



Long-Term Follow-up of Bifurcation PCI

Insight from NORDIC-BALTIC Bifurcation Studies



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Disclosure Statement of Financial Interest

I, *Indulis Kumsars*, DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

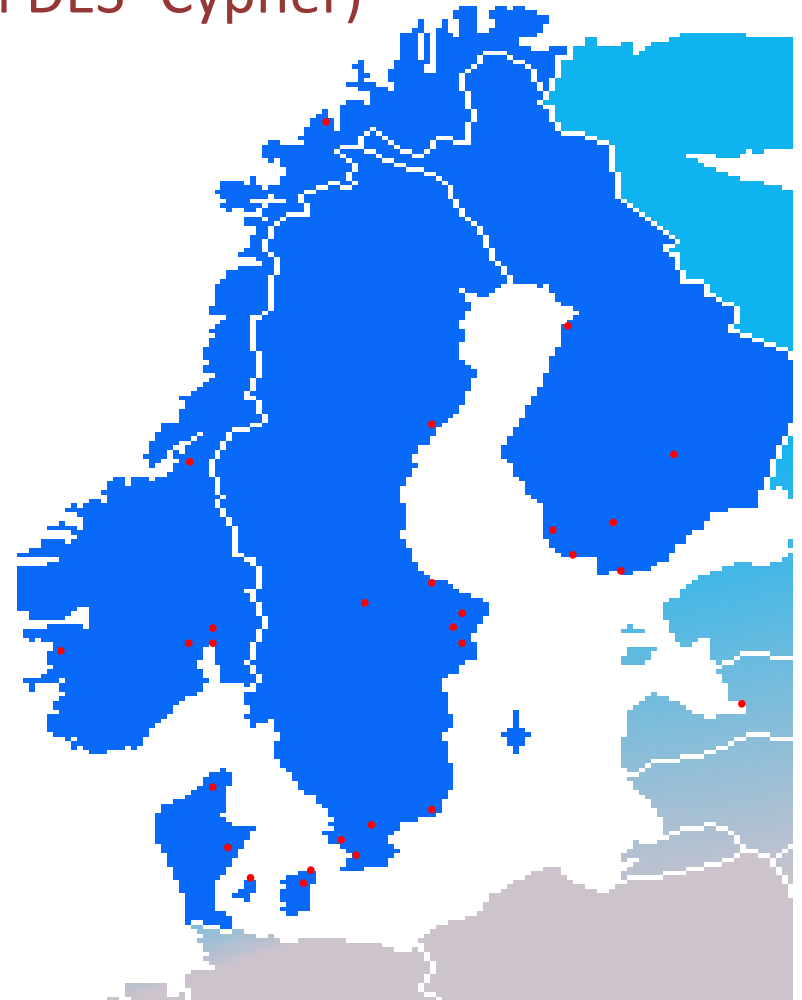
The Nordic-Baltic Bifurcation Studies were an academic studies primarily funded by participating hospitals.

The participating institutions received unrestricted study grants form Cordis and Abbott.

Nordic-Baltic Bifurcation Studies

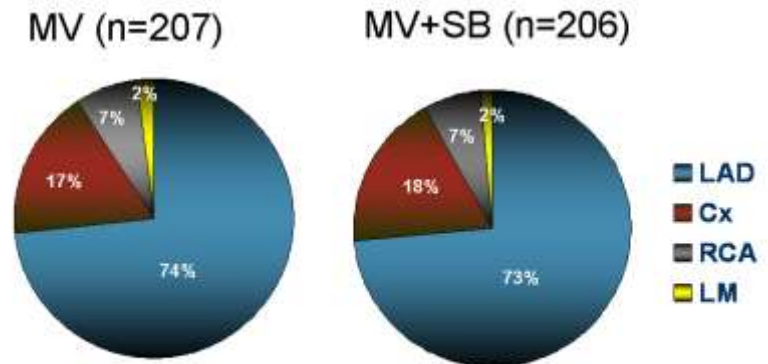
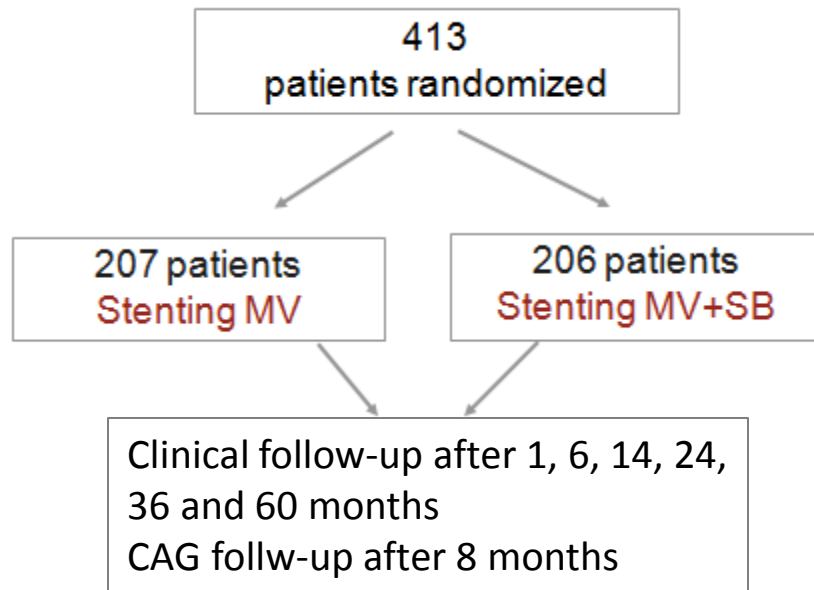
Prospective, multicenter, large-scale randomized trials
(study device: 1st generation DES- Cypher)

- **Nordic-Baltic I**
1 vs 2 stents
- **Nordic-Baltic II**
Crush vs Culotte stenting
- **Nordic-Baltic III**
+/- kissing balloon post dilatation
after MV stenting
- **Nordic-Baltic IV**
1 vs 2 stents in true bifurcations
with large SB
Cypher/Xience



NORDIC I

Nordic Bifurcation Study (NORDIC I): the randomized study on simple versus complex stenting of coronary artery bifurcation lesions

