HYBRID TWO-STEP APPROACH IN TREATMENT OF PATIENTS WITH CORONARY ARTERY DISEASE AND ATRIAL FIBRILLATION

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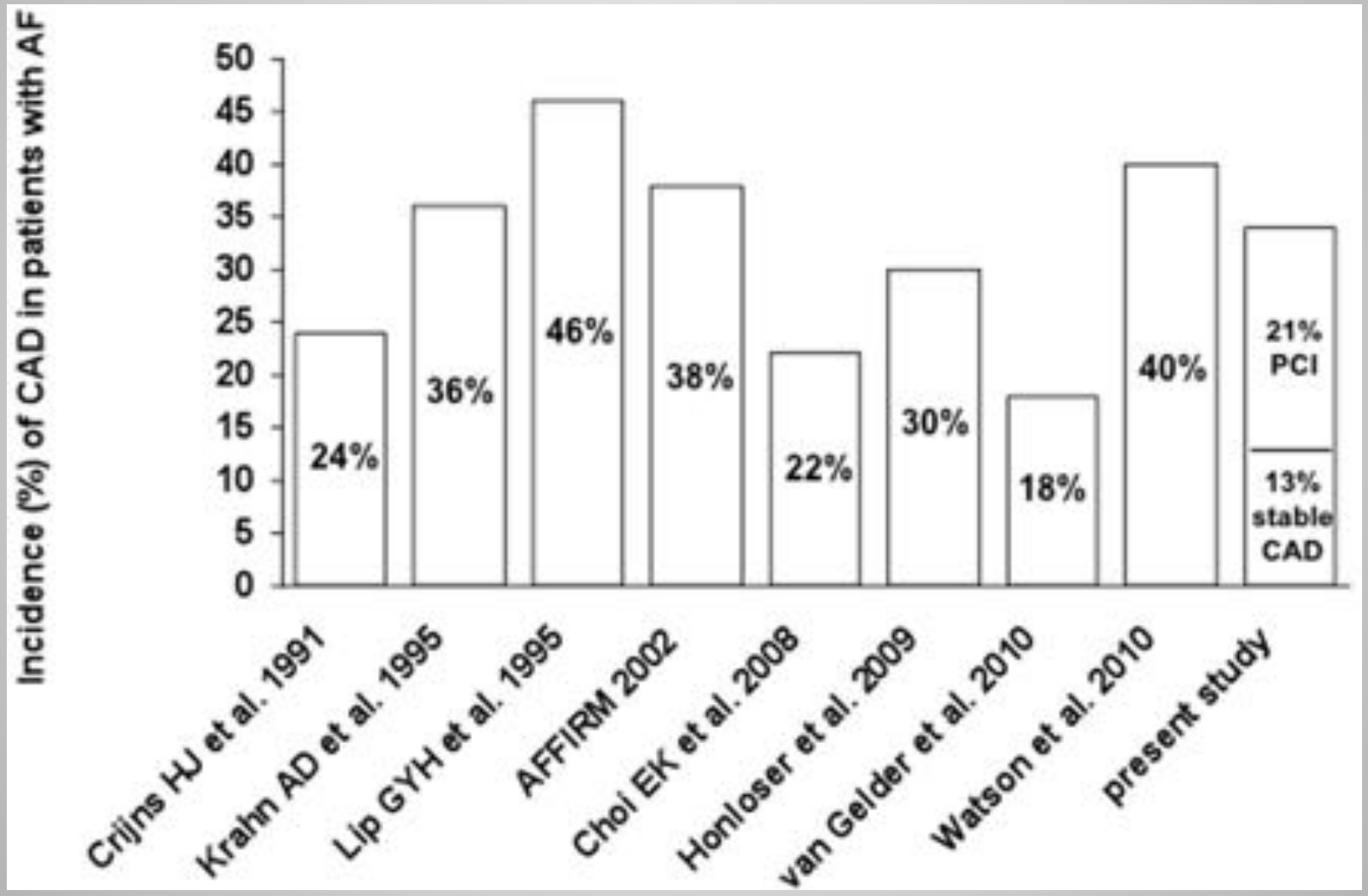
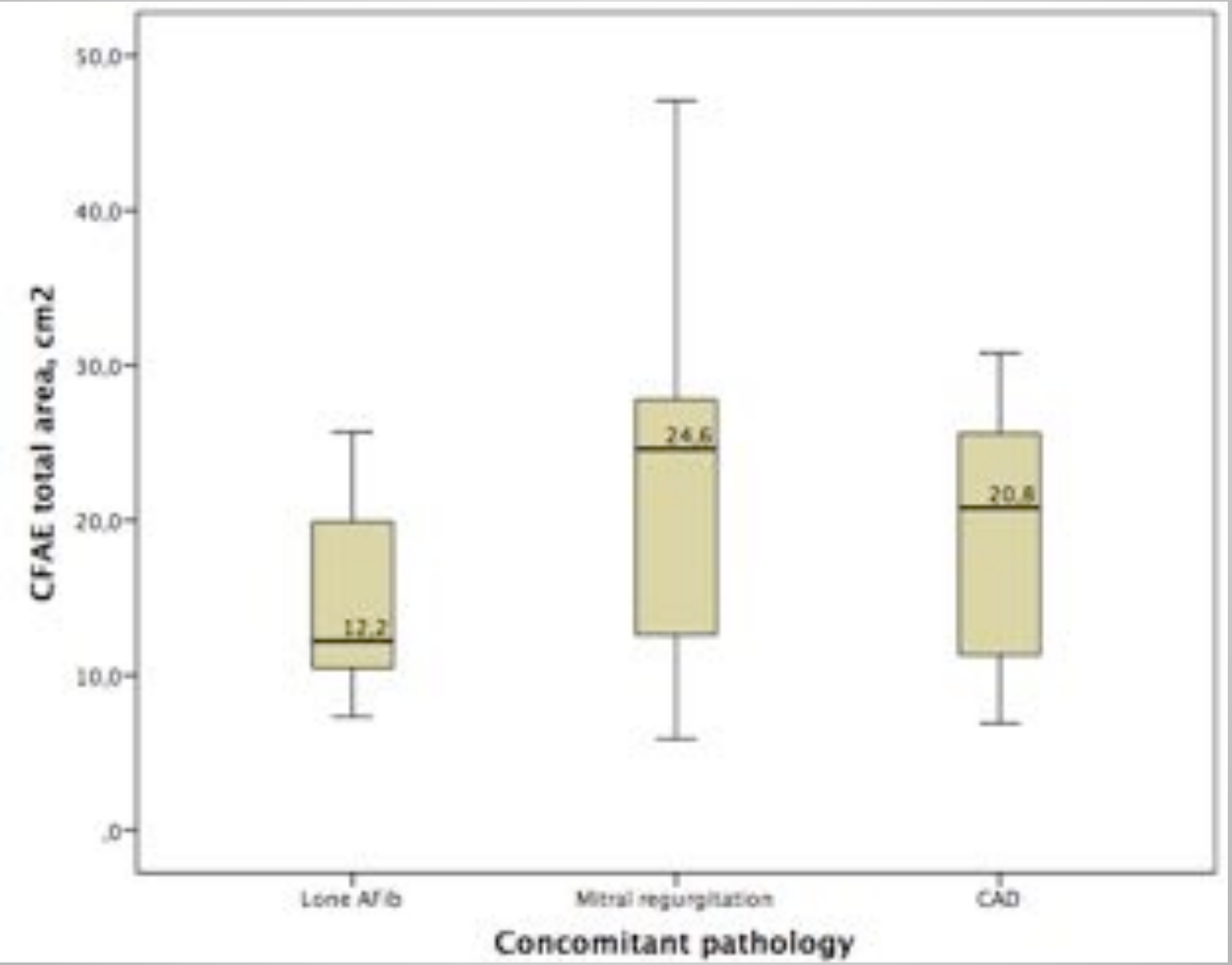
CAD in AF population



