Πνευμονική αρτηριακή υπέρταση στις συγγενείς καρδιοπάθειες

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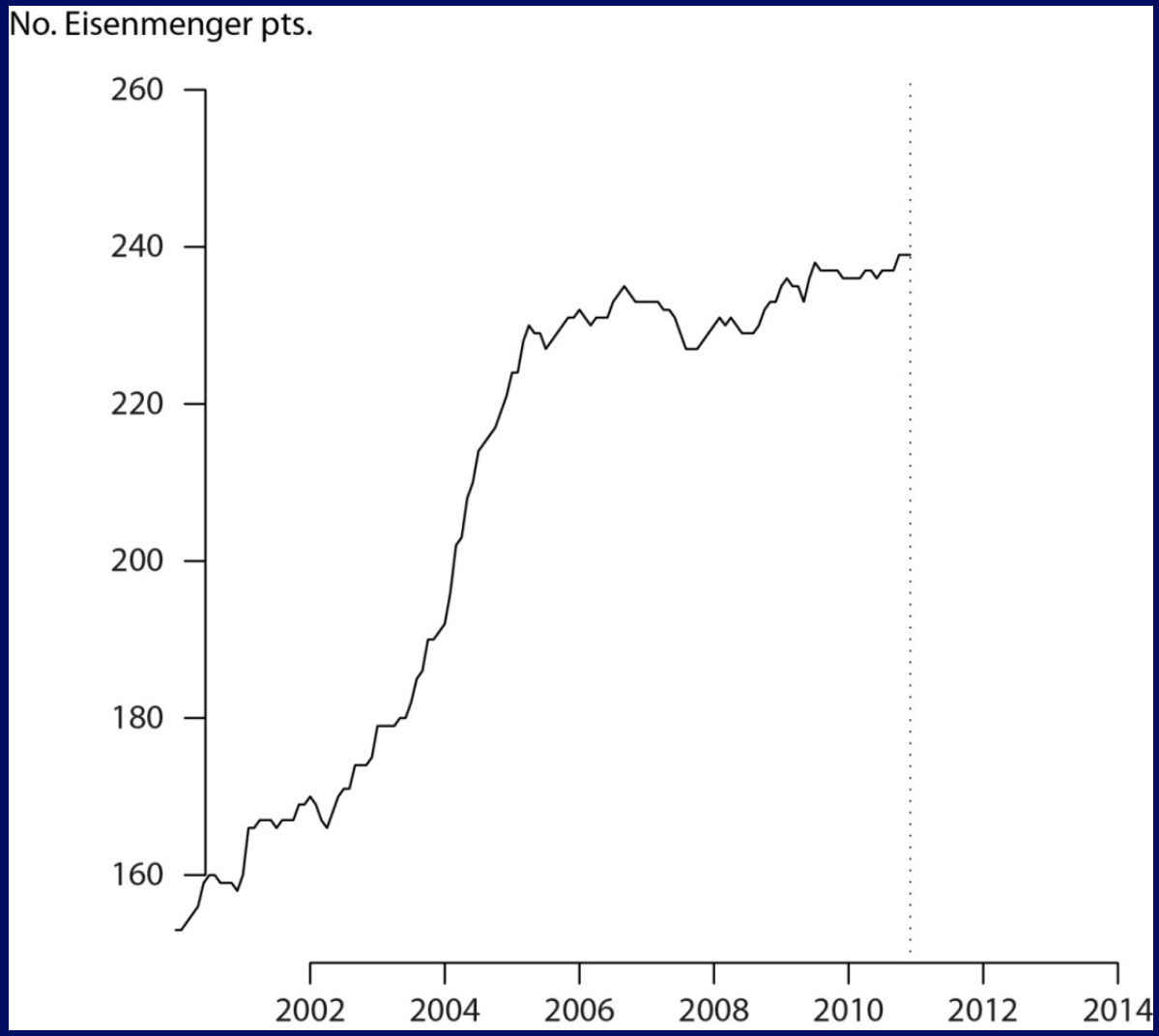
Cardiology Department, AHEPA Hospital

