

Tailored Antithrombotic Strategy for CHIP and HBR patients

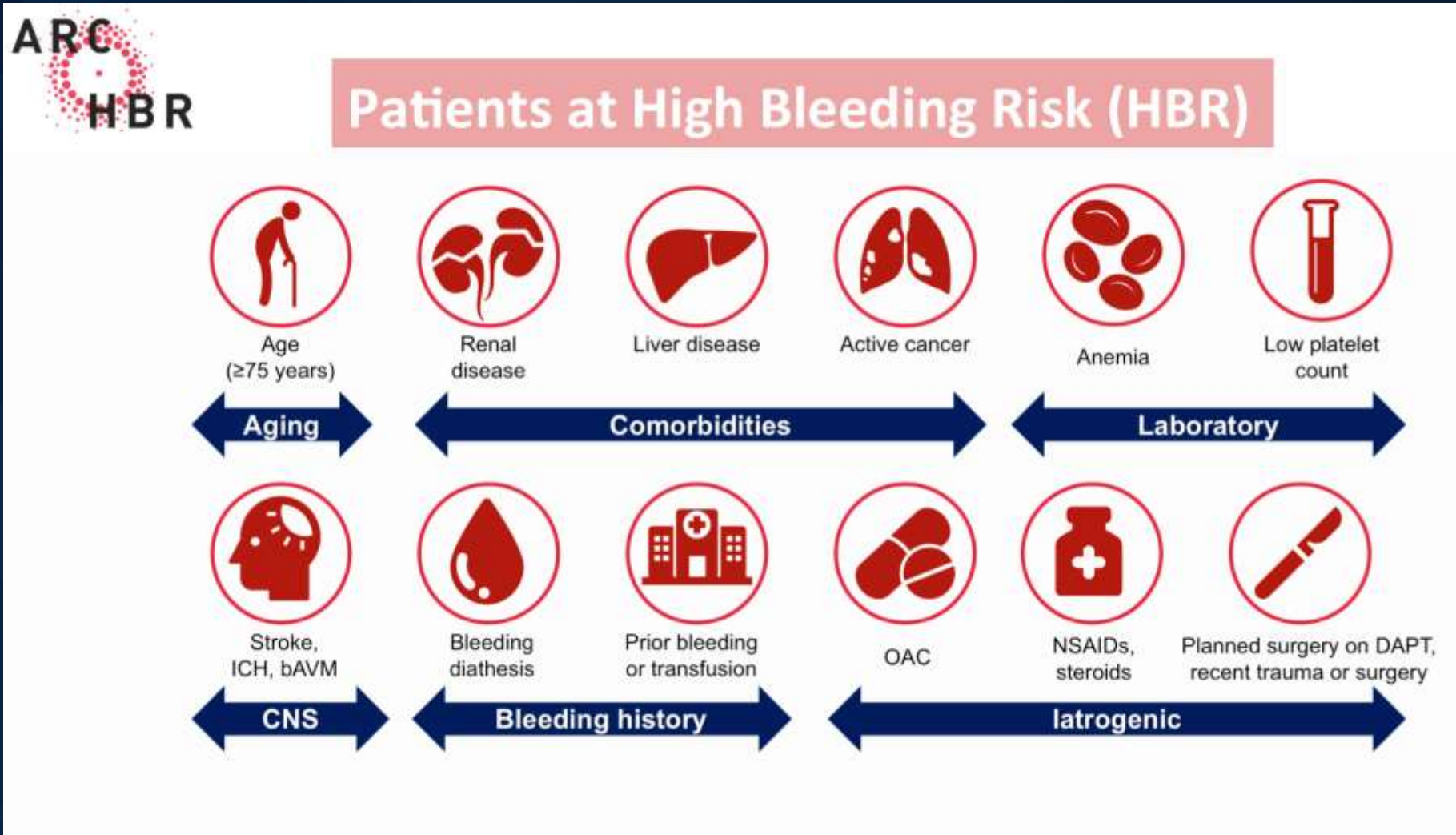
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Disclosures

- Consultant to Biosensors Europe and MedAlliance
- CEC fees from Edwards Lifescience
- DSMB fees from Cardialysis
- Honoraria as medical co-director at CERC
- Shareholder MedAlliance

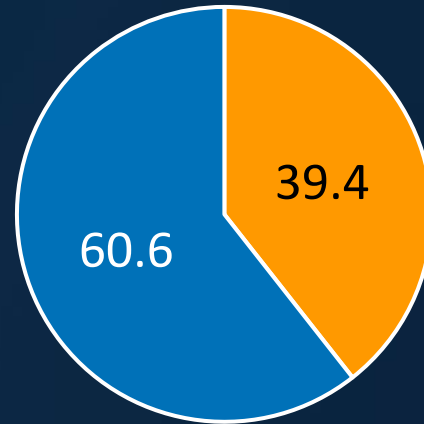
High Bleeding Risk (HBR) patients



Urban P et al. Eur Heart J 2019; 40: 2632-2653

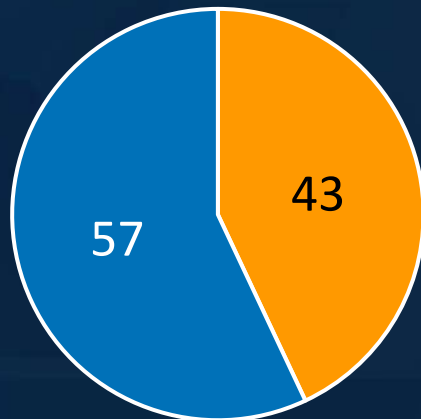
Prevalence of ARC-HBR patients in PCI registries