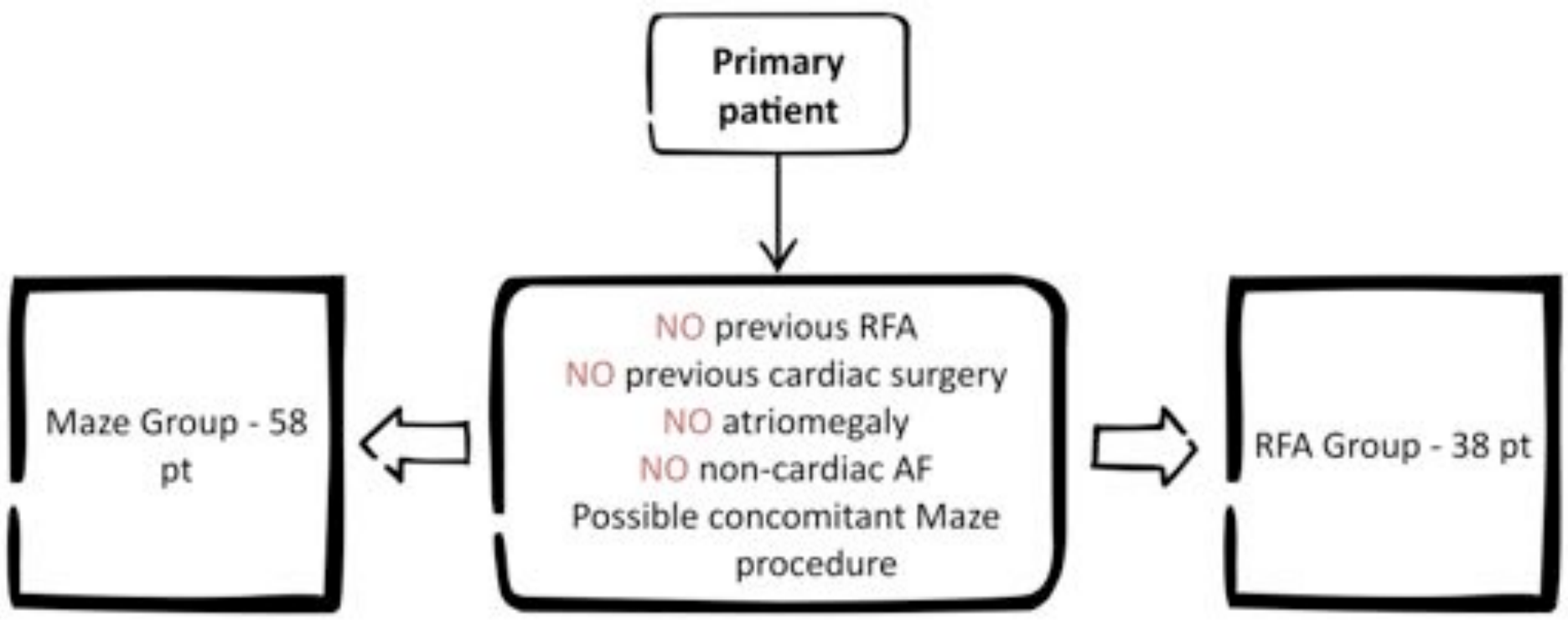
Kralev et al. PLOS ONE, 2011

CFAE in concomitant cardiac pathology



A.Kovalev, 2014, in progress

Design


Primary patient
NO previous RFA
NO previous cardiac surgery
NO atriomegaly
NO non-cardiac AF
Possible concomitant Maze procedure
Maze Group - 58 pt
RFA Group - 38 pt

Clinical characteristics

	By-pass & Maze	By-pass & RFA
Gender m/f	40/18	22/16
Age	51±7,6	56±7,6
Diabetis	3 (5,1%)	4 (10,5%)
Hypertension	21(36,2%)	19(50%)
Renal disfunction	2(3,4%)	2(5,2%)
LA thrombosis	2(3,4%)	0(0%)
TIA	4(6,9%)	4(10,5%)

*p=0,0034

	By-pass & Maze	By-pass & RFA
AF anamnesis	ONLY PERSISTENT FORM*	
AF duration	41,7±9,6	41,2±8,9
Avearge bpm during paroxysm	138±19	143±25

	By-pass & Maze	By-pass & RFA
NYHA		
I	3(5,2%)	3(7,9%)
II	32(55,2%)	20(52,7%)
III	21(36,2%)	14(36,8%)
IV	2% (3,4%)	1 (2,6%)

EchoCG and CT

Attribute	Group	Mean	St. deviation	p
LVES, cm	Bypass+RFA	3,255	1,0752	0,373
	Bypass+Maze	3,422	0,5156	
LVED, cm	Bypass+RFA	5,359	0,58	0,238
	Bypass+Maze	5,196	0,5568	
ESV, ml	Bypass+RFA	57,21	24,257	0,154
	Bypass+Maze	49,56	20,235	
EDV, ml	Bypass+RFA	145,46	37,027	0,061
	Bypass+Maze	129,89	31,582	
SV, ml	Bypass+RFA	89,04	21,729	0,141
	Bypass+Maze	80,45	20,266	
LVEF, %	Bypass+RFA	62,34	9,488	0,946
	Bypass+Maze	62,49	8,564	
dLA, cm	Bypass+RFA	4,546	0,7129	0,983
	Bypass+Maze	4,542	0,8865	
LA LD, cm	Bypass+RFA	6,356	0,654	0,21
	Bypass+Maze	6,881	1,1617	
LA AP, cm	Bypass+RFA	4,878	0,8333	0,333
	Bypass+Maze	4,488	1,0786	
LA TD, cm	Bypass+RFA	7,078	0,8772	0,367
	Bypass+Maze	6,708	1,0951	
LA vol, ml	Bypass+RFA	130	36,893	0,708
	Bypass+Maze	136,95	70,569	
RSPV, cm	Bypass+RFA	2,073	0,2987	0,275
	Bypass+Maze	1,95	0,3658	
RIPV, cm	Bypass+RFA	1,78	0,4346	0,218
	Bypass+Maze	1,631	0,3247	
LSPV, cm	Bypass+RFA	2,036	0,2499	0,282
	Bypass+Maze	1,927	0,3244	
LIPV,cm	Bypass+RFA	1,843	0,1453	0,065
	Bypass+Maze	1,669	0,3234	