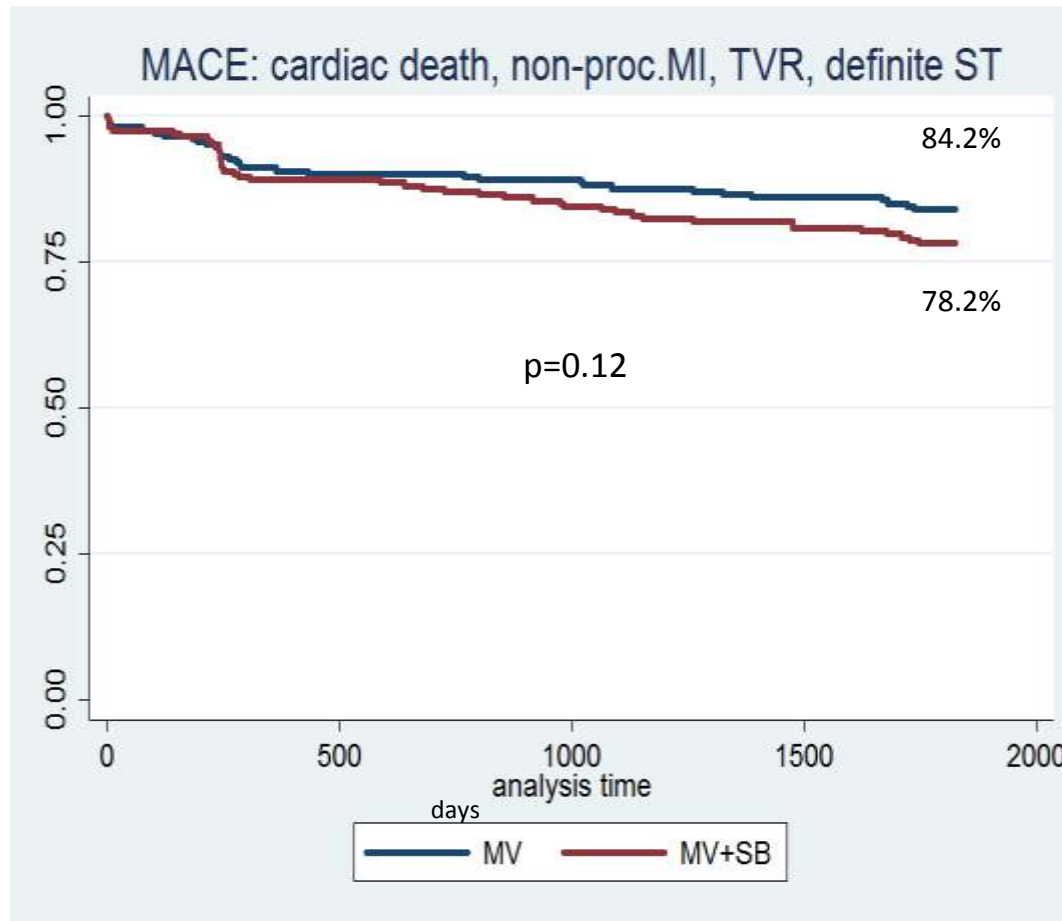


**True bifurcations 71%
(DS>50% in MV and SB)**

Clinical end-points at 5-year follow-up (n=404, 98%)

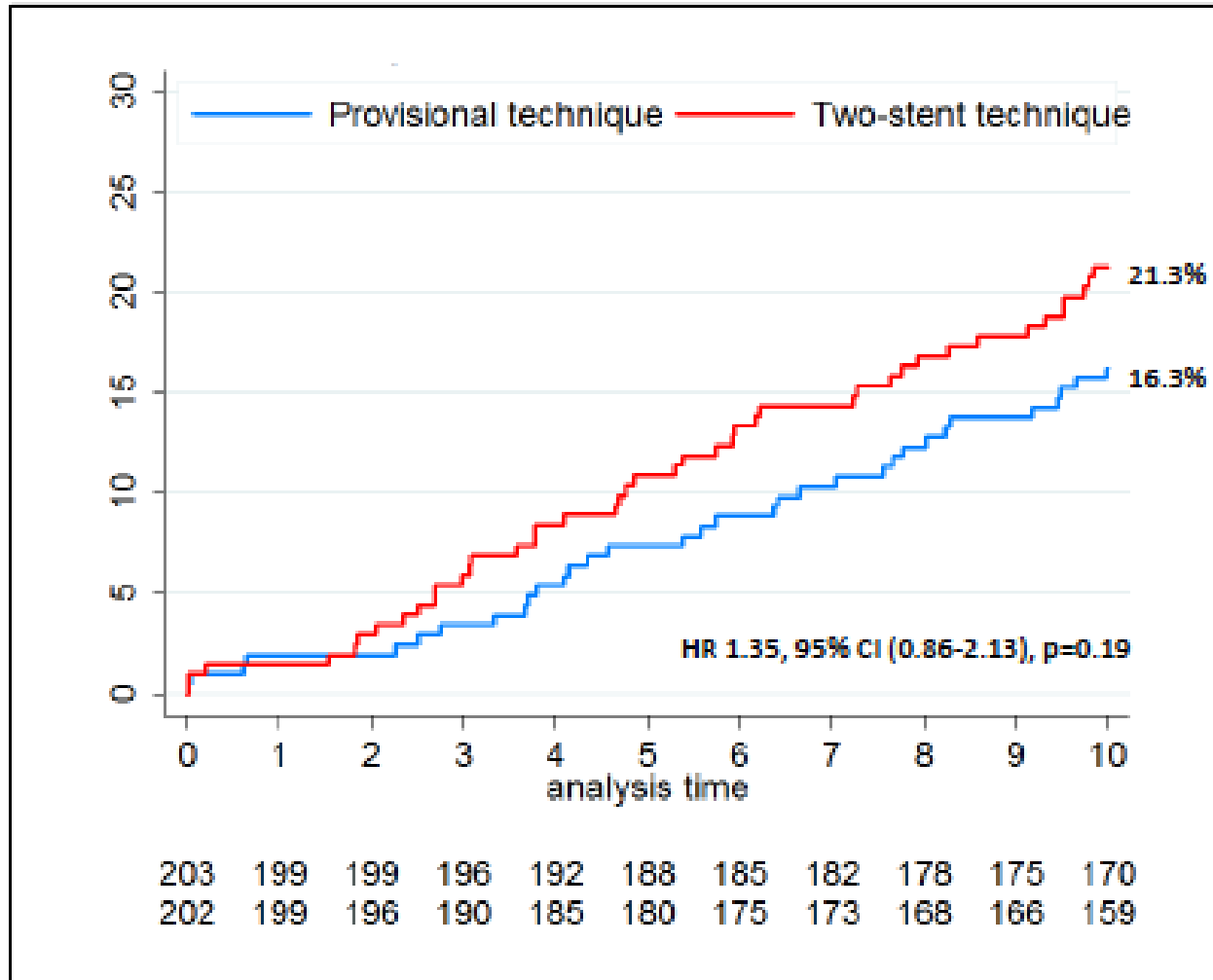
	MV	MV+SB	p
All cause death	5.9 %	10.4 %	0.16
Cardiac death	2.5 %	4.0 %	0.40
Myocardial infarction	4.0 %	7.9 %	0.09
Target lesion revascularization	11.3 %	15.3 %	0.24
Target vessel revascularization	13.4 %	18.3 %	0.14
Target vessel revascularization by CABG	2.0 %	3.5 %	0.38
Definite stent thrombosis	3.0 %	1.5 %	0.32

MACE free survival at 5 years follow-up



10 years all-cause mortality

(n=405; 98%)