Ueki et al ²

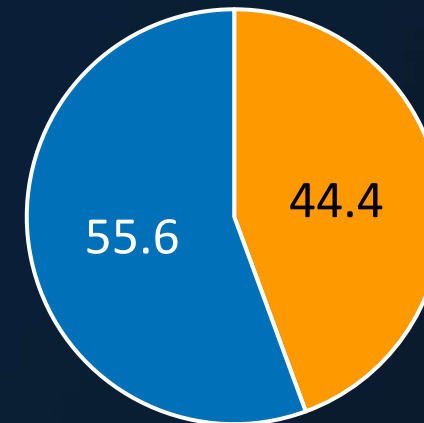


1. Circ Cardiovasc Interv. 2019;12:e008307
2. EuroIntervention 2020;16:371-379
3. JACC 2020; 75:2711-22

Natsuaki et al ¹

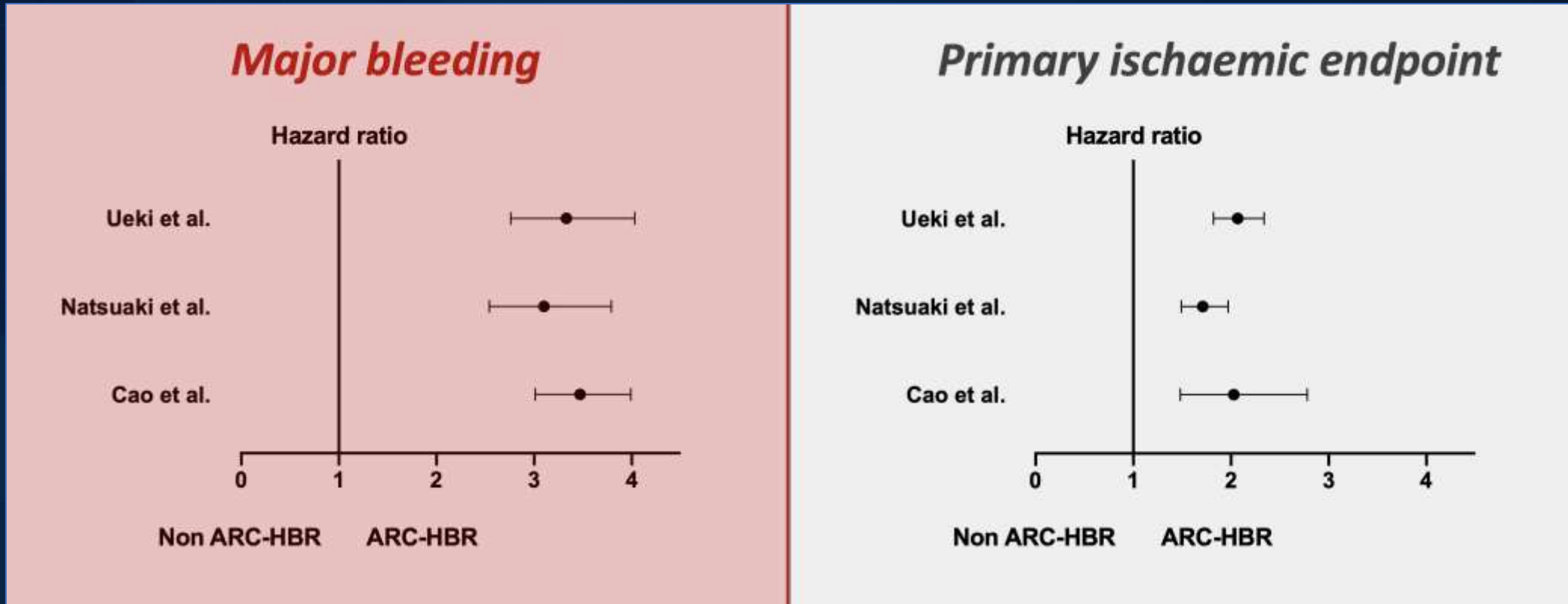


Cao et al ³



ARC HBR non-HBR

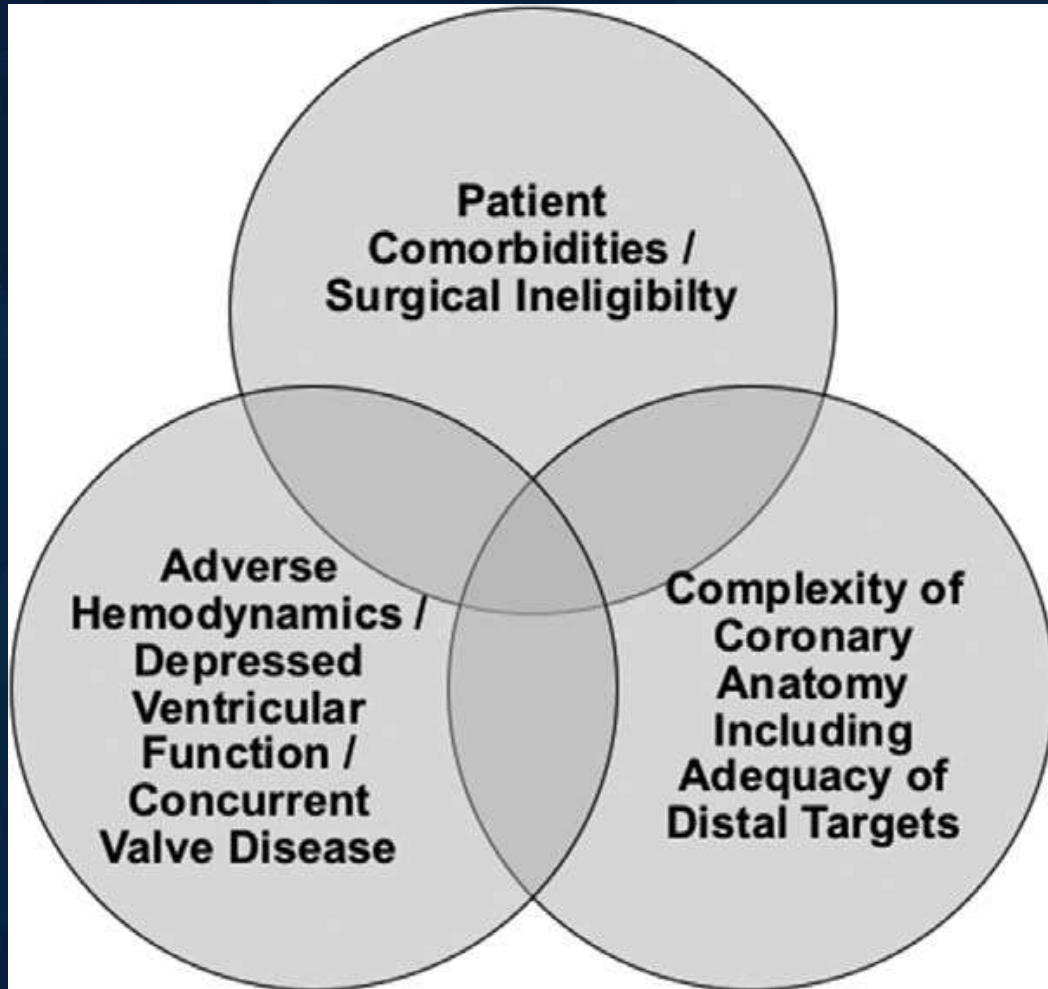
Bleeding and ischaemic risks for HBR patients



Colleran R and Urban P. EuroIntervention 2020;16:357-360

1. Circ Cardiovasc Interv. 2019;12:e008307
2. EuroIntervention 2020;16:371-379
3. JACC 2020; 75:2711-22

Complex Higher-Risk (and Indicated) Patients (CHIP)



May include:

- age >80 years and/or frailty
- Severe lung or liver disease
- Severe renal failure
- Prior stroke/carotid disease
- Left main target
- CTO or bi-trifurcation target
- Multivessel PCI
- High SYNTAX score/calcification
- LVEF<30%
- Pulmonary hypertension
- Overt heart failure/valve disease
- prior CABG

High-risk features for ischaemic events

- | |
|---|
| Prior stent thrombosis on adequate antiplatelet therapy |
| Stenting of the last remaining patent coronary artery |
| Diffuse multivessel disease, especially in diabetic patients |
| Chronic kidney disease (i.e. creatinine clearance <60 mL/min) |
| At least three stents implanted |
| At least three lesions treated |
| Bifurcation with two stents implanted |
| Total stented length >60 mm |
| Treatment of a chronic total occlusion |
| History of STEMI |
| STEMI: ST-elevation myocardial infarction. |



+ SVG target

“HTR”

2018 ESC/EACTS Guidelines on myocardial revascularization

(Neuman F-J et al. European Heart Journal 2018 doi:10.1093/eurheartj/ehy394)

HBR vs. CHIP

	Heterogeneity	Bleeding risk	Thrombotic risk	Technically challenging PCI
HBR	++	+++	++	+
CHIP	+++	+ / +++	++	+++

Until recently, both CHIP and HBR patients have been excluded or under-represented from randomized clinical trials

Assessing the Risks of Bleeding vs Thrombotic Events in Patients at High Bleeding Risk After Coronary Stent Implantation The ARC-High Bleeding Risk Trade-off Model