STUDY PROTOCOL

Intraoperative stage

Bypass+Maze

- On-pump/beating heart
- Mono-, bipolar RFA, Cryoablation
- Transemurality control
- Bidirectional conduction block
- LOM ablation/resection
- LAA ligature/removal

Bypass+RFA

- Step 1:
  - On-pump/beating heart
  - LAA ligature/removal
  - Amiodaron 15 mg/kg/d pre- and postoperative
  - DDD/AAI pacing for 1-3 days
- Step 2:
  - Electroanatomical mapping
  - “Box lesion” ablation
  - Cava-caval and cava-tricuspid lesion

Postoperative stage

- Amiodaron 15 mg/kg/d
- OAC (INR ≥2-3≤)
- Low K^+ prevention
- DDD/AAI pacing for 1-3 days after Maze procedure
- ECG – every day
- Holter – in 7 days
- EchoCG – twice in 3-7 days and before discharge
- Cardioversion – if necessary

Late follow-up

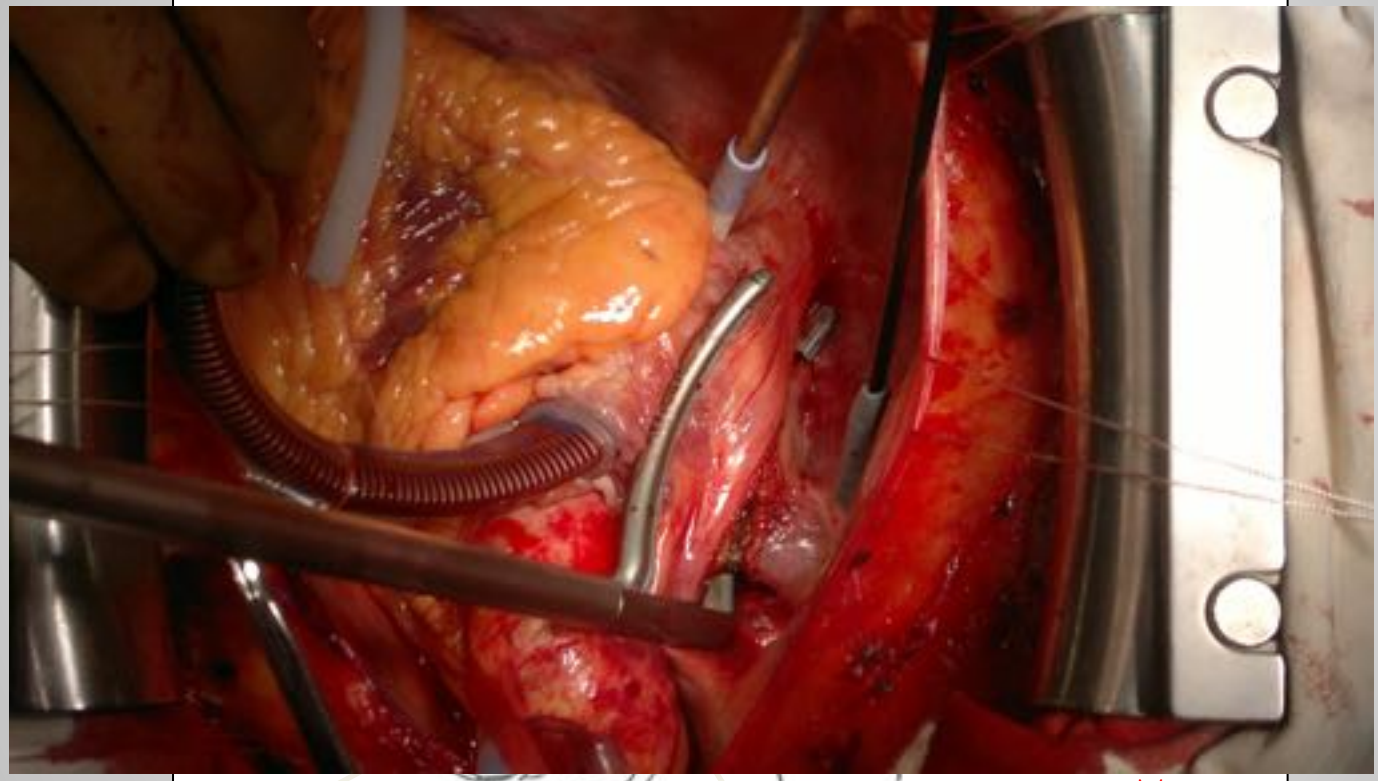
- 1st month - cardiologist: – advanced AAT and OAC control, ECG, cardioversion if necessary
- 3d month – cardiologist: ECG, reduction or canceling of AAT and OAC (if in SR), cardioversion if necessary
- 6th month – cardiac surgeon: ECG, reduction or canceling of AAT and OAC (if in SR), cardioversion if necessary
- Every year – cardiologist/cardiac surgeon: ECG, EchoCG, advanced AAT and OAC control if necessary, cardioversion if necessary

