



VENERDI' 1 MARZO

L'HEART TEAM ALLARGATO. UNA CARDIOCHIRURGIA PER PIÙ OSPEDALI

Massimo Massetti

*Dipartimento di Scienze Cardiovascolari
Università Cattolica del Sacro Cuore
Fondazione Policlinico Universitario A. Gemelli IRCCS, Roma*





UNIVERSITÀ
CATTOLICA
del Sacro Cuore

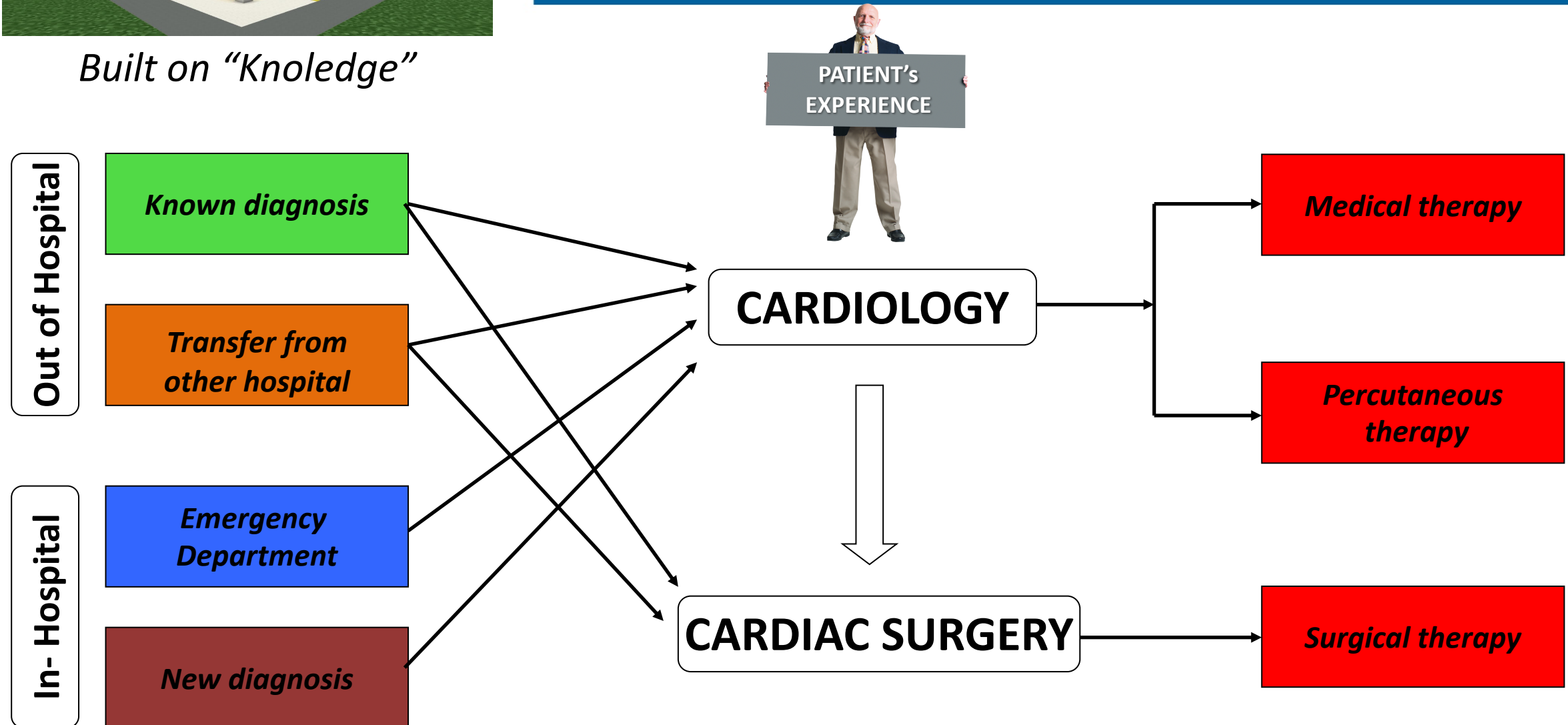
... Why Heart Team?





Built on “Knowledge”

Old Paradigm





UNIVERSITÀ
CATTOLICA
del Sacro Cuore

Mortality in cardiac surgery

AVR vs AVR + CABG:

$\leq 2\%$ vs $> 3\%$

MVPI vs MVPI + CABG:

$\leq 1\%$ vs $> 5\%$

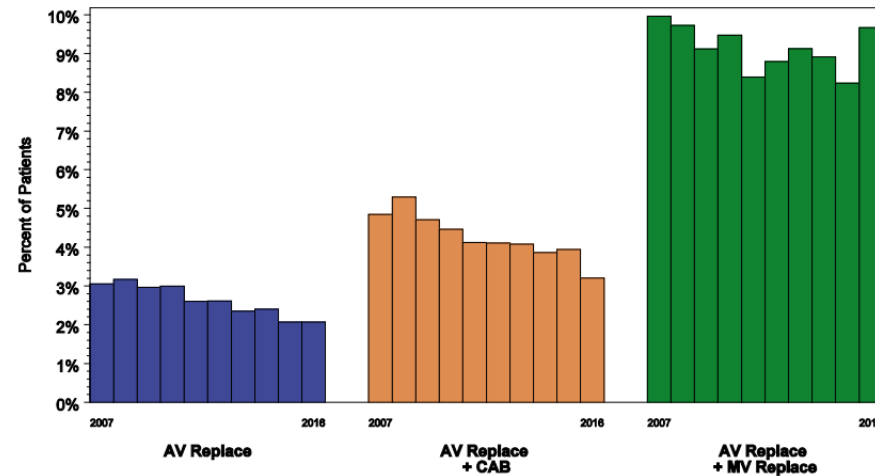
MVR vs MVR + CABG:

