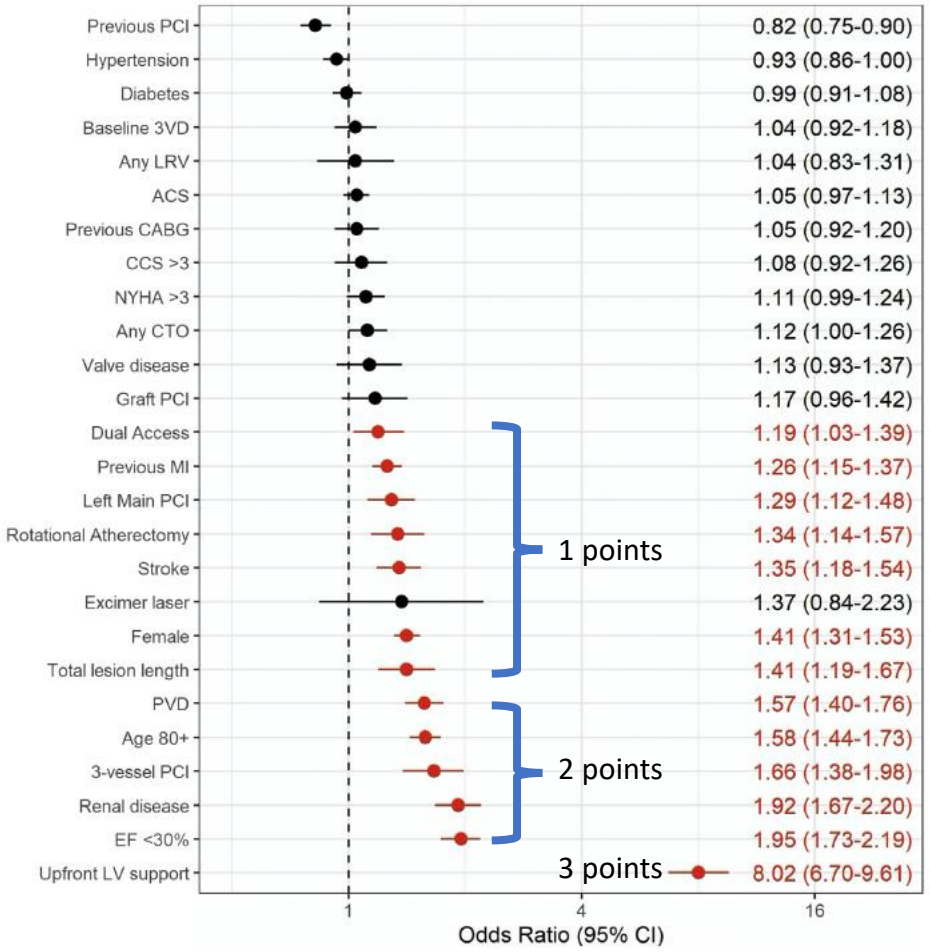
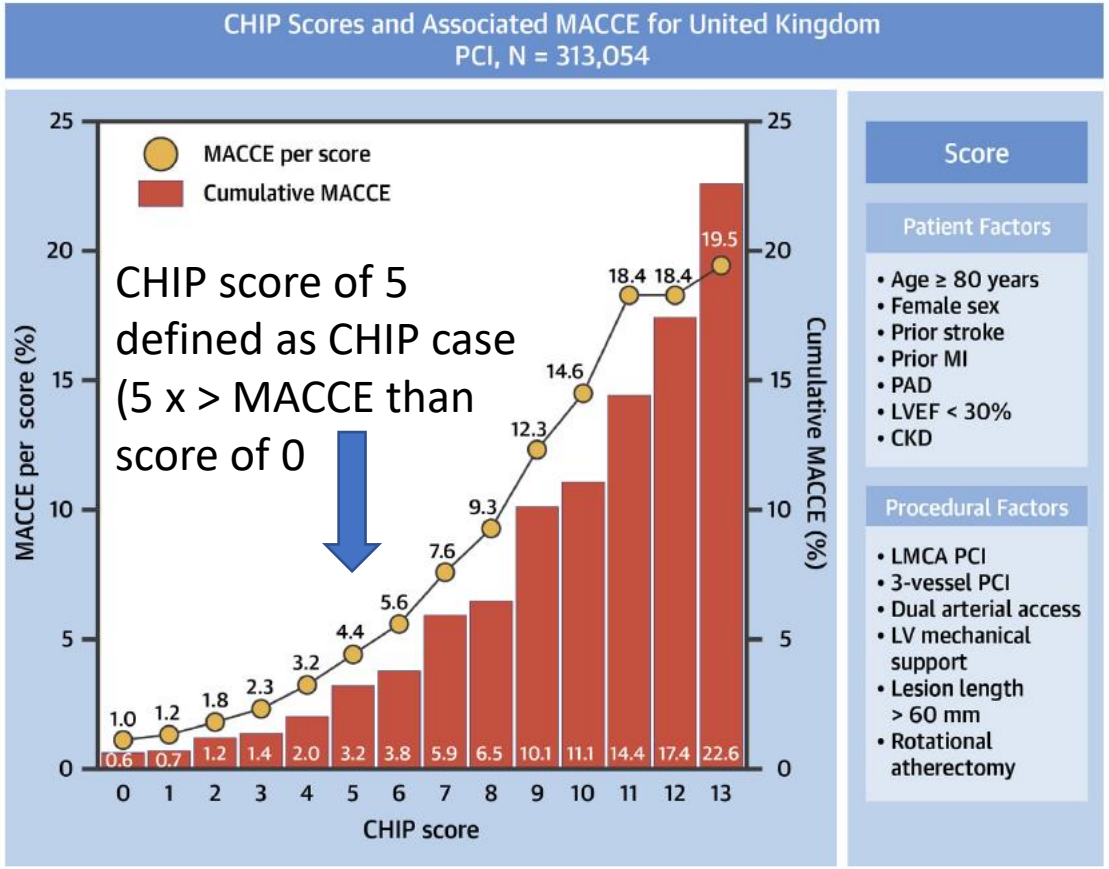
FIGURE 1 Multivariate Adjusted Baseline and Procedural Covariates Associated With In-Hospital MACCE