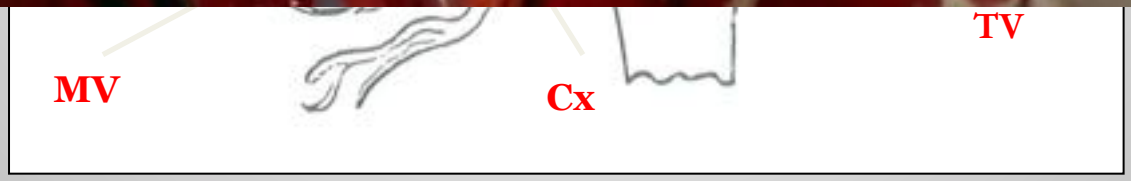
RESULTS

Step 1 – open heart surgery

	By-pass & Maze	By-pass & RFA	p
Euroscore	2,68±1,87	3,5±2,6	0,227
CHA_2DS_2–VASc	2,7±1,2	2,8±1,1	0,651
On-pump time, min	96,3±7,4	84,8±35,2	0,112
Aortic clamp, min	45,4±8,8	43,9±8,2	0,374
Cardioplegia	Blood antegrade/ custodiol	Custodiol	
Ventilation, h	10,2±5,9	7,6±2,5	0,094
LA reduction, n	3	0	
LAA ligature/ removal	47/11	30/8	