Bifurcation Bad Krozingen I study

5 years follow-up

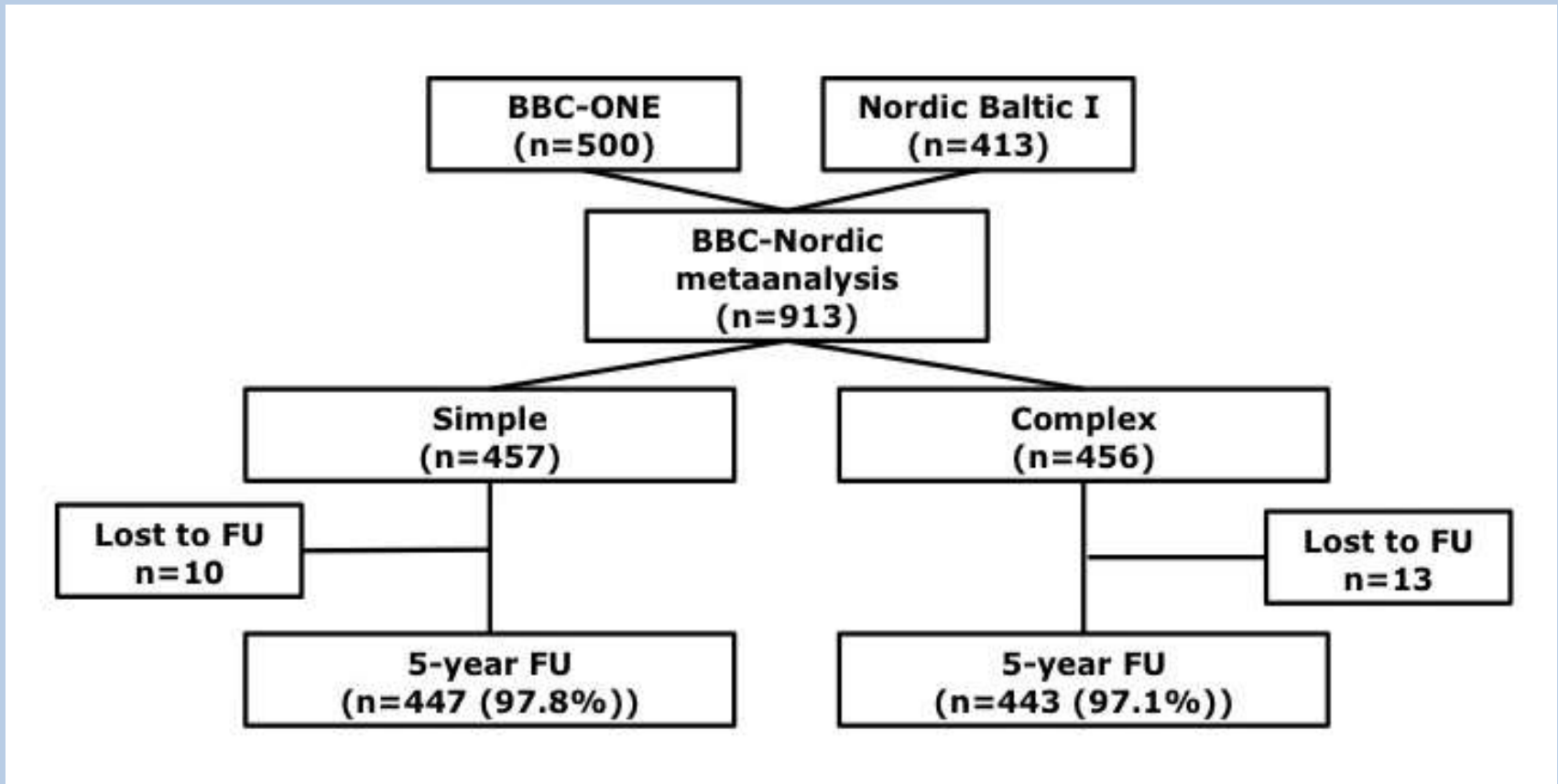
(Cypher stent)

	Provisional T N- 101	Routine T N= 101	p
Death (%)	7.9	10.0	0.65
TLR (%)	16.3	16.2	0.97
ST (%)	2.0	5.1	0.25
MACE (%)	22.9	22.8	0.91

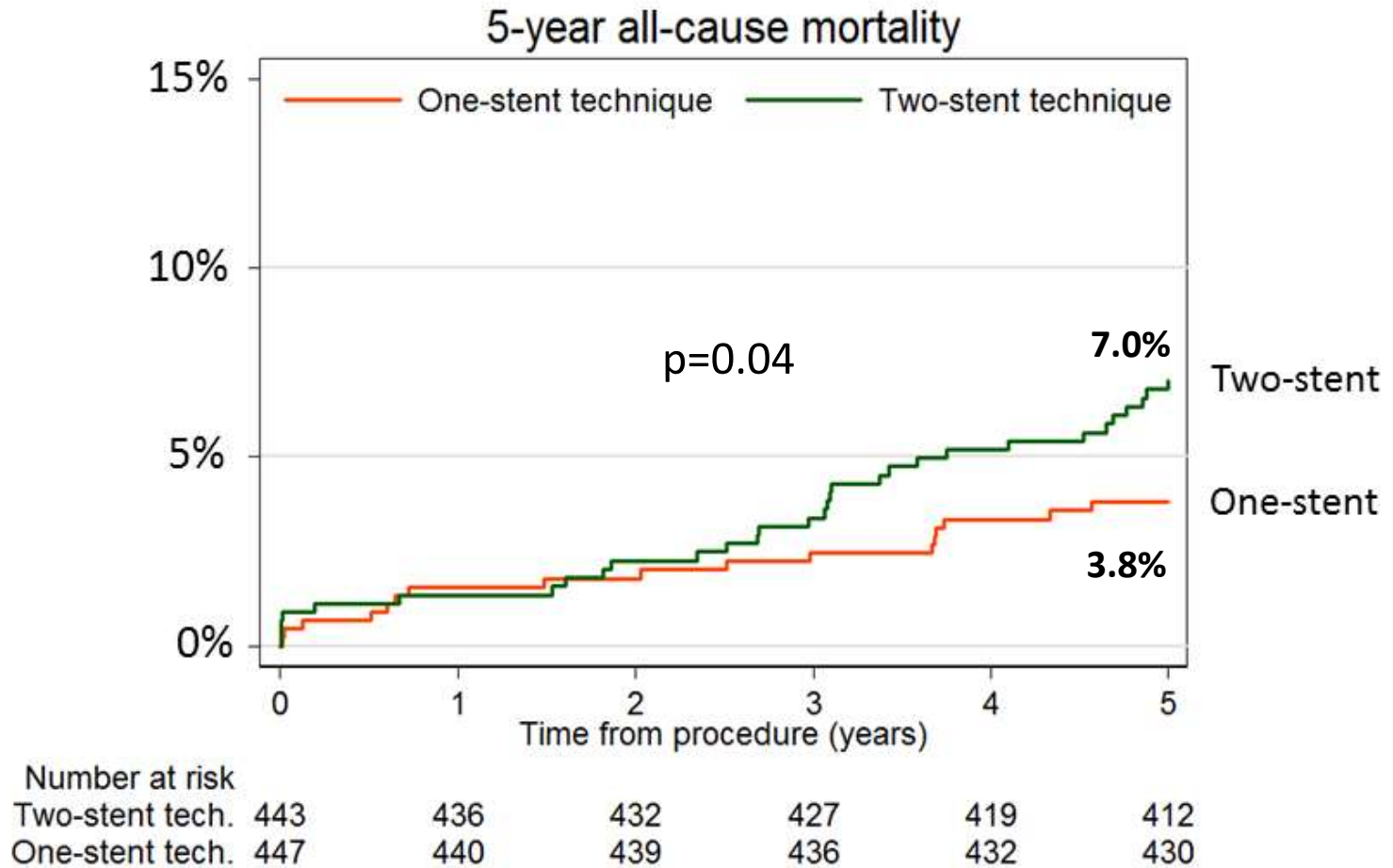
**CORONARY BIFURCATION LESIONS TREATED WITH SIMPLE OR COMPLEX STENTING:
FIVE-YEAR SURVIVAL FROM PATIENT-LEVEL POOLED ANALYSIS OF THE
NORDIC BIFURCATION STUDY AND THE BRITISH BIFURCATION CORONARY STUDY**