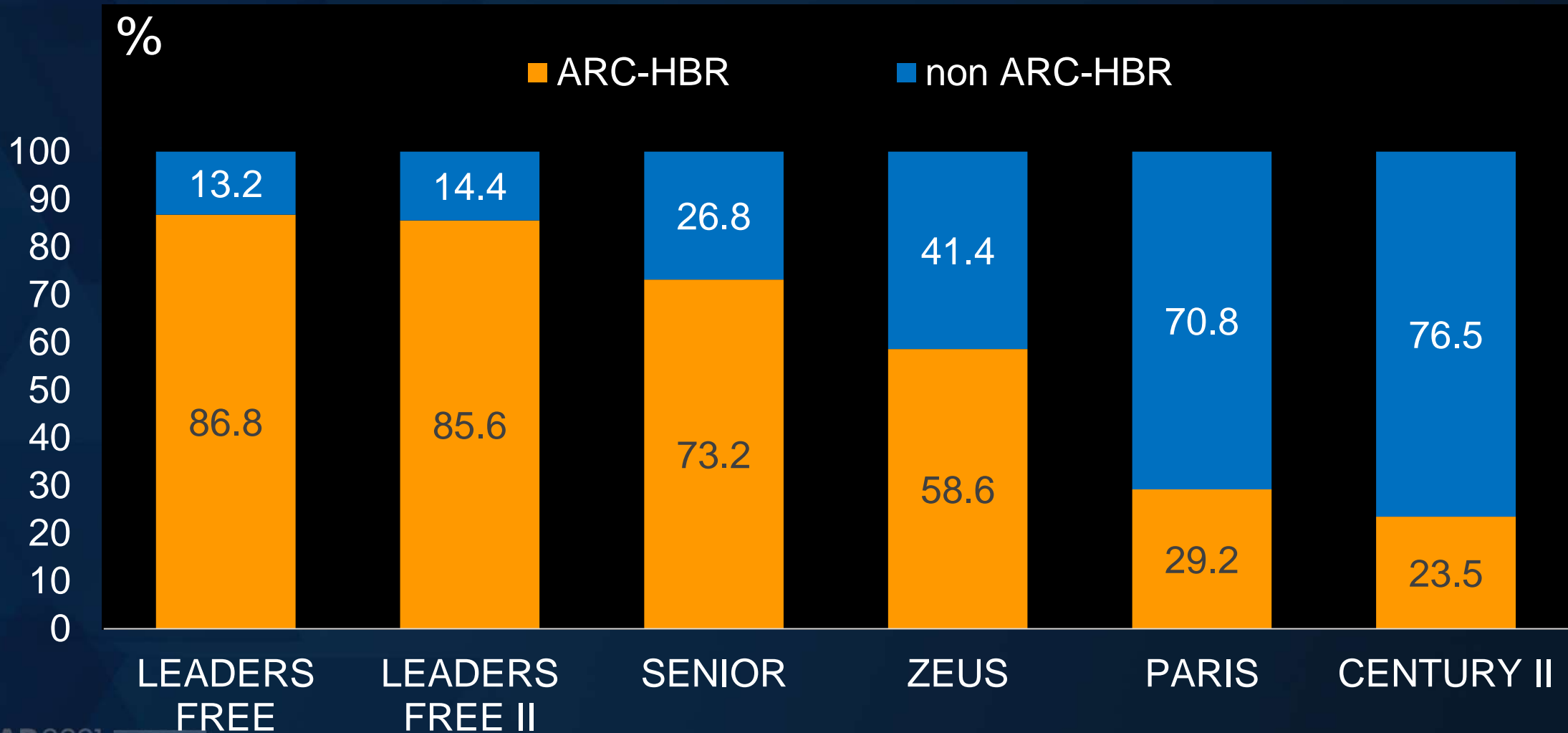
Philip Urban, MD; John Gregson, PhD; Ruth Owen, MSc; Roxana Mehran, MD; Stephan Windecker, MD; Marco Valgimigli, MD, PhD;
Olivier Varenne, MD, PhD; Mitchell Krucoff, MD; Shigeru Saito, MD; Usman Baber, MD, MSc; Bernard Chevalier, MD;
Davide Capodanno, MD, PhD; Marie-Claude Morice, MD; Stuart Pocock, MSc, PhD

- PCI patients who are at high bleeding risk constitute a therapeutic challenge because they often also face an increased risk of thrombotic complications
- Our objective was therefore to develop and validate models for individual patients at high bleeding risk to predict the risks of:
 - major bleeding (BARC 3-5)
 - myocardial infarction (MI) and/or stent thrombosis (ST)