$< 5\%$ vs $> 10\%$

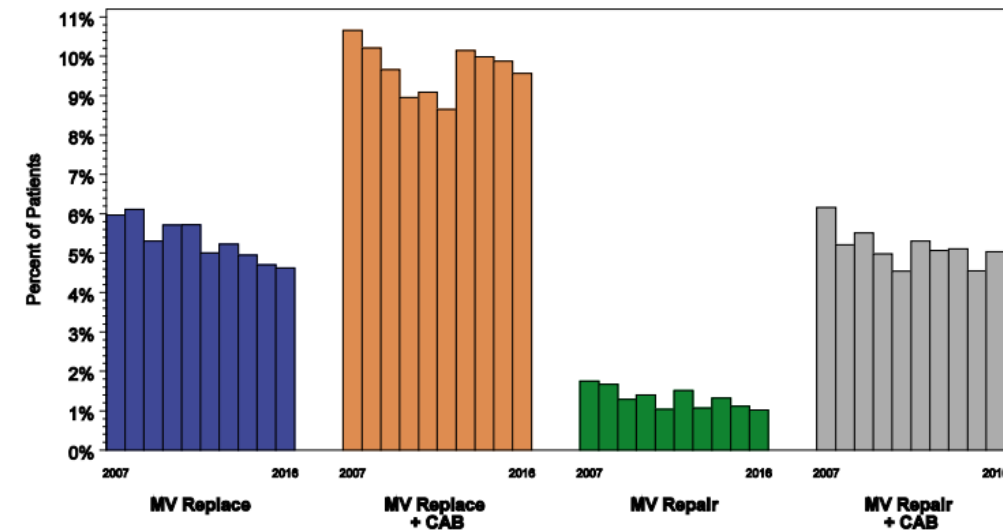
AVR + MVR: $> 9\%$



Unadjusted Aortic Valve Operative Mortality
Yearly over last 10 years



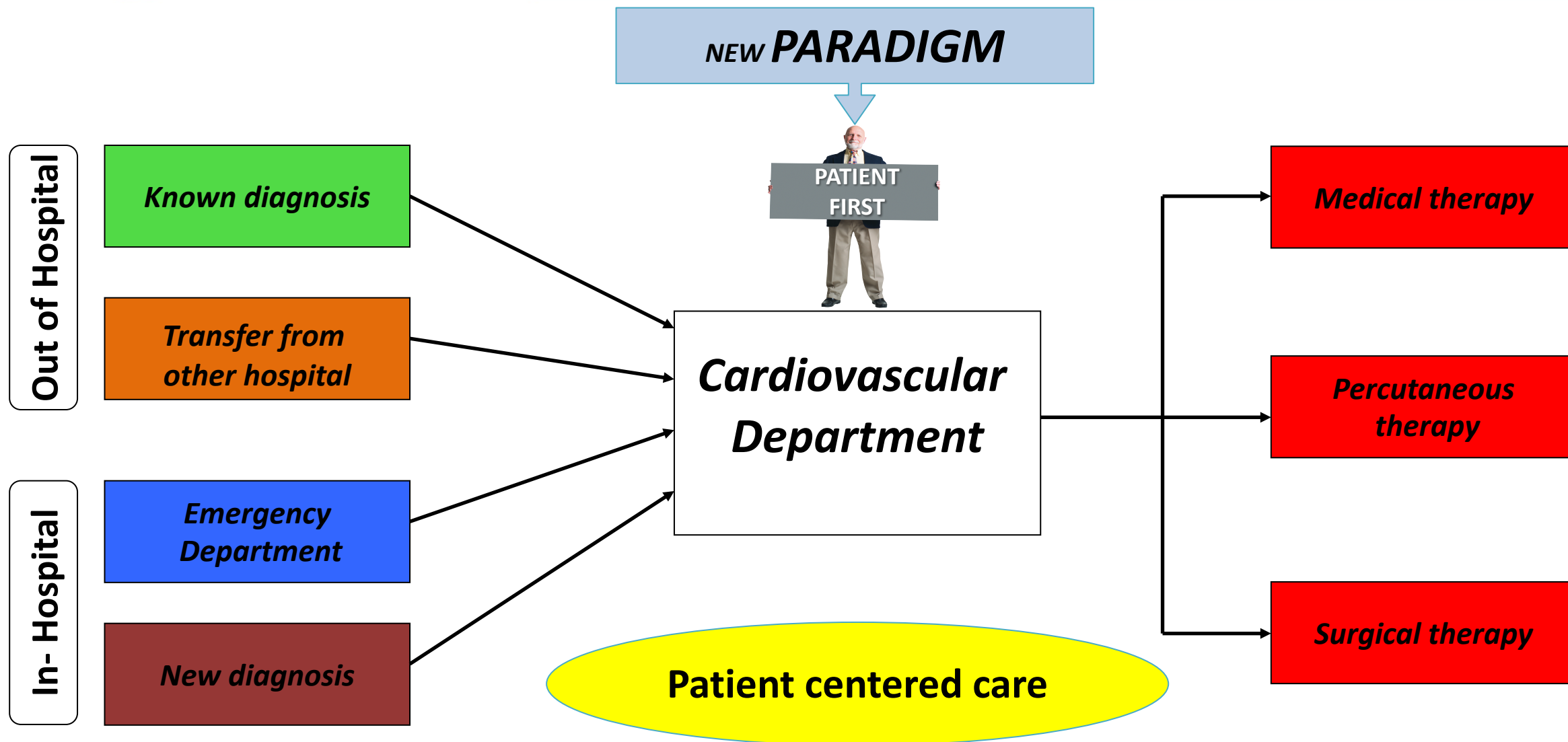
Unadjusted Mitral Valve Operative Mortality
Yearly over last 10 years



STS Adult Cardiac Surgery Database - 2016



The paradigm shift:





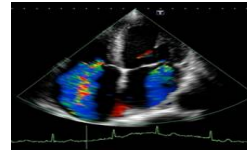
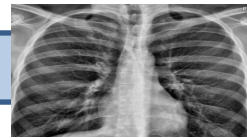
UNIVERSITÀ
CATTOLICA
del Sacro Cuore

Clinical Pathways

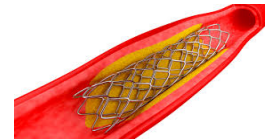
Emergency, urgent or elective admission



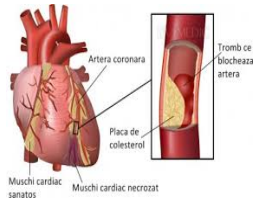
Diagnostic workup



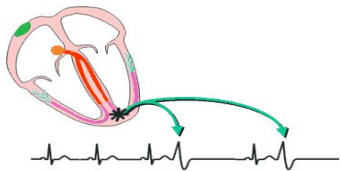
Therapy



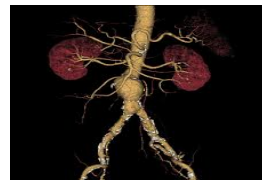
Home
discharge and
follow-up



Ischemic



Rhythm



Aorta & Vascular



Valve Pathology



Heart Failure



UNIVERSITÀ
CATTOLICA
del Sacro Cuore

Heart Team:

Multidisciplinary “Decision Making” Instrument

First Generation Heart Team

On Site daily meeting

2006: Born with the SYNTAX Trial;

2010: ESC Guidelines on myocardial revascularisation;

2012: ESC Guidelines on Valvular Heart Disease

GUIDELINES

Guidelines on the management of valvular heart disease (version 2012)

The Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

2014 ESC/EACTS Guidelines on myocardial revascularization

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

2013



2017

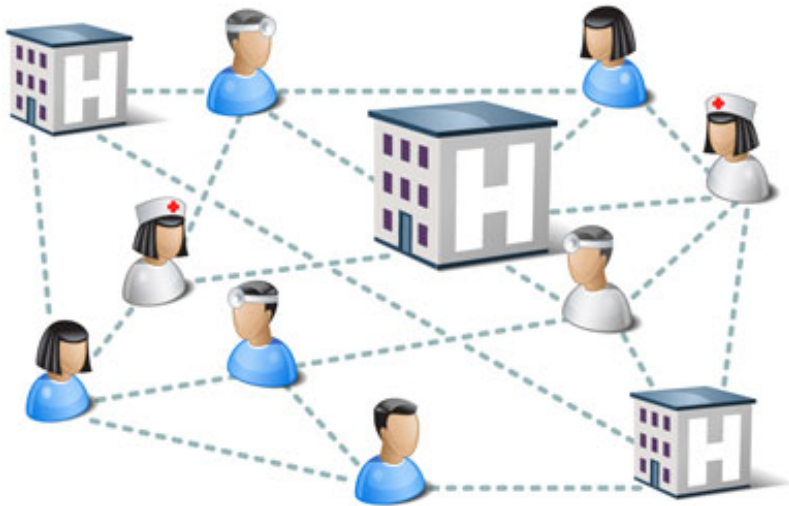




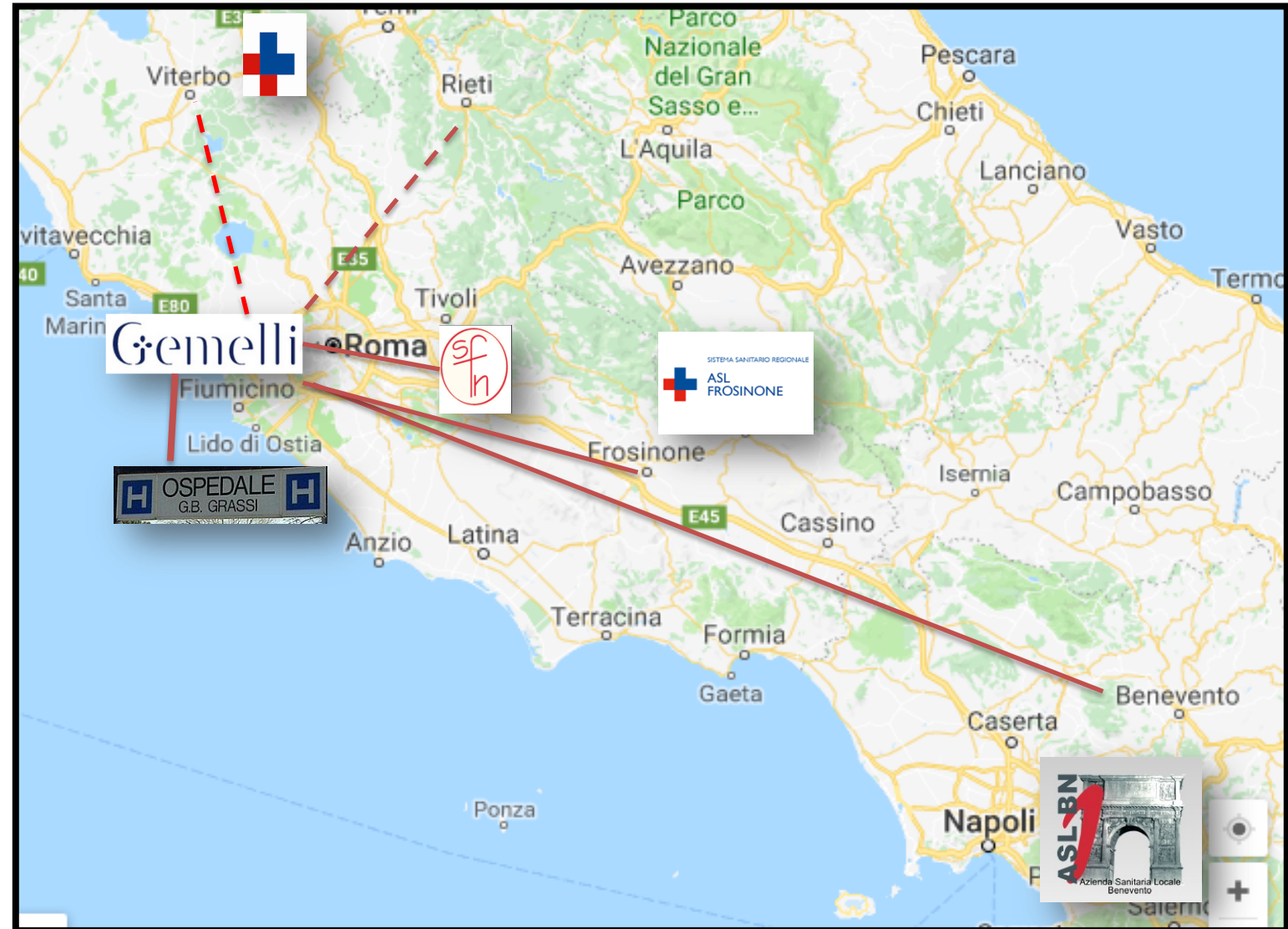
UNIVERSITÀ
CATTOLICA
del Sacro Cuore

E-Heart Team 2.0

*Hub and Spoke
meeting*



E-Heart Team 2.0:





UNIVERSITÀ
CATTOLICA
del Sacro Cuore

The Heart Team

Gemelli

The Cardiac Team

**WALLACE O. AUSTIN, M.D., FORREST H. ADAMS, M.D., and
LESLIE HOLVE, M.D., Los Angeles**

An Introduction to a Symposium on Congenital Heart Disease

Austin WO, Adams FH, Holve L. Calif Med, 1957;86:161.

team.” Great contributions have been made in recent years as a result of the *combined* efforts of many persons working on the problem of cardiovascular disease. The results have been most dramatic in the field of congenital heart disease. It appears that it has been in those institutions and situations where there has been a *team effort* that the contributions have been the greatest.

any board of advisors. The purposes for which the cardiac team here reported upon was formed were:

- ¶ To assist in the resolution of a clinical problem by:
Advising regarding special studies; interpreting results of clinical data; recommending special therapy.
- ¶ To critically evaluate existing diagnostic and therapeutic procedures.
- ¶ To suggest and initiate areas of research.



Previous studies

Heart team discussion in managing patients with coronary artery disease: outcome and reproducibility[†]

Jenny Long^a, Heyman Luckraz^{a*}, Joyce Thekkudan^a, Abdul Maher^a and Michael Norell^b

^a Cardiothoracic Unit, Heart & Lung Centre, New Cross Hospital, Wolverhampton, UK

^b Department of Cardiology, Heart & Lung Centre, New Cross Hospital, Wolverhampton, UK

Introduction of an interdisciplinary heart team-based transcatheter aortic valve implantation programme: short and mid-term outcomes

G. J. Martinez,^{1,2} M. Seco,³ S. K. Jaijee,^{1,2} M. R. Adams,¹ B. L. Cartwright,⁴ P. Forrest,⁴ D. S. Celermajer,¹ M. P. Vallety,⁵ M. K. Wilson⁵ and M. K. C. Ng¹

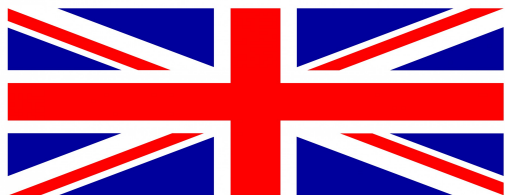
It was demonstrated :

- Reproducibility
- Appropriateness of the outcomes

Most of the studies → only one type of patients (CAD or VHD)



UNIVERSITÀ
CATTOLICA
del Sacro Cuore



The Heart Valve Team

Prevalence & composition of heart valve multi-disciplinary teams within a national health system

Sanjeev Bhattacharyya^a, Christopher Pavitt^b, Guy Lloyd^c, John B. Chambers^{d,*},
on behalf of the British Heart Valve Society

Frequency of valve MDT meetings.