Miles W Behan, Niels R Holm, Adam J de Belder, James Cockburn, Andrejs Erglis, Nicholas P Curzen, Matti Niemelä, Keith G Oldroyd, Kari Kervinen, Indulis Kumsars, Paal Gunnes, Rodney H Stables, Michael Maeng, Jan Ravkilde, Jan Skov Jensen, Evald H Christiansen, Nina Cooter, Terje K Steigen, Saila Vikman, Leif Thuesen, Jens Flensted Lassen, David Hildick-Smith

BBC – NORDIC I metaanalysis

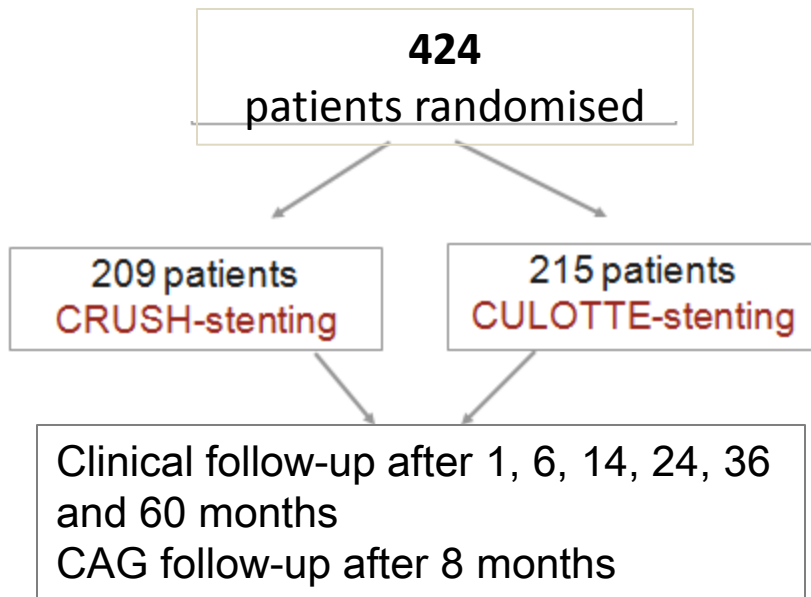


BBC – NORDIC I metaanalysis

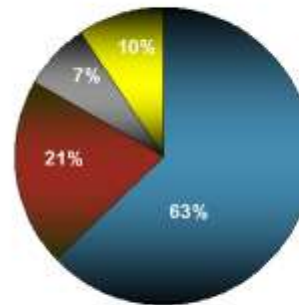


NORDIC II

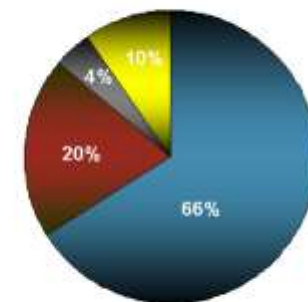
Nordic Stent Technique Study (NORDIC II): the first randomized clinical and angiographic comparison of the crush and the culotte bifurcation stent techniques



Crush (n=209)



Culotte (n=215)