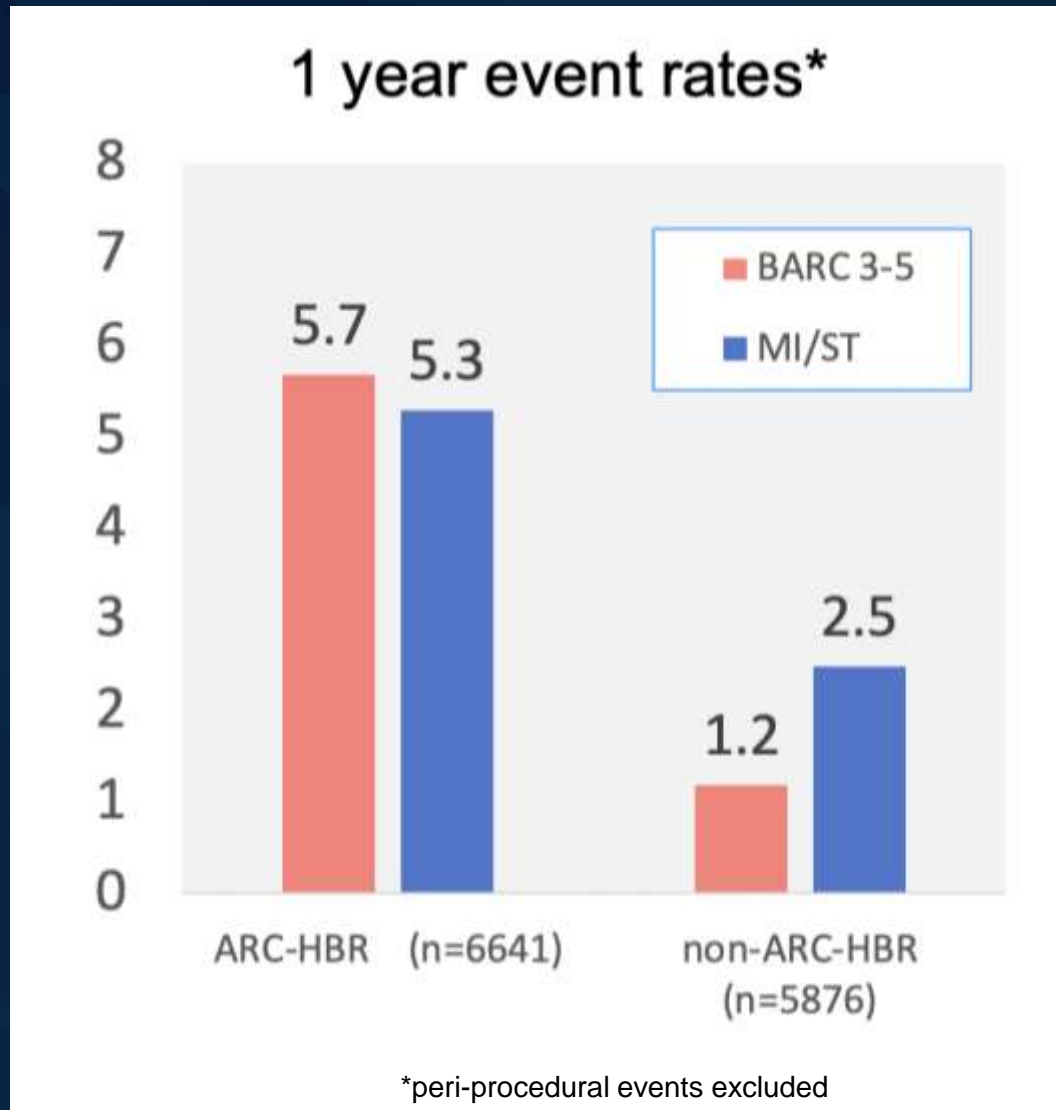


6 studies for the trade-off model

n=12517 patients



ARC-HBR vs. non-ARC-HBR patients



ARC-HBR patients:

> 4x more bleeding

> 2x more MI and or ST

Multivariate predictors (ARC-HBR patients)

4

4

4

	BARC 3-5 bleeding		MI/ST	
	HR (95% CI)	P	HR (95% CI)	P
OAC at discharge	2.00 (1.62, 2.48)	<0.0001	-	
Liver disease, cancer or planned surgery	1.63 (1.27, 2.09)	0.0001	-	
Age ≥65 years	1.50 (1.08, 2.08)	0.01	-	
COPD	1.39 (1.05, 1.83)	0.02	-	
Prior myocardial infarction	-		1.89 (1.52, 2.35)	<0.0001
NSTEMI or STEMI presentation	-		1.82 (1.46, 2.25)	<0.0001
Diabetes	-		1.56 (1.26, 1.93)	<0.001
Bare metal stent	-		1.53 (1.23, 1.89)	<0.001
Hemoglobin (g/L)				
≥130	reference group	<0.0001	reference group	0.005
110-129	1.69 (1.30, 2.20)		1.27 (0.99, 1.63)	
<110	3.99 (3.06, 5.20)		1.50 (1.12, 1.99)	
Estimated GFR (mL/min)				
≥ 60	reference group	0.02	reference group	0.001
30-59	0.99 (0.79, 1.24)		1.30 (1.03, 1.66)	
<30	1.43 (1.04, 1.96)		1.69 (1.20, 2.37)	
Current smoker	1.47 (1.08, 1.99)	0.01	1.48 (1.09, 2.01)	0.009
Complex procedure	1.32 (1.07, 1.61)	0.008	1.50 (1.21, 1.85)	<0.001
	C-statistic=0.68		C-statistic=0.69	

Validation: ARC-HBR ONYX-ONE patients

C-statistic=0.74

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Multivariate predictors (ARC-HBR patients)