Bypass + Maze-4



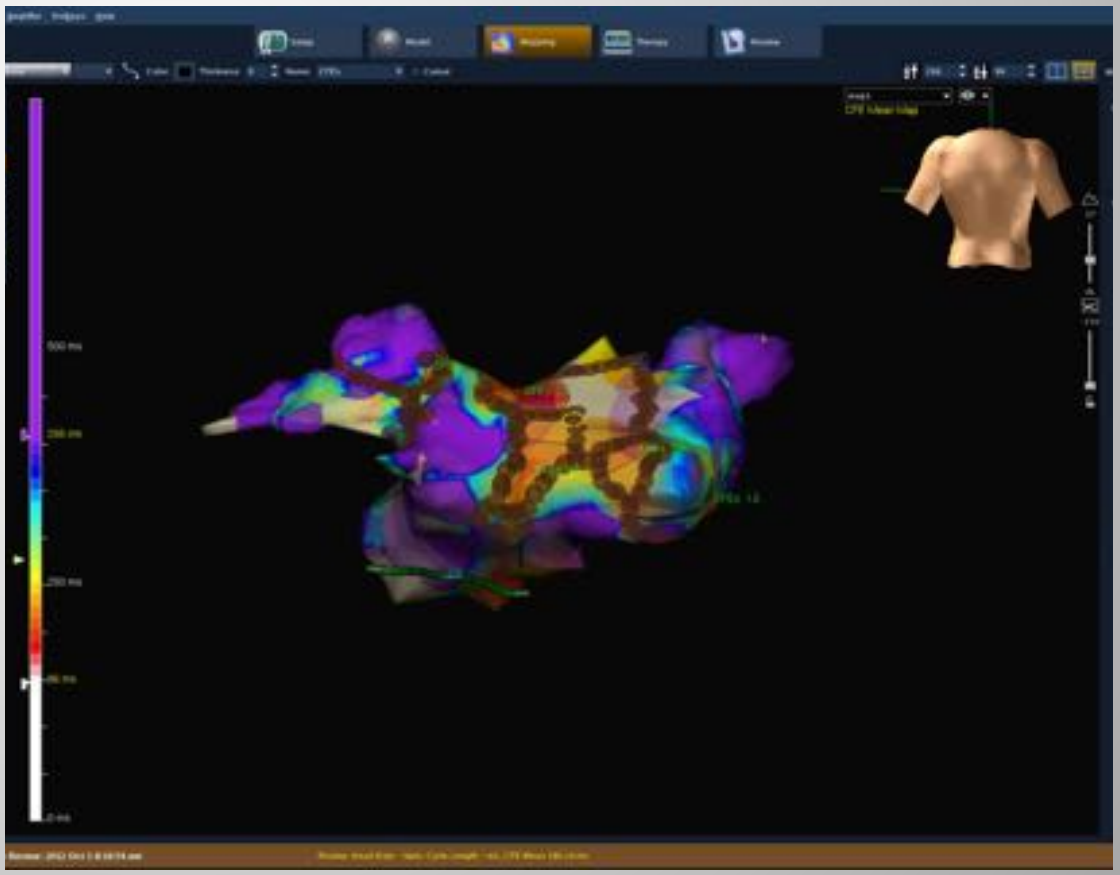


Cryoablation ● RF ablation ····· Surgical Incision ·····

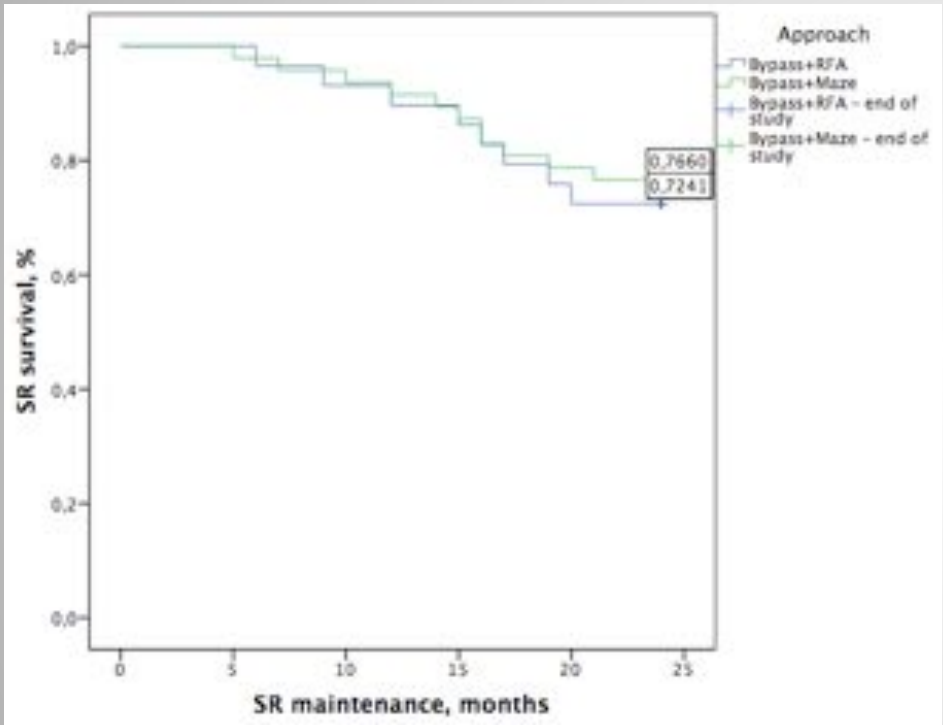
Step 2 - electroanatomical mapping – in 3 months after bypass surgery