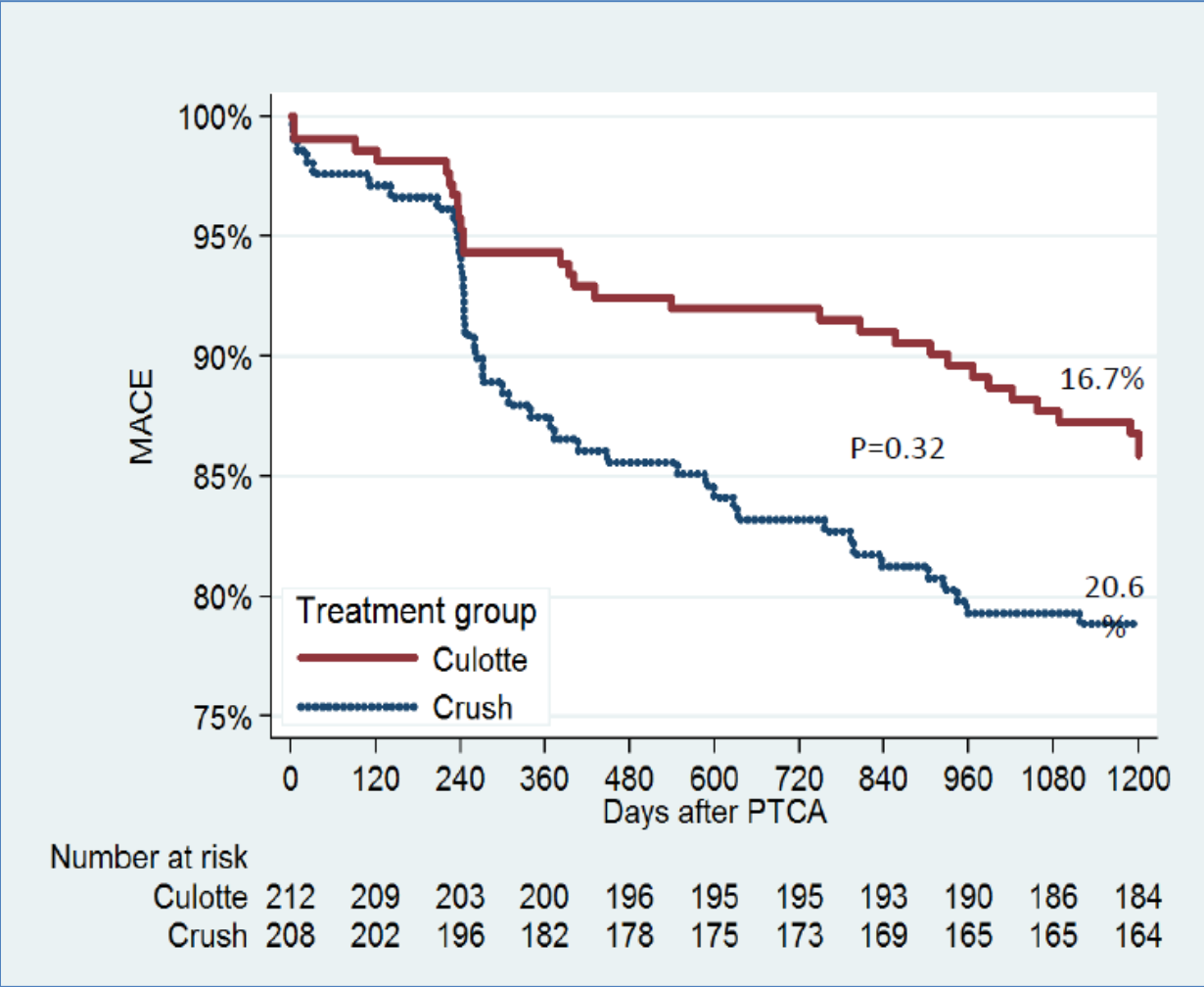


**True bifurcations: 73.3% Crush vs. 82.3% Culotte, p=0.03
(Medina classification 1,1,1 - 1,0,1 - 0,1,1)**

Endpoints after 3 years

	Crush (n= 209)	Culotte (n= 215)	p-value
Total death (%)	4.8	6.5	0.53
Cardiac death (%)	3.3	3.0	0.54
MI (%)	6.7	6.0	0.84
TLR (%)	6.2	6.1	ns
TVR (%)	12.0	9.8	0.47
Definite ST (%)	1.4	4.7	0.09
Definite, probable and possible ST (%)	5.3	7.9	0.33

MACE free survival at 3years follow-up

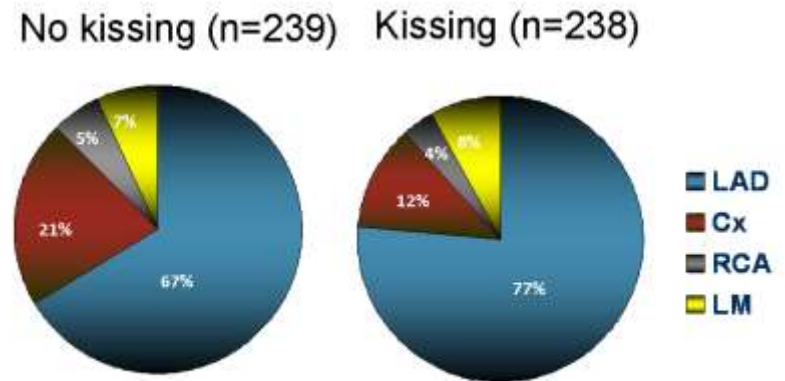
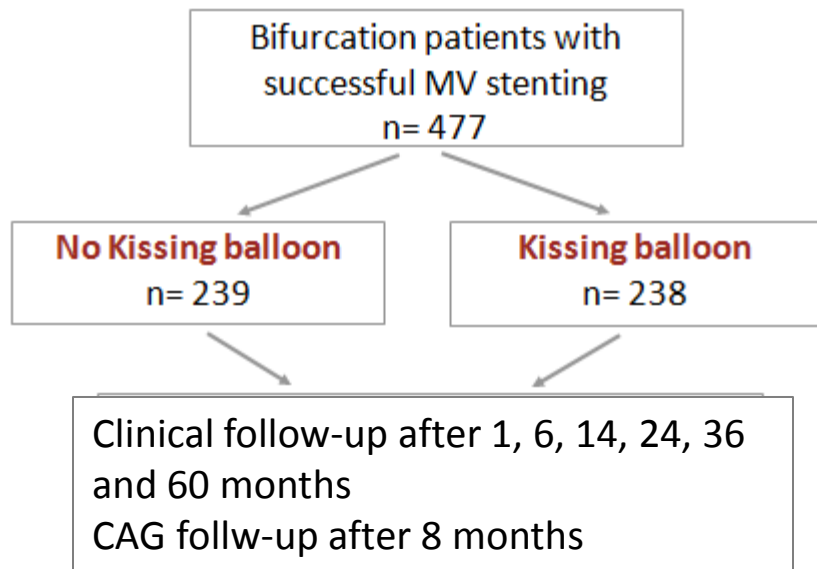


Effect of FKBD on end points

	FKBD+	No-FKBD	P-value
MACE (%)	18	24	0.3
Non-procedural MI (%)	5	18	0.001
Definite ST (%)	2	8	0.04

NORDIC III

Nordic-Baltic Bifurcation Study III: A prospective randomized trial of side branch dilatation strategies in patients with coronary bifurcation lesions undergoing treatment with a single stent