	Weekly	Alternate weeks	Monthly	Alternate months
General valve MDT meeting (n = 24)	19 (79%)	3 (13%)	2 (8%)	0
Aortic MDT (n = 18)	9 (47%)	3 (17%)	6 (32%)	0
Mitral MDT (n = 13)	7 (54%)	3 (23%)	2 (15%)	1 (8%)

Multi-disciplinary team (MDT).

Types of valve cases discussed at valve MDT meetings.

		Aortic MDT meeting (n = 18)	Mitral MDT meeting (n = 13)	General MDT meeting (n = 24)
Aortic valve	All cases	5 (28%)	0	17 (71%)
	High risk	10 (56%)	0	17 (71%)
	TAVI	14 (78%)	0	15 (63%)
Mitral valve	All case	0	6 (46%)	15 (63%)
	High risk	0	9 (69%)	18 (75%)
	MitraClip	0	6 (46%)	7 (29%)
	Repair	0	7 (54%)	15 (63%)

Trans-catheter aortic valve implantation (TAVI) and multi-disciplinary team (MDT).

In summary, under one fifth of all UK hospitals have a dedicated heart valve MDT meeting. The majority of these are used to determine the management of patients with high risk aortic or mitral valve disease or those being considered for trans-catheter valve intervention. Inclusion of complementary specialities including care of the elderly and renal physicians is very limited.



UNIVERSITÀ
CATTOLICA
del Sacro Cuore

Comparison of Patients with Multi-Vessel Disease Treated at Centers With and Without On-Site Cardiac Surgery

Eilon Ram, MD¹, Ilan Goldenberg, MD², Yigal Kassif, MD¹, Amit Segev, MD², Jakob Lavee,
MD¹, Nir Shlomo, MSC², Ehud Raanani, MD¹

Methods: This prospective study included 1063 consecutive patients with multi-vessel disease enrolled between January and April 2013 from all 22 hospitals in Israel that perform coronary angiography and percutaneous coronary intervention (PCI), with or without on-site cardiac surgery services.

Conclusions: Patients with multi-vessel coronary artery disease treated in centers without on-site cardiac surgery services receive a lower rate of appropriate guideline-based intervention with CABG. These findings suggest that a heart-team approach should be mandatory even in centers with stand-alone interventional cardiology units.

Results: Of the 1063 patients, 487 (46%) underwent coronary artery bypass graft (CABG) and 576 (54%) PCI. A higher proportion of patients (65%) underwent PCI in hospitals without on-site cardiac surgery, compared to those with on-site services (46%; $p < 0.001$). Furthermore, patients referred to CABG from hospitals without on-site cardiac surgery had a significantly higher mean SYNTAX score compared to those who underwent CABG in centers with on-site surgery services (29 vs. 26, respectively; $p = 0.018$). Multivariate logistic regression analysis consistently showed that the absence of on-site cardiac surgery and a heart team was independently associated with a 2.5-fold increased likelihood for predicting the referral of PCI rather than CABG (OR=2.54 [95% CI 1.8 - 3.6]).



Methods

- ✓ *From September 2015 to April 2018: enrolled **prospectively 300 patients** discussed during Heart Team at “A. Gemelli” Hospital*
- ✓ The day before the Heart Team:
 - a. clinical cases **individually** to cardiologists and cardiac surgeons
 - b. anonymously expressed **his opinion**: surgical, percutaneous, medical, hybrid therapy or further tests
- ✓ The day after, multidisciplinary decision
- ✓ In-hospital patient's **outcomes**

NOME _____	COGNOME _____	PZ. N. _____
CODICE SANITARIO _____		
DATA DI NASCITA (____ - ____ - ____) ETÀ ____		
DATA DISCUSSIONE (____ - ____ - ____)		
REPARTO _____		
COMPILATORE: O CARDIOCHIRURGO O EMODINAMISTA		
TERAPIA : O CHIRURGICA O PERCUTANEA O IBRIDA O MEDICA O NECESSARI ULTERIORI ESAMI		
DECISIONE FINALE HEART TEAM: : O CHIRURGICA O PERCUTANEA O IBRIDA O MEDICA O NECESSARI ULTERIORI ESAMI		

Journal of Cardiothoracic Surgery



Research article

Open Access

Variations in clinical decision-making between cardiologists and cardiac surgeons; a case for management by multidisciplinary teams?

MA Denvir^{*1}, JP Pell², AJ Lee³, J Rysdale¹, RJ Prescott³, H Eteiba², A Walker⁴, P Mankad⁵ and IR Starkey¹

✓ 6 pts

✓ All pts with CAD

Abstract

Objective: To assess variations in decisions to revascularise patients with coronary heart disease between general cardiologists, interventional cardiologists and cardiac surgeons

Design: Six cases of coronary heart disease were presented at an open meeting in a standard format including clinical details which might influence the decision to revascularise. Clinicians (n = 53) were then asked to vote using an anonymous electronic system for one of 5 treatment options: medical, surgical (CABG), percutaneous coronary intervention (PCI) or initially medical proceeding to revascularisation if symptoms dictated. Each case was then discussed in an open forum following which clinicians were asked to revote. Differences in treatment preference were compared by chi squared test and agreement between groups and between voting rounds compared using Kappa.

Results: Surgeons were more likely to choose surgery as a form of treatment (p = 0.034) while interventional cardiologists were more likely to choose PCI (p = 0.056). There were no significant differences between non-interventional and interventional cardiologists (p = 0.13) in their choice of treatment. There was poor agreement between all clinicians in the first round of voting (Kappa 0.26) but this improved to a moderate level of agreement after open discussion for the second vote (Kappa 0.44). The level of agreement among surgeons (0.15) was less than that for cardiologists (0.34) in Round 1, but was similar in Round 2 (0.45 and 0.45 respectively)

Conclusion: In this case series, there was poor agreement between cardiac clinical specialists in the choice of treatment offered to patients. Open discussion appeared to improve agreement. These results would support the need for decisions to revascularise to be made by a multidisciplinary panel.