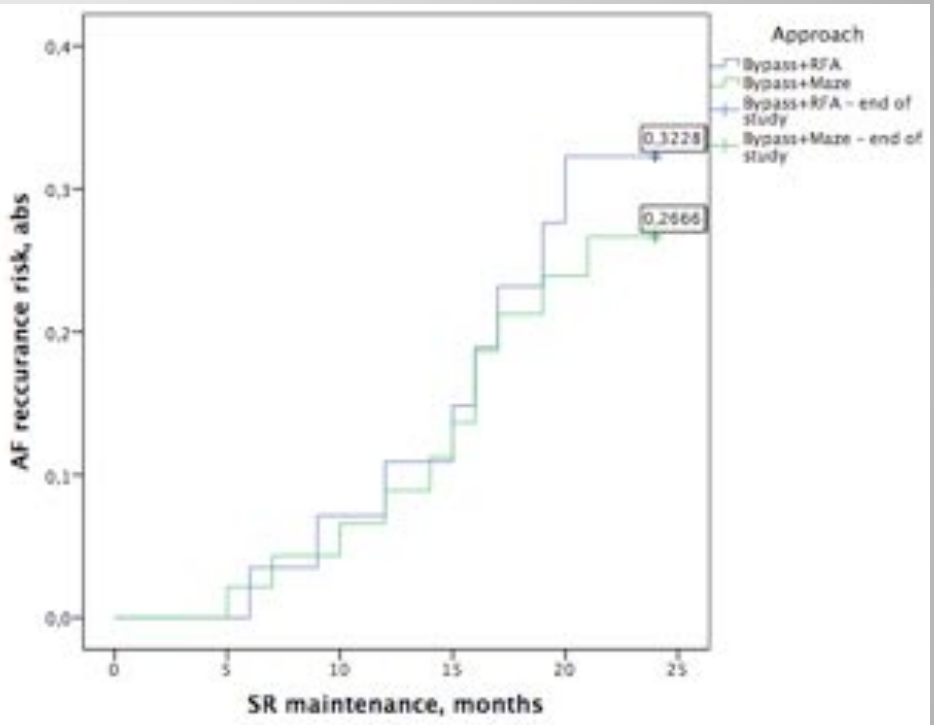
Parameters	Values
P-P sensivity	0,04-0,05 mV
EGM refractory	40 ms
EGM width	20 ms
EGM segment length	8 s
Interpolation	5 mm
Internal/external projection	5 mm