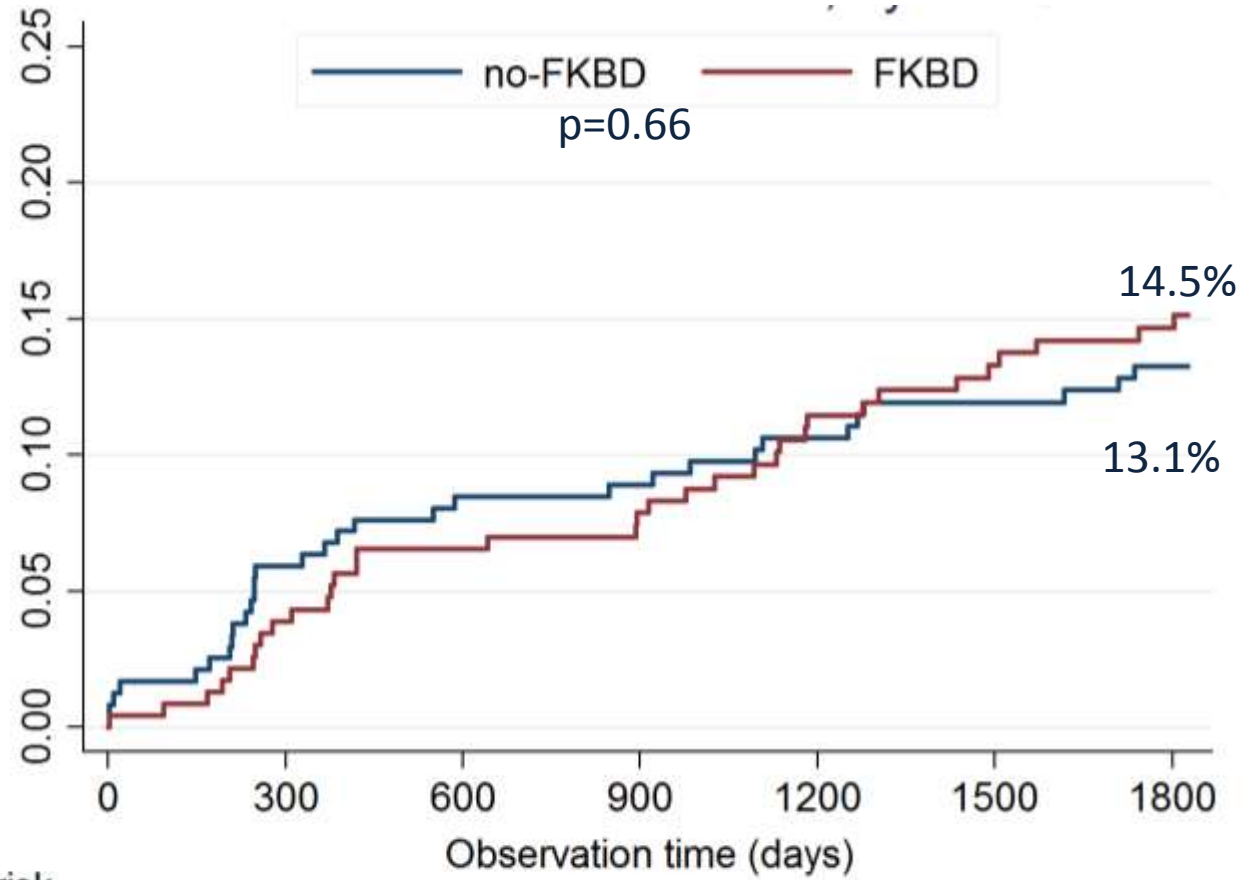


True bifurcations: **50.8%** Kissing vs. **49.0%** No kissing, p=0.71

Medina classification 1,1,1 - 1,0,1 - 0,1,1



Nordic-Baltic III, 5 yr MACE (n=472, 99%)



Number at risk		0	300	600	900	1200	1500	1800
FKBD	235	220	212	206	196	189	184	
no-FKBD	237	222	214	211	207	201	197	

Clinical end-points at 5-year follow-up (n= 472; 99%)

	No-FKBD	FKBD	p
All case death (%)	3.8	9.8	0.01
Cardiac death (%)	0.8	4.3	0.02
Myocardial infarction (%)	4.6	4.3	0.87
TLR (%)	10.1	8.5	0.55
Stent thrombosis, definite (%)	1.3	0.8	0.66

True bifurcation lesions

	No-FKBD (n=116)	FKBD (n=119)	p
MACE (%)	18.1	16.0	0.66
Total death (%)	3.5	8.4	0.09
Cardiac death (%)	1.7	4.2	0.23
Non-procedural MI (%)	6.0	5.9	0.96
Stent thrombosis, definite (%)	1.7	0.4	0.56
Target lesion revascularization (%)	13.8	9.3	0.19

Non-true bifurcation lesions

	No-FKBD (n=121)	FKBD (n=116)	p
MACE (%)	8.3	12.9	0.24
Total death (%)	4.1	11.2	0.034
Cardiac death (%)	0	4.3	0.027
Non-procedural MI (%)	3.3	2.6	0.74
Stent thrombosis, definite (%)	0.8	0	0.32
Target lesion revascularization (%)	6.6	7.7	0.346

Randomized comparison of provisional side branch stenting versus a two-stent strategy for treatment of true coronary bifurcation lesions involving a large side branch.

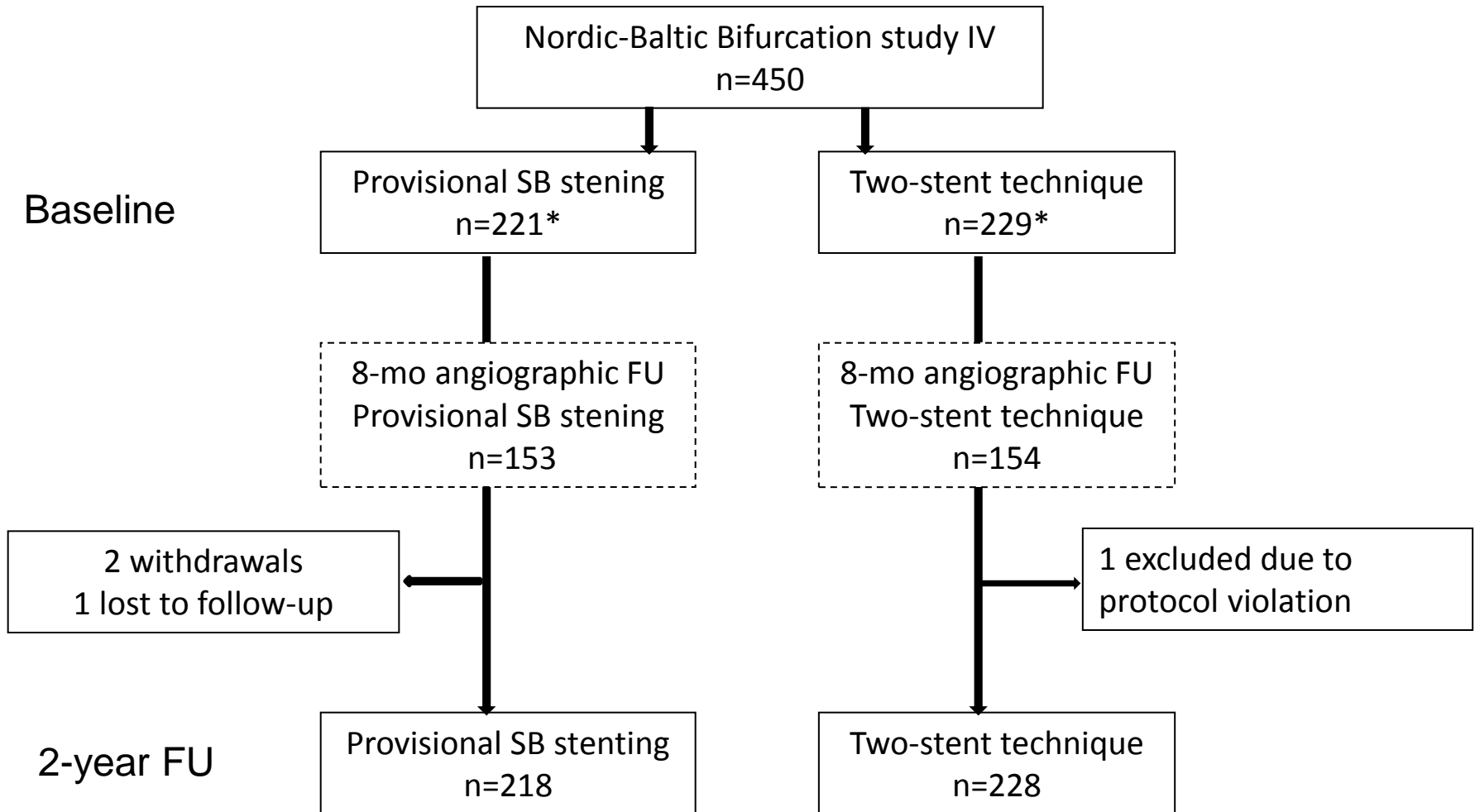
Two-year results in the Nordic-Baltic bifurcation study IV