Patients' Characteristics

VARIABLE	Patients 1-300	Patients 1-100	Patients 101-200	Patients 201-300	p
Female sex	91 (30.3%)	29 (29%)	25 (25%)	37 (37%)	0.181
Age (years)	71.4 (± 11.2)	73 (± 10.3)	70 (± 11.2)	71 (± 18.8)	0.179
EuroSCORE II mortality risk	3.81% ($\pm 4.7\%$)	3.6% ($\pm 3.3\%$)	3.4% ($\pm 7.8\%$)	3.8 (± 3.7)	0.740
STS mortality risk	3.80 ($\pm 3.96\%$)	4.6% ($\pm 4.6\%$)	2.5% ($\pm 2.9\%$)	3.4 (± 3.4)	0.001
STS morbidity risk	16.47 ($\pm 11.4\%$)	15.4% ($\pm 12.7\%$)	14.5% ($\pm 10.3\%$)	18.1 (± 10.2)	0.052
Hypertension	237 (79%)	85 (85%)	76 (76%)	76 (76%)	0.218
Hypercholesterolemia	160 (53%)	52 (52%)	56 (56%)	52 (52%)	0.870
Diabetes mellitus	106 (35.3%)	44 (44%)	35 (35%)	27 (27%)	0.001
Active smoking	55 (18.3%)	14 (14%)	23 (23%)	18 (18%)	0.287
Ex-smoking	101 (33.6%)	35 (35%)	28 (28%)	38 (38%)	0.373
NHYA Class III-IV	79 (26.3%)	41 (41%)	21 (21%)	16 (16%)	0.001
EF	52.8 ($\pm 12.1\%$)	51.7% ($\pm 10.4\%$)	54.6% ($\pm 11.1\%$)	52.2 (± 14.3)	0.228

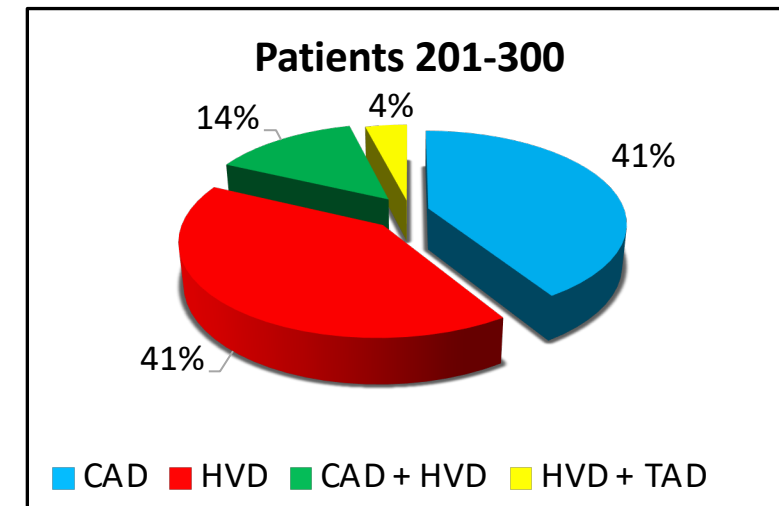
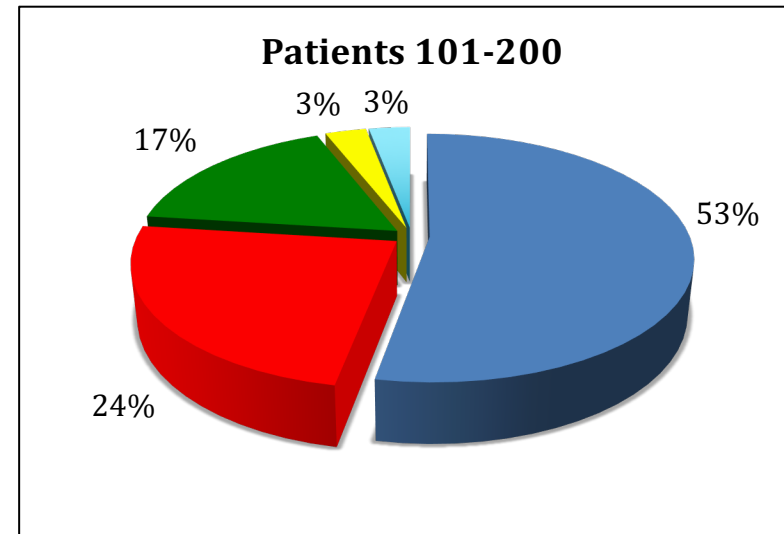
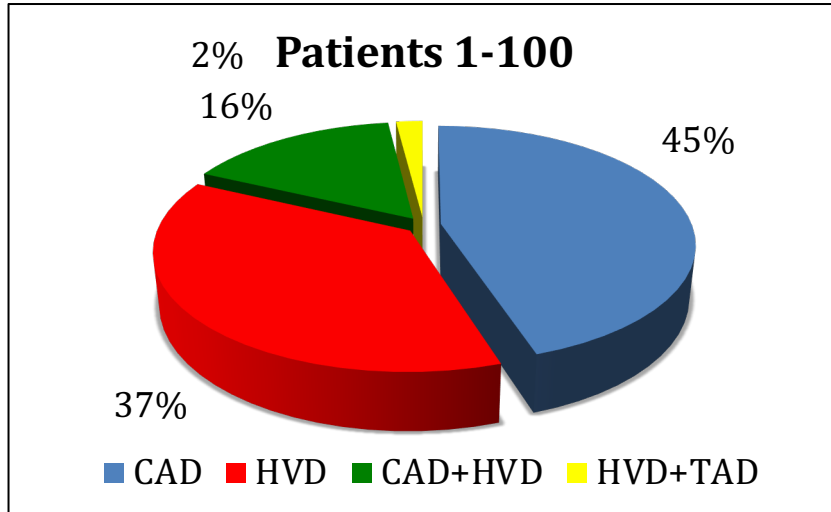


Patients' Characteristics

VARIABLE	Patients 1-300	Patients 1-100	Patients 101-200	Patients 201-300	p
sPAP (mmHg)	37.5 (± 13)	36.6 (± 12.4)	36.6 (± 12.6)	39.2 (± 13.4)	0.334
Atrial fibrillation	37 (12.3%)	14 (14%)	13 (13%)	10 (10%)	0.660
CKD Stage ≥ 2	55 (18.3%)	21 (21%)	18 (18%)	16 (16%)	0.628
COPD	42 (14%)	16 (16%)	14 (14%)	3 (3%)	0.001
PVD	54 (18%)	22 (22%)	17 (17%)	17 (7%)	0.540
Carotid disease	62 (20.5%)	29 (29%)	21 (21%)	4 (4%)	0.001
Previous stroke	10 (3%)	2 (2%)	4 (4%)	4 (4%)	0.673
Neurological dysfunction	13 (4.3%)	2 (2%)	3 (3%)	8 (8%)	0.083
Previous myocardial infarction (>3 months)	49 (16.3%)	25 (25%)	14 (14%)	18 (18%)	0.393
Recent STEMI	22 (7.3%)	7 (7%)	5 (5%)	11 (11%)	0.017
Acute coronary syndrome	59 (19.6%)	28 (28%)	13 (13%)	18 (18%)	0.001
Previous PCI	58 (19.3%)	19 (19%)	23 (23%)	17 (17%)	0.583
Previous cardiac surgery	29 (9,6%)	6 (6%)	9 (9%)	14 (14%)	0.341