- Lead-up
- Mapping (Step-by-step, OneMap)
- Fusion
- Postprocessing
- CFAE computation



Late p/o follow-up*

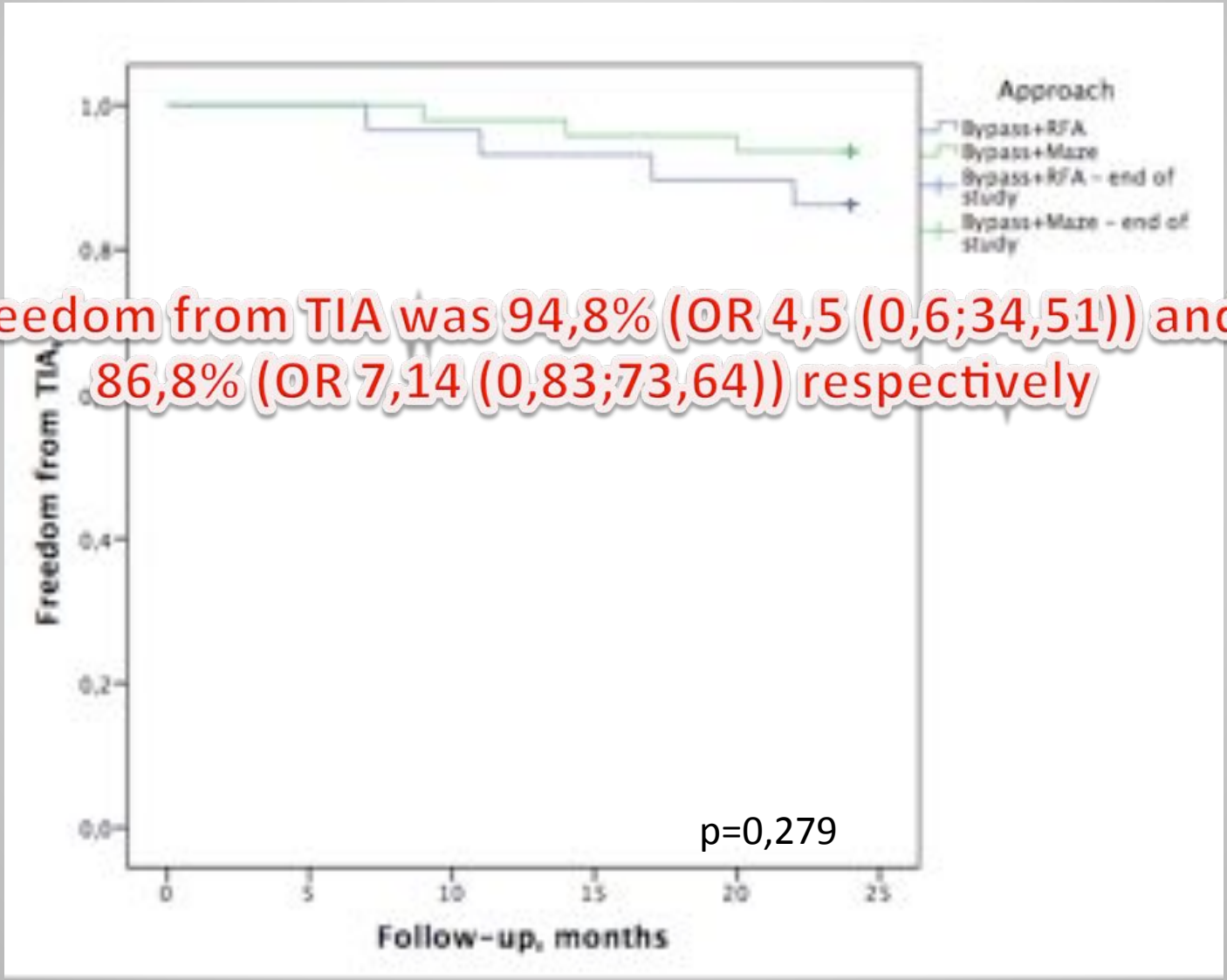




*p=0,881

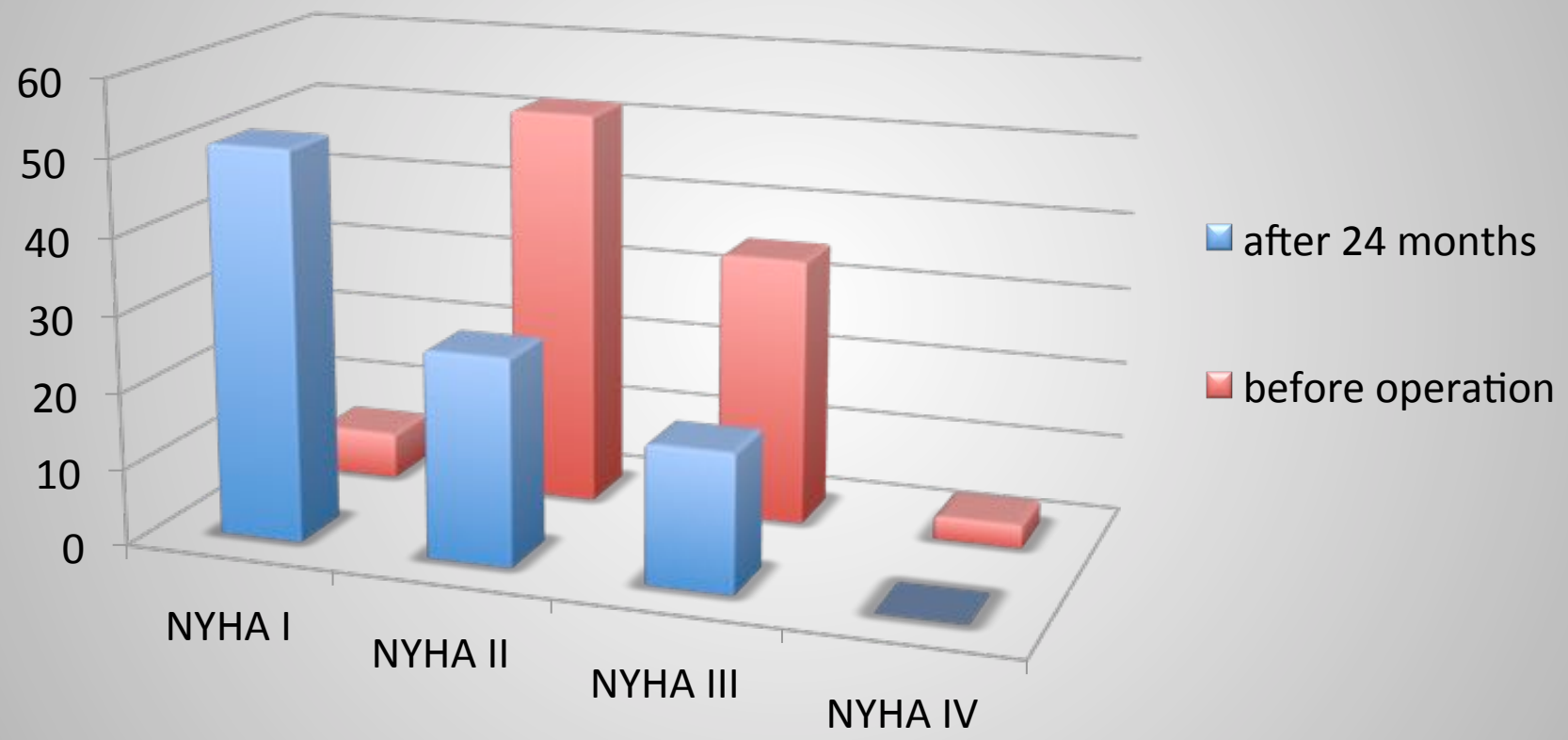
Cumulative HR was 0,99 (0,64;2,05) and 1,2 (0,77;2,73)
Total mortality - 1,04%

Freedom from TIA



Freedom from TIA was 94,8% (OR 4,5 (0,6;34,51)) and 86,8% (OR 7,14 (0,83;73,64)) respectively

HF after operation



Conclusion

- No significant differences between bypass + maze and hybrid approach in patient with persistent AF
- RFA should be performed entirely with 3D mapping systems
- Hybrid AF surgery is useful in patients with :
  - high EuroSCORE
  - expected reverse modeling of LA
  - no LA thrombosis
  - ≤3 coronary artery failure (including LMA and/or proximal LAD stenosis)

Thank You! Grazie!