Indulis Kumsars, Niels R. Holm, Matti Niemelä, Andrejs Erglis, Kari Kervinen, Evald H. Christiansen, Michael Maeng, Andis Dombrovskis, Vytautas Abraitis, Aleksandras Kibarskis, Terje K. Steigen, Thor Trovik, Gustavs Latkovskis, Dace Sondore, Inga Narbute, Christian Juhl Terkelsen, Markku Eskola, Hannu Romppanen, Lisette Okkels Jensen, Mika Laine, Tuija Vasankari, Pål Gunnes, Lasse Hebsgaard, Ole Frobert, Fredrik Calais, Jens Aaroe, Juha Hartikainen, Svend Eggert Jensen, Jan Ravkilde, Thomas Engstrøm, Leif Thuesen, Jens F. Lassen

For the Nordic-Baltic PCI Study Group



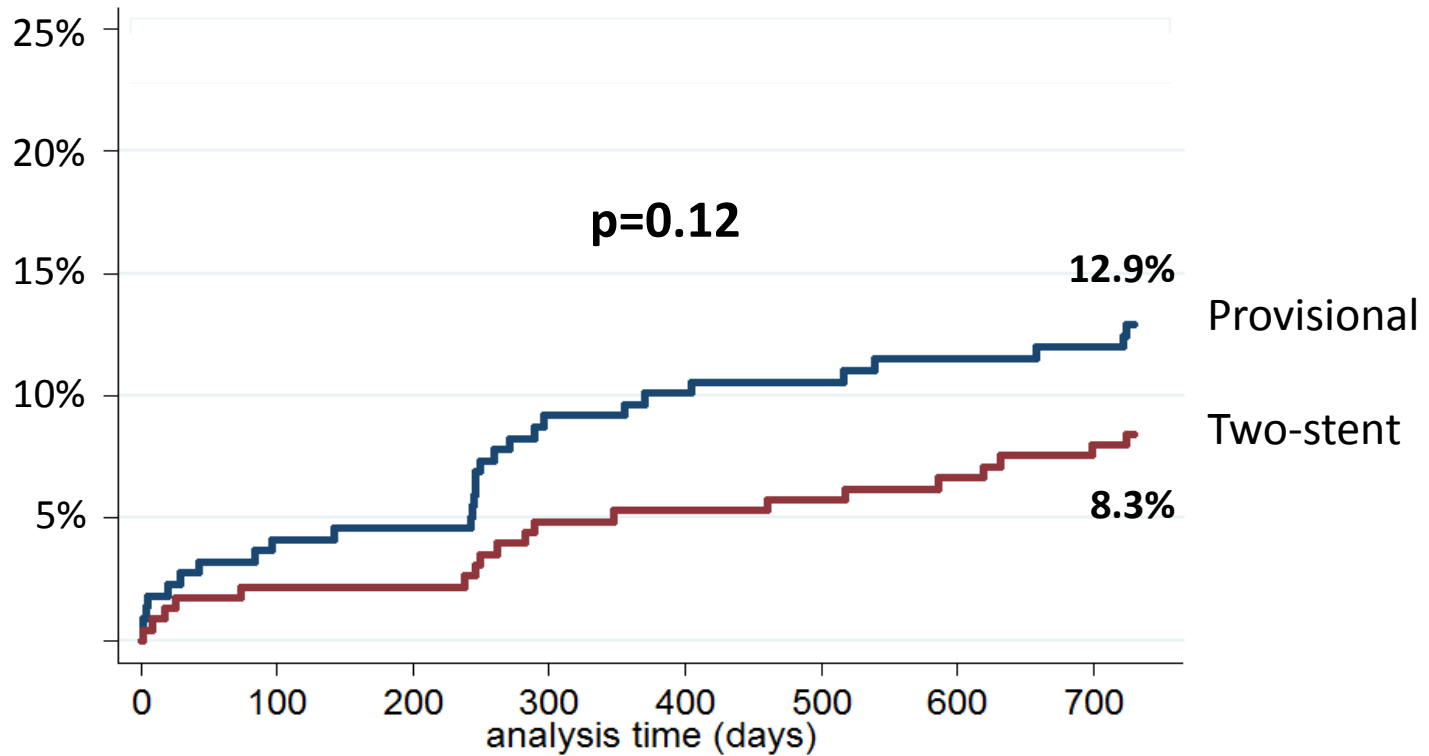
Patient flowchart



*numbers not balanced due to block randomization and sites with less than 4 inclusions



Two-year MACE



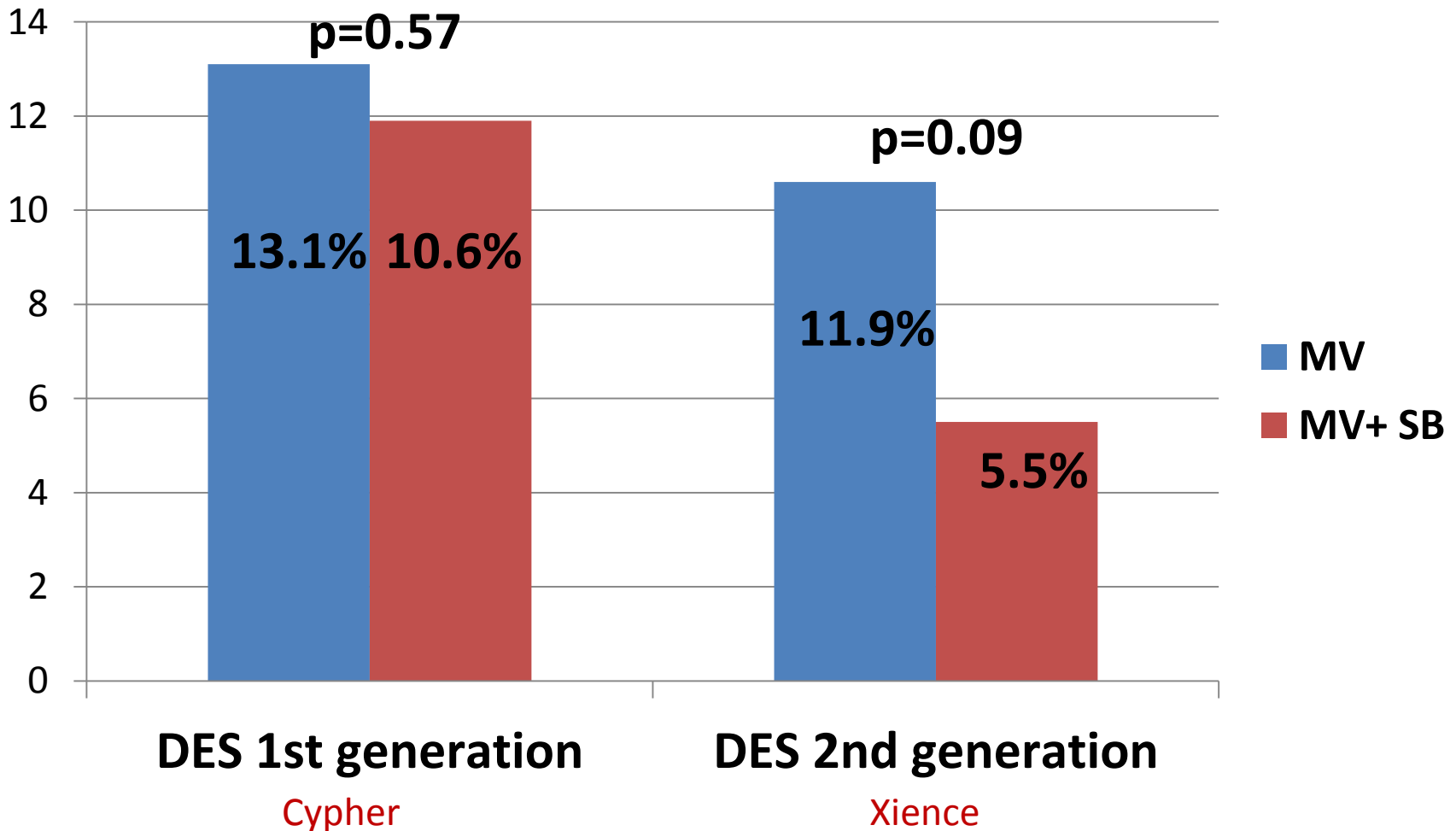
Number at risk		0	100	200	300	400	500	600	700
Two-stent tech.	228	221	221	214	212	211	209	206	
Provisional tech.	218	209	208	196	194	192	189	187	