Diagnosis at Presentation



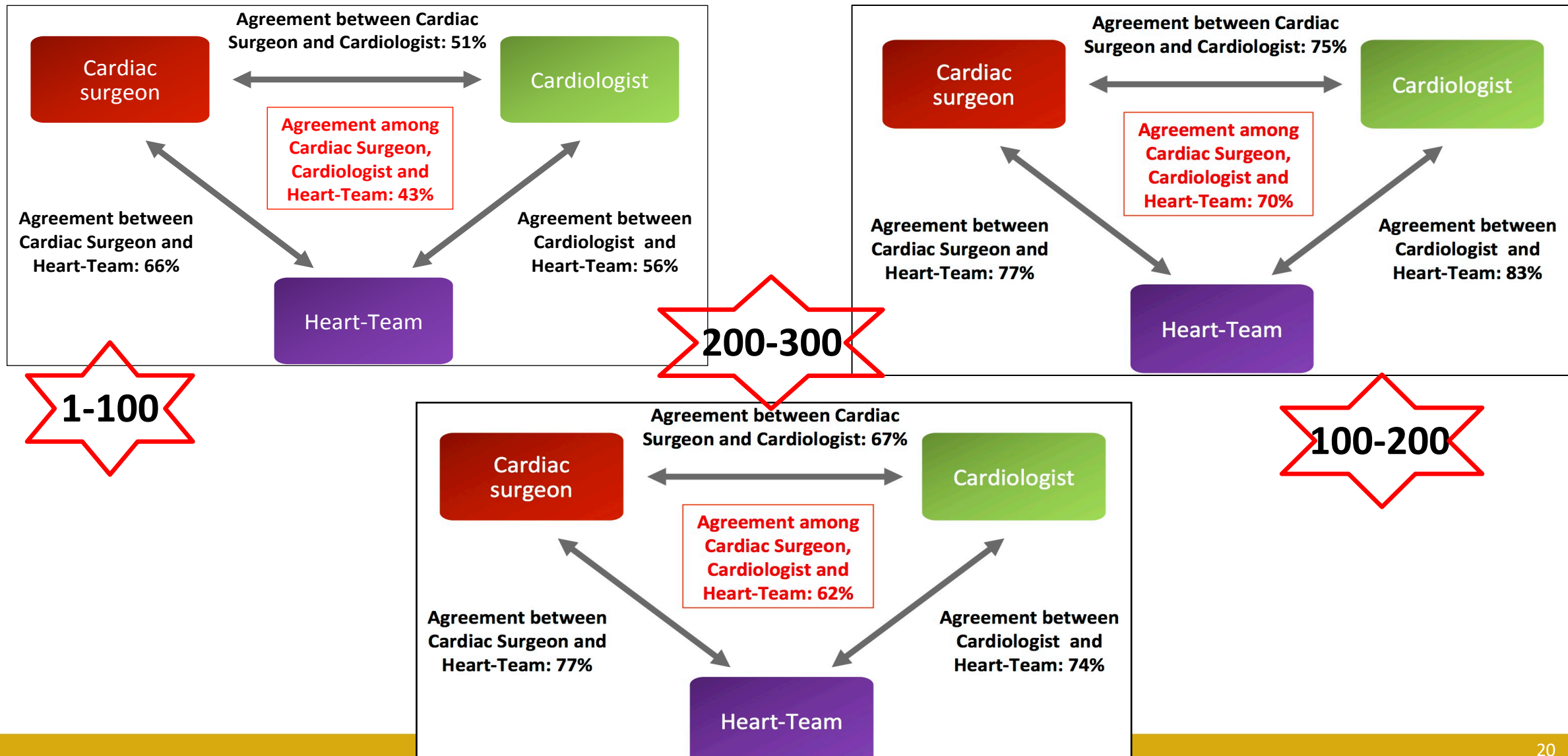
CAD: Coronary Artery Disease; **HVD:** Heart Valve Disease; **TAD:** Thoracic Aorta disease



Treatment Recommendations

	Heart Team			Cardiologist			Cardiac Surgeon		
	1-100	101-200	201-300	1-100	101-200	201-300	1-100	101-200	201-300
Surgery	42 (42%)	51 (51%)	34 (34%)	49 (49%)	56 (56%)	39 (39%)	48 (48%)	54 (54%)	35 (35%)
Percutaneous	34 (34%)	32 (32%)	31 (31%)	44 (44%)	27 (27%)	32 (32%)	31 (31%)	26 (26%)	33 (33%)
Hybrid	5 (5%)	1 (1%)	3 (3%)	2 (2%)	3 (3%)	2 (2%)	8 (8%)	1 (1%)	2 (2%)
Medical Therapy	7 (7%)	12 (12%)	17 (17%)	2 (2%)	11 (11%)	12 (12%)	4 (4%)	17 (17%)	16 (16%)
Need for further investigations	12 (12%)	4 (4%)	15 (15%)	3 (3%)	3 (3%)	15 (15%)	9 (9%)	2 (2%)	14 (14%)

Agreement rates





Inter-rater Agreement

Respondents	Patients	k	SE	p	95% CI
Cardiologist/ Cardiac Surgeon	1-100	0.29	± 0.07	<0.001	0.13-0.44
	101-200	0.60	± 0.08	<0.001	0.45-0.76
	201-300	0.53	± 0.06	<0.001	0.42-0.66
Cardiologist/ Heart Team	1-100	0.35	± 0.08	<0.001	0.28-0.56
	101-200	0.72	± 0.08	<0.001	0.57-0.88
	201-300	0.69	± 0.09	<0.001	0.58-0.81
Cardiac Surgeon/ Heart Team	1-100	0.42	± 0.07	<0.001	0.30-0.54
	101-200	0.61	± 0.08	<0.001	0.46-0.76
	201-300	0.68	± 0.06	<0.001	0.57-0.77
All three	1-100	0.36	± 0.05	<0.001	0.28-0.43
	101-200	0.65	± 0.05	<0.001	0.54-0.77
	201-300	0.79	± 0.05	<0.001	0.72-0.85

k value	Strength of agreement beyond chance
<0	Poor
0.00-0.20	Slight
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.00	Almost perfect



	Patients 1-100	Patients 101-200	Patients 201-300
Death	0 (0%)	2 (2%)	0 (0%)
Stroke	1 (1%)	2 (2%)	0 (0%)
TIA	1 (1%)	0 (0%)	0 (0%)
STEMI	2 (2%)	0 (0%)	0 (0%)
NSTEMI	1 (1%)	0 (%)	1 (1%)

TIA: Transient Ischemic Attack; **STEMI:** ST elevation myocardial infarction; **NSTEMI:** non-ST elevation myocardial infarction

Patients 1-100: One stroke, one TIA and one STEMI among patients who underwent surgery and two NSTEMI in patients who underwent percutaneous treatment.