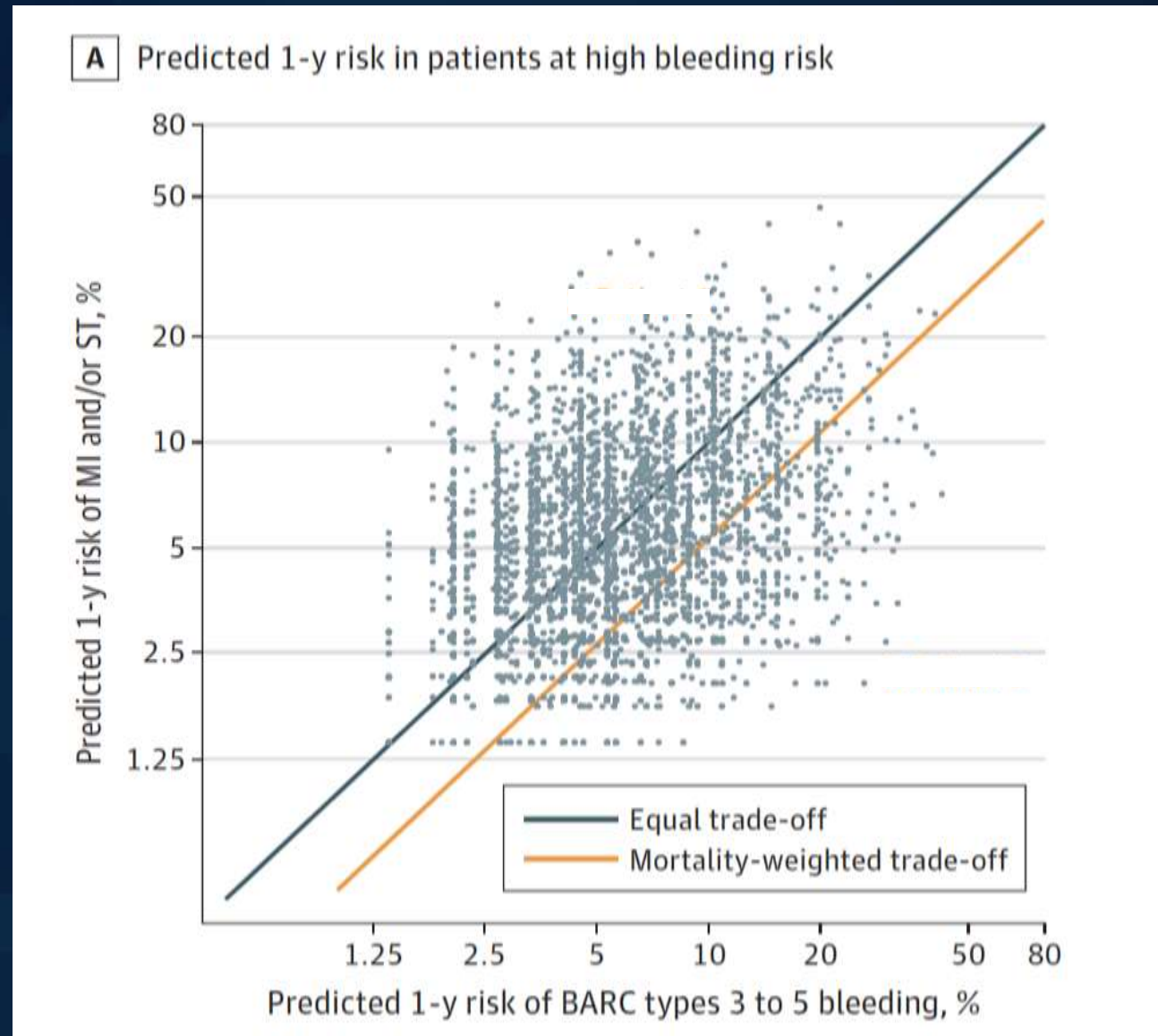
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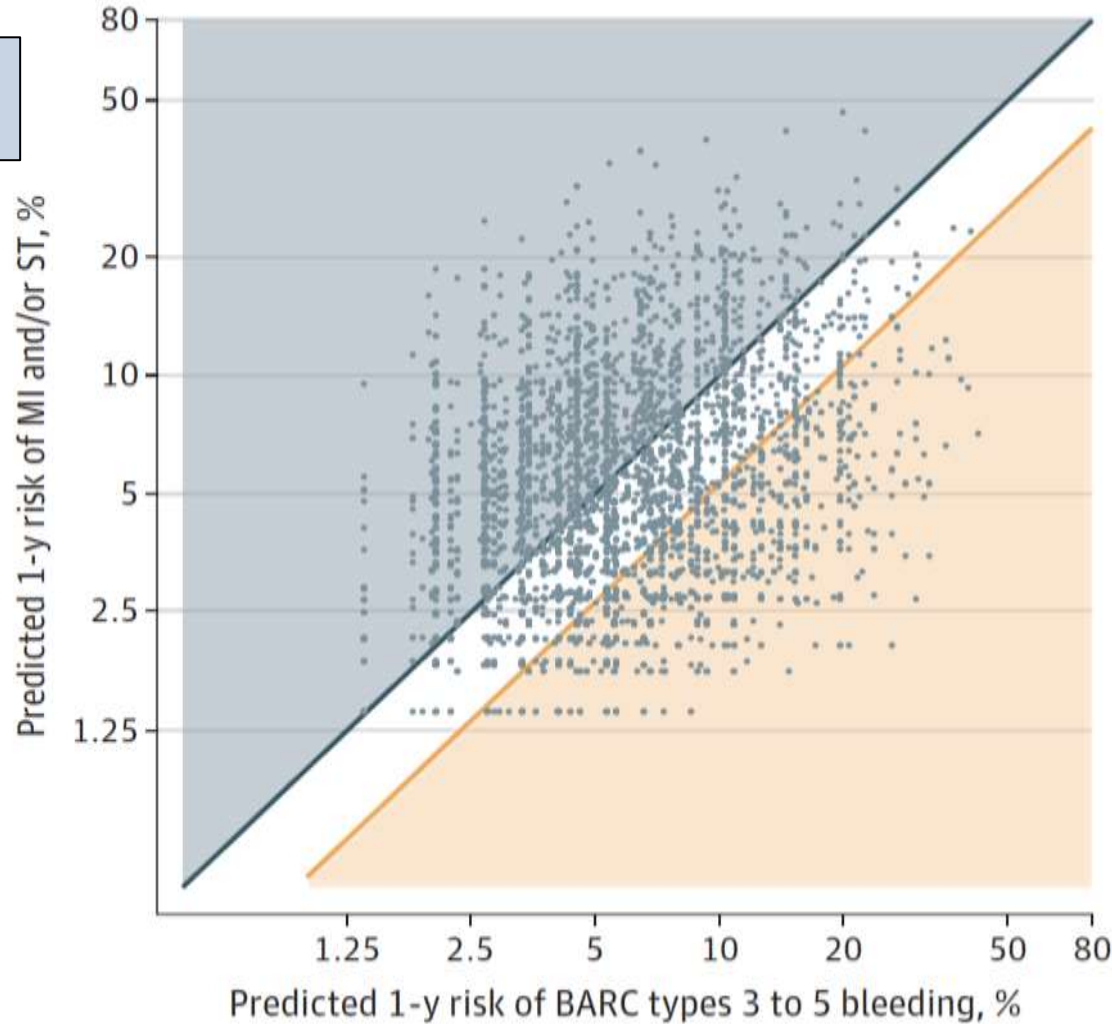
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Predicted risks for 6641 individual patients