MACE: cardiac death, non-procedural myocardial infarction, target lesion revascularization and definite stent thrombosis



Nordic-Baltic IV

MACE rate at 2 years follow-up

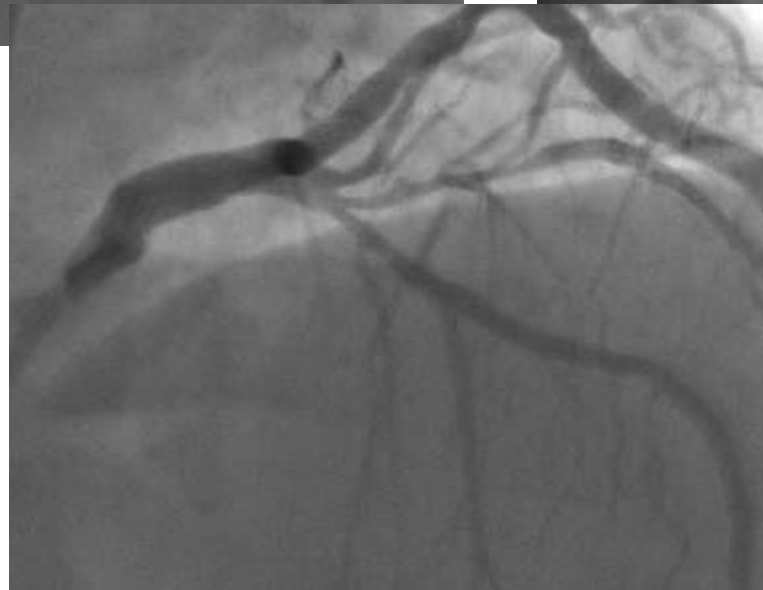
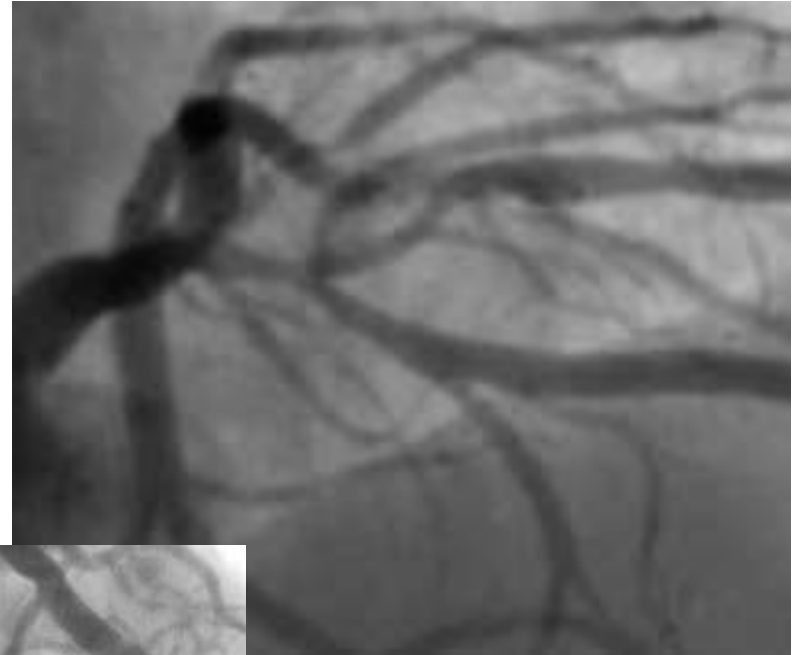
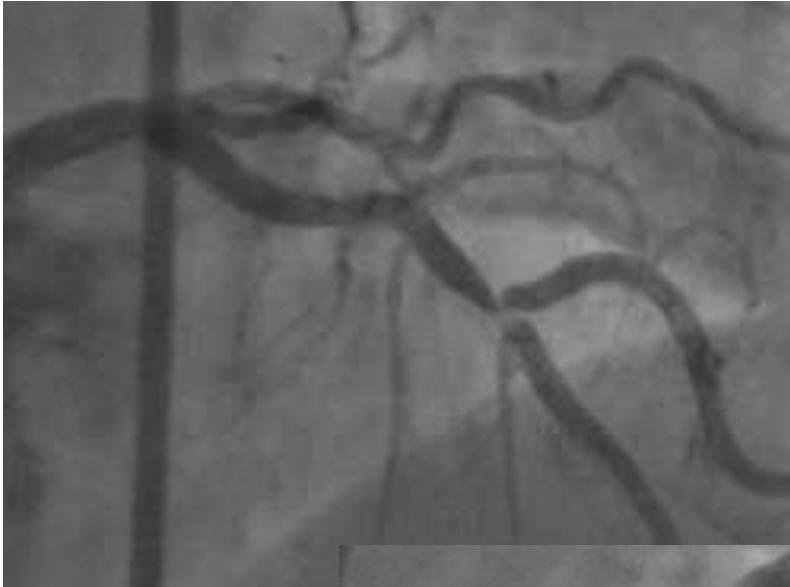


The Nordic-Baltic experience

1. The long term follow-ups are very important to evaluate safety and efficacy of different stenting strategies
2. **Keep it simple!** MV stenting with appropriate POT may be used in most cases
3. True bifurcations with a large SB may need two stents



Medina 1,1,1 and Medina 1,1,1





Thank You for attention!