Patients 101-200: One death in a patient for whom was indicated mitral valve surgery plus coronary artery bypass grafting who was not operated due to new-onset sepsis and later developed cardiac arrest complicated by neurological injury and died of respiratory complications and one death in a patient who underwent transcatheter aortic valve implantation complicated by perforation of the left ventricle



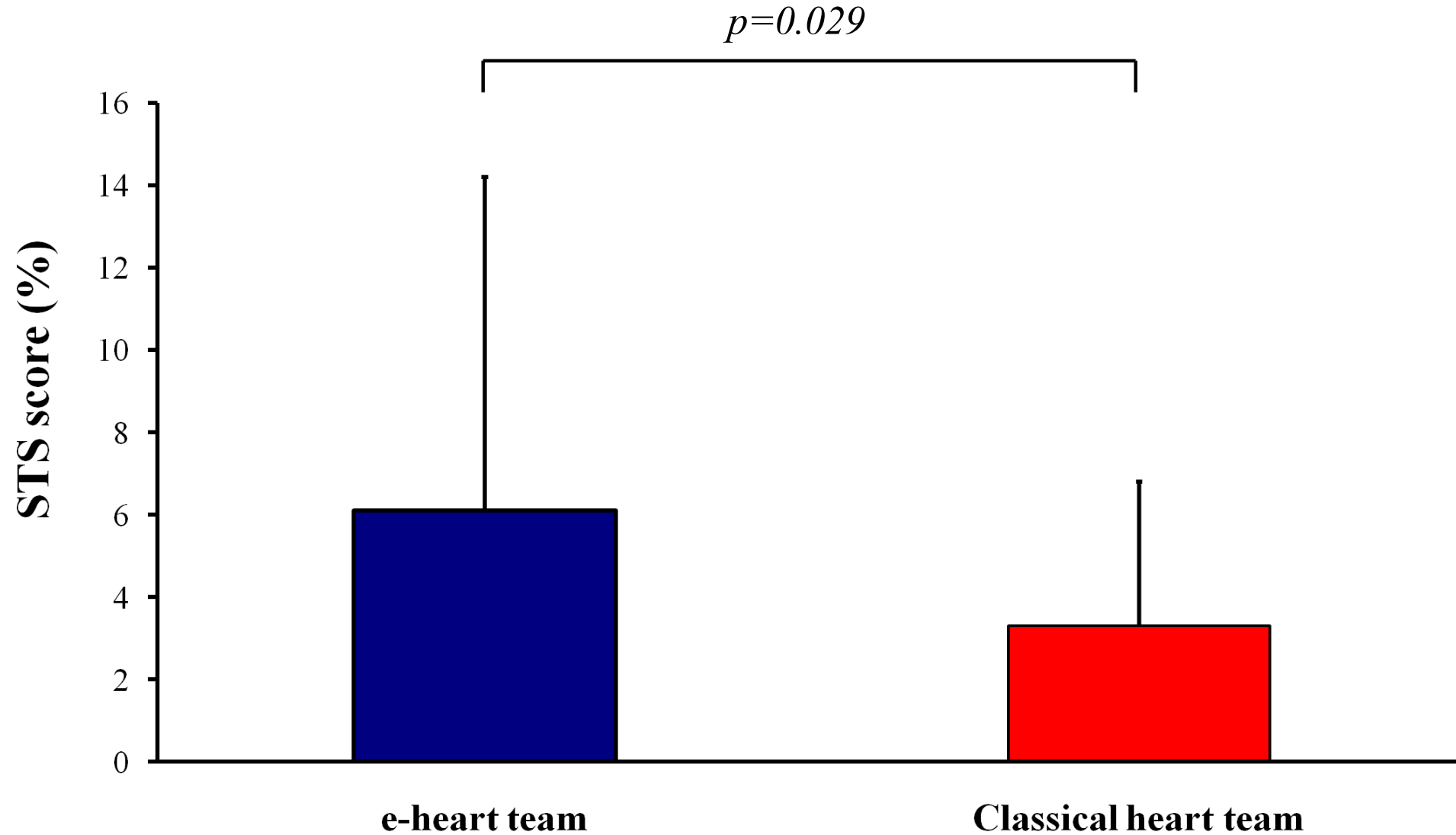
The clinical characteristics of Spoke and Hub centers' patients

	FBF Spoke center 62 pts	GH Hub center 42 pts	<i>p</i>
Age (years)	68 ± 12	70 ± 13	<i>NS</i>
Gender (Male,%)	33 (53%)	16 (38%)	<i>NS</i>
Previous cardiac surgery (%)	19 (31%)	8 (19%)	<i>NS</i>
NYHA ≥2 (%)	50 (81%)	26 (62%)	<i>0.030</i>
Ejection fraction (%)	53 ± 12	56 ± 13	<i>NS</i>
Aortic stenosis (%)*	14 (22%)	18 (43%)	<i>0.031</i>
Aortic regurgitation (%)*	9 (14%)	12 (29%)	<i>NS</i>
Mitral regurgitation (%)*	21 (34%)	13 (31%)	<i>NS</i>
Mitral stenosis (%)*	8 (13%)	1 (2%)	<i>0.05</i>
Prosthetic valve failure	7 (11%)	2 (5%)	<i>NS</i>