CENTRAL ILLUSTRATION In-Hospital Major Adverse Cardiac or Cerebrovascular Events



Protty, M. et al. J Am Coll Cardiol Intv. 2022;15(1):39-49.

Defining Percutaneous Coronary Intervention Complexity and Risk

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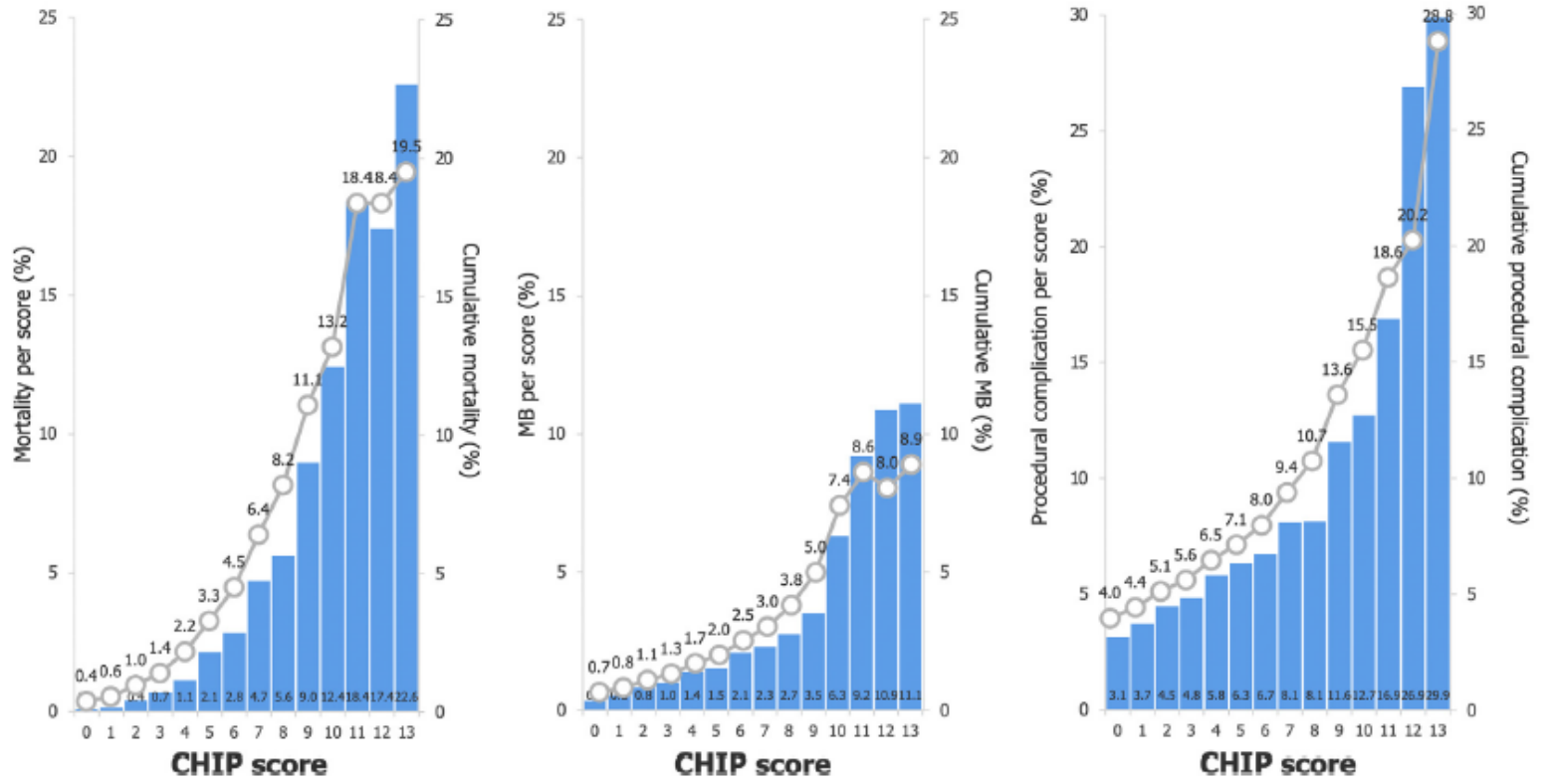
FIGURE 3 In-Hospital Mortality and Major Bleeding, and Procedural Complications by the Number of CHIP Factors Present