Predicted risks for 6641 individual patients

B Subgroups of patients based on relative 1-y risk



2931 patients (44.1%)
thrombotic risk > bleeding risk

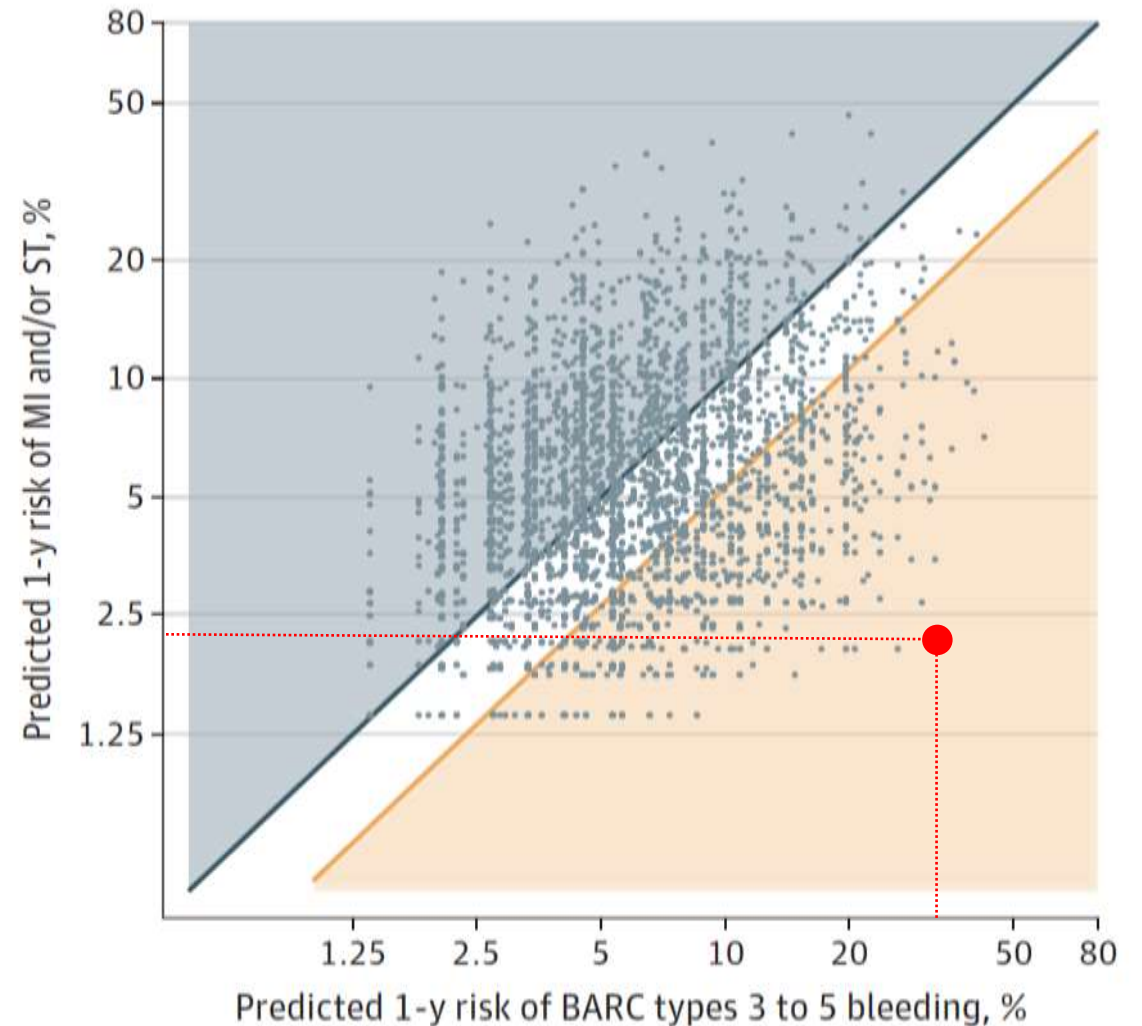
2155 patients (32.4%)
bleeding risk \approx thrombotic risk

1555 patients (23.4%)
bleeding risk > thrombotic risk

Example #1

- 79-year-old man
- CCS class III exertional angina
- On OAC for chronic AF
- Ex-smoker with COPD
- Hemicolectomy for cancer 6 months ago
- Hemoglobin = 105 g/L
- eGFR = 70 mL/min