*Valvular heart disease alone or associated with other disorder



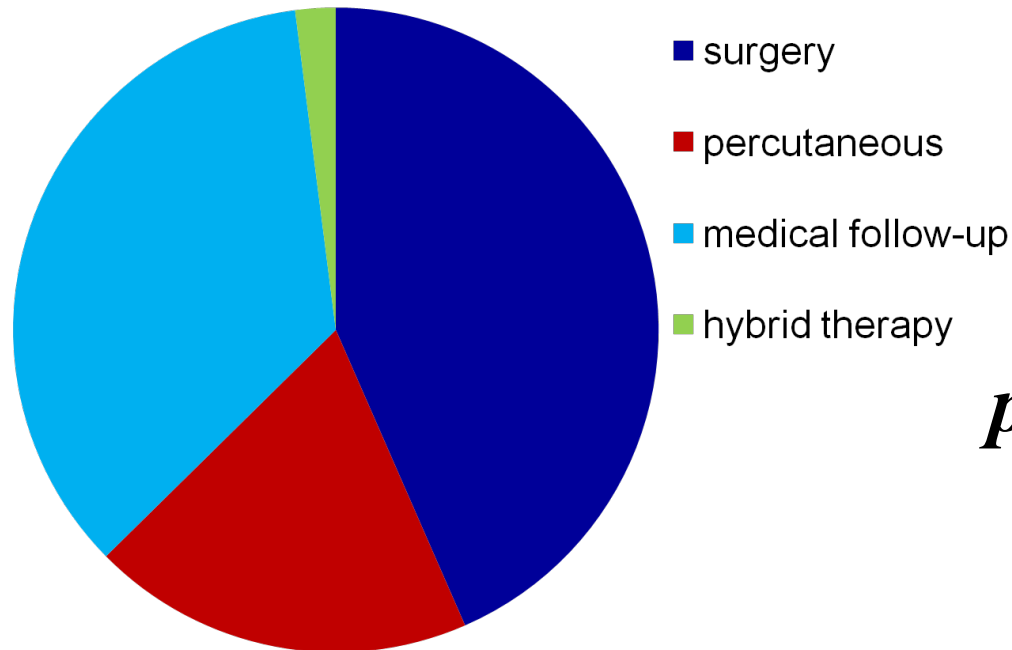
STS score



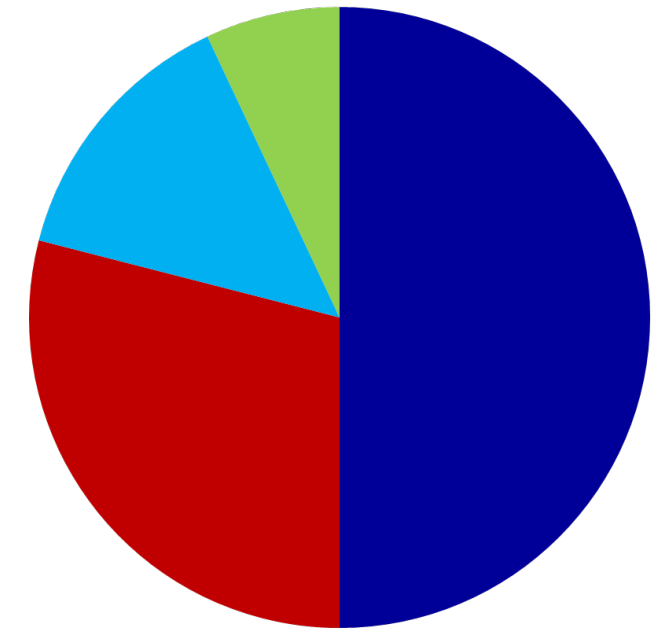


Results-1

e-heart team



Classical heart team

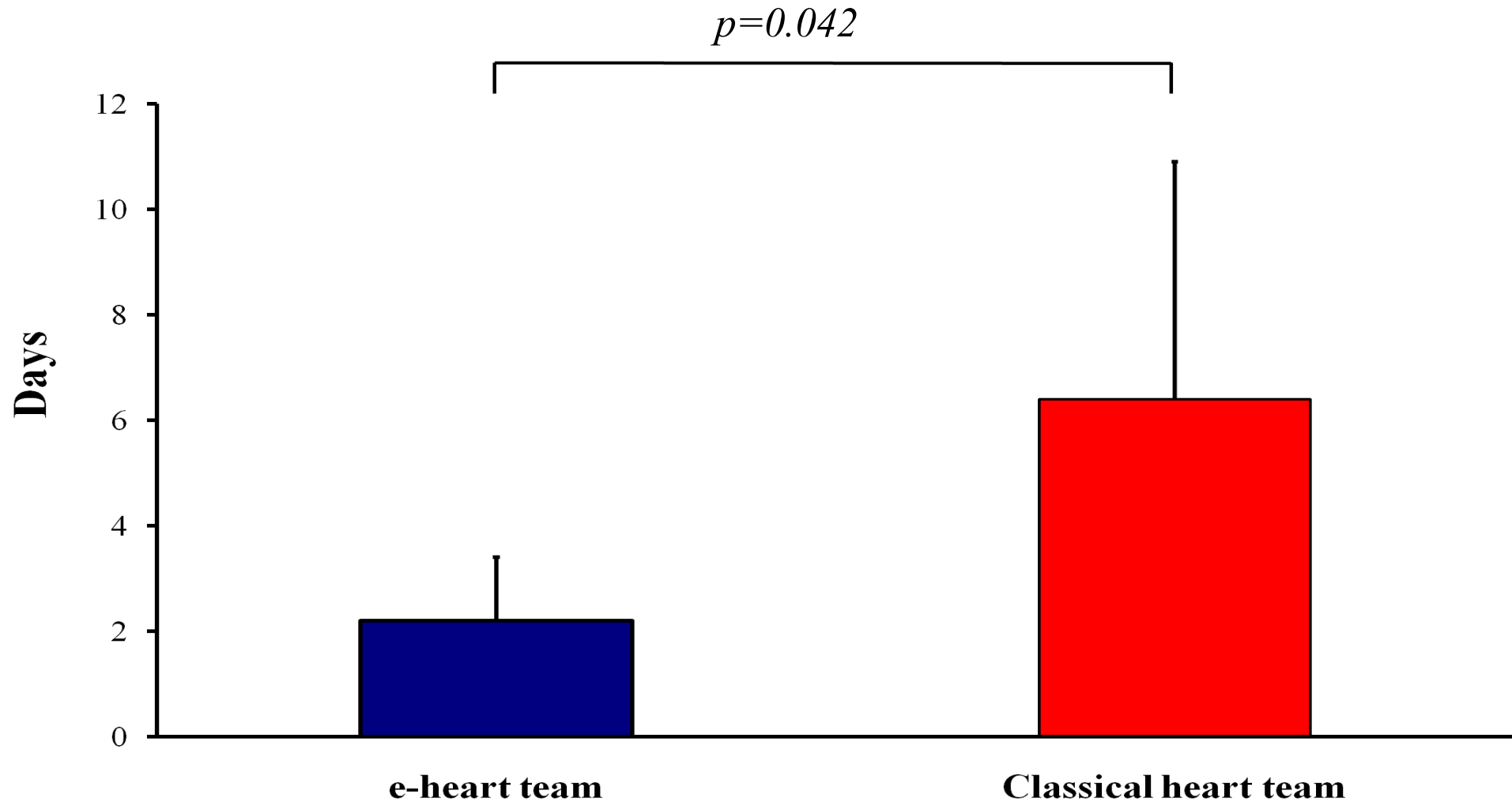


p = N.S.

We found no difference in the final decision of e-heart team and traditional heart team about indication for surgery (44% vs 50%, $p = \text{NS}$), or percutaneous therapy (20% vs 29%, $p = \text{NS}$), or hybrid therapy (2% vs 7%, $p = \text{NS}$) with high incidence of medical follow-up in e-heart team (34% vs 14%, $p = 0.002$).



Hospital stay before cardiac surgery in the Hub center





Results-2

- The concordance between decisions of the e-heart team and classical heart team was comparable (88% vs. 92%; $p=NS$)
- The duration of hospital stay in Hub center before cardiac surgery was significantly shorter in e-heart team patients compared to conventional heart-team patients (Figure) with the same hospitalization duration (9.8 ± 3 vs 12.9 ± 10 days, $p=NS$).
- After a *median follow-up of 9 months*, all patients in both groups were alive.



Take-home message

Integrated Heart Team experience is a strong indicator of evolution and probably will form the Heart of Modern Cardiovascular era

BUT

WE HAVE TO RE-THINK OUR WAY TO WORK

with a patient-centered model of care