(Left) Bars indicate in-hospital mortality by the number of CHIP factors present. The cumulative mortality for procedures associated with a score of CHIP 5+ was 3.3%. **(Middle)** Bars indicate in-hospital major bleeding (MB) by the number of CHIP factors present. The cumulative in-hospital MB of that number of factors or more/case. **(Right)** Bars indicate procedural complication by the number of CHIP factors present. The cumulative procedural complications of that number of factors or more/case.

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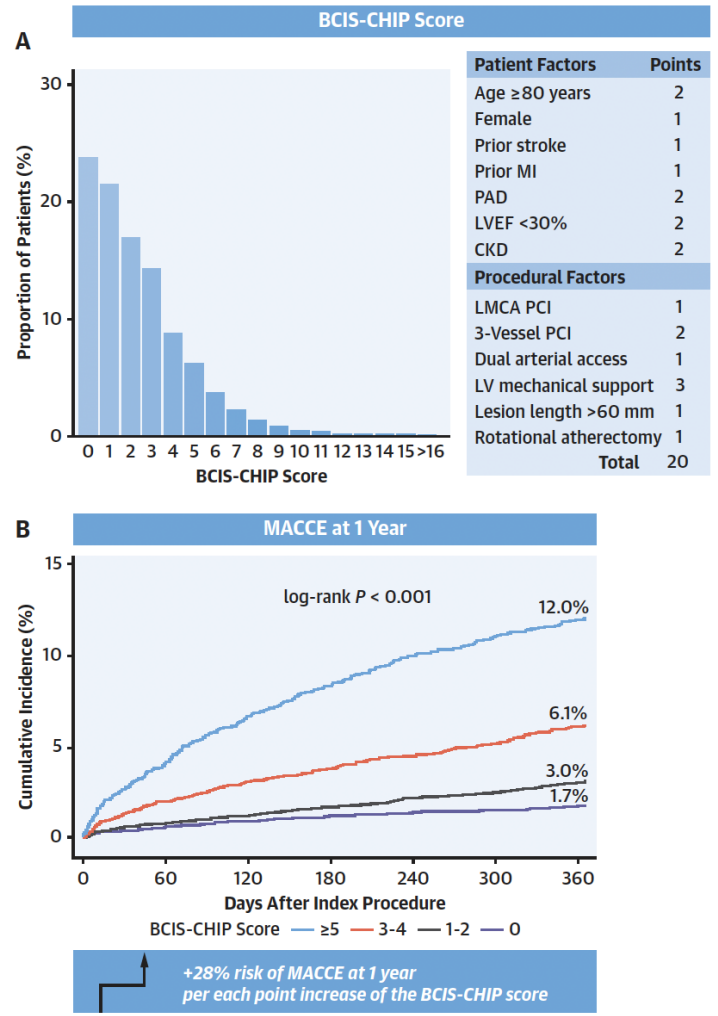
NEW RESEARCH PAPER

CORONARY

Validation of UK-BCIS CHIP Score to Predict 1-Year Outcomes in a Contemporary United States Population

Gaurav Khandelwal, MD, Alessandro Spirito, MD, Richard Tanner, MD, Anoop N. Koshy, MD, PhD, Samantha Sartori, PhD, Negar Salehi, MD, Gennaro Giustino, MD, Vishal Dhulipala, MD, Zhongjie Zhang, MPH, Jaime Gonzalez, BA, Amit Hooda, MD, Manish Vinayak, MD, Asif Shaikh, MD, Roxana Mehran, MD, Annapoorna S. Kini, MD, Samin K. Sharma, MD

CENTRAL ILLUSTRATION CHIP Score From the BCIS Database



Khandelwal G, et al. J Am Coll Cardiol Intv. 2023;16(9):1011-1020.

Defining complexity

- Complexity should be defined by risk
- Accounted for by clinical factors, procedural factors and lesion characteristics
- Use patient centred clinically relevant endpoints such as MACCE to define complexity rather than isolated lesion / clinical / procedural characteristics
- With exception of LV support a single factor has only a modest impact on MACCE
- Therefore complex PCI should be considered in the context of multiple risk factors that may be pt level, lesion level or technical level.