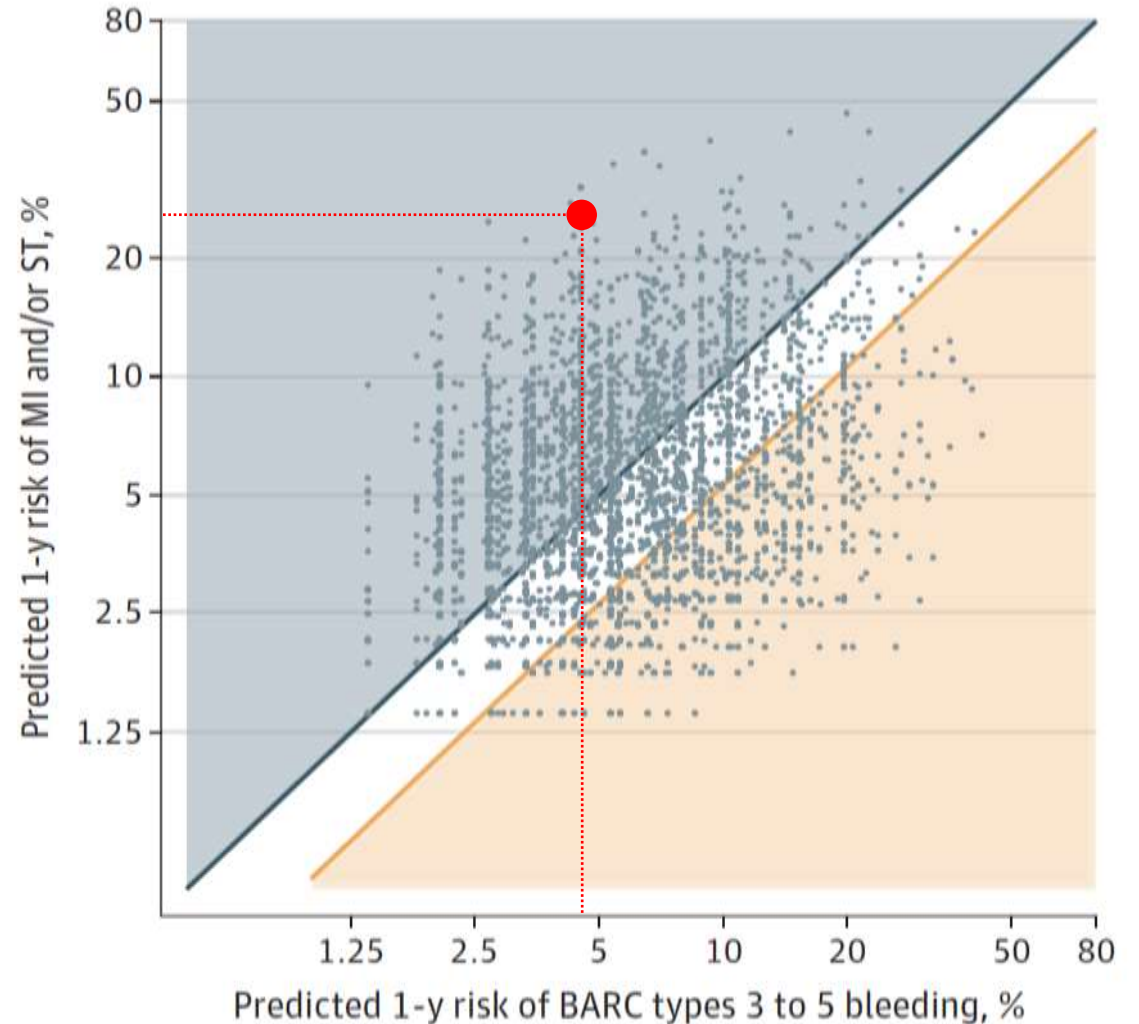
- Single DES to the proximal LAD
- Discharged on clopidogrel and OAC

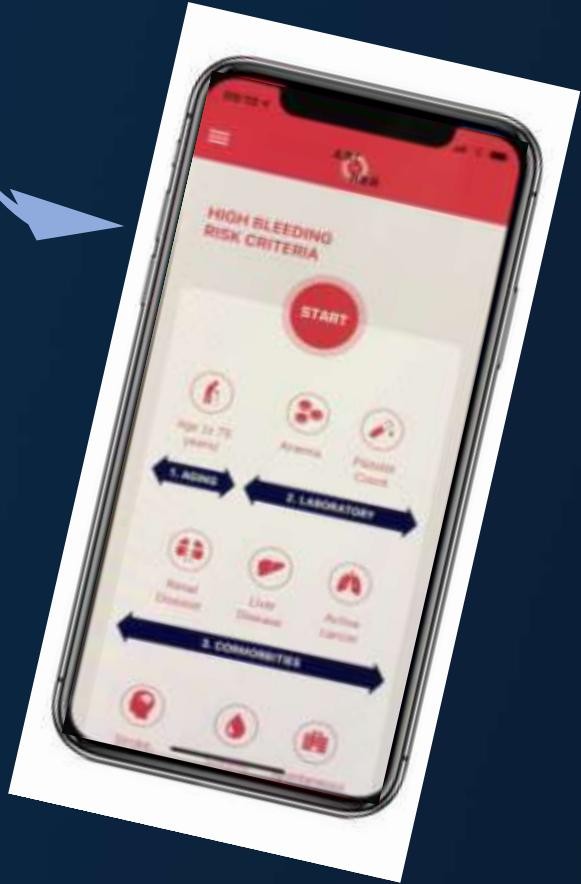


Example #2

- 56-year-old lady
- NSTEMI presentation
- Previous MI 2 years ago
- Diabetes
- Active smoking
- Arthritis treated with long-term ibuprofen
- Hemoglobin level = 120 g/L
- eGFR = 40 mL/min

- 2 DES to LAD & 2 to RCA
- Discharged on ticagrelor & aspirin





Conclusion / Take-home Message

- Both HBR and CHIP patients have a marked increased risk of thrombotic and bleeding complications associated with PCI
- Both groups are heterogeneous and overlap to a significant degree
- Both have often been excluded or underrepresented in clinical trials
- The recently developed trade-off model for ARC-HBR patients will shortly be available as a smartphone app. It may help to better quantify bleeding and thrombotic risks and thereby assist in defining revascularisation strategies and optimizing individual anti-thrombotic regimens

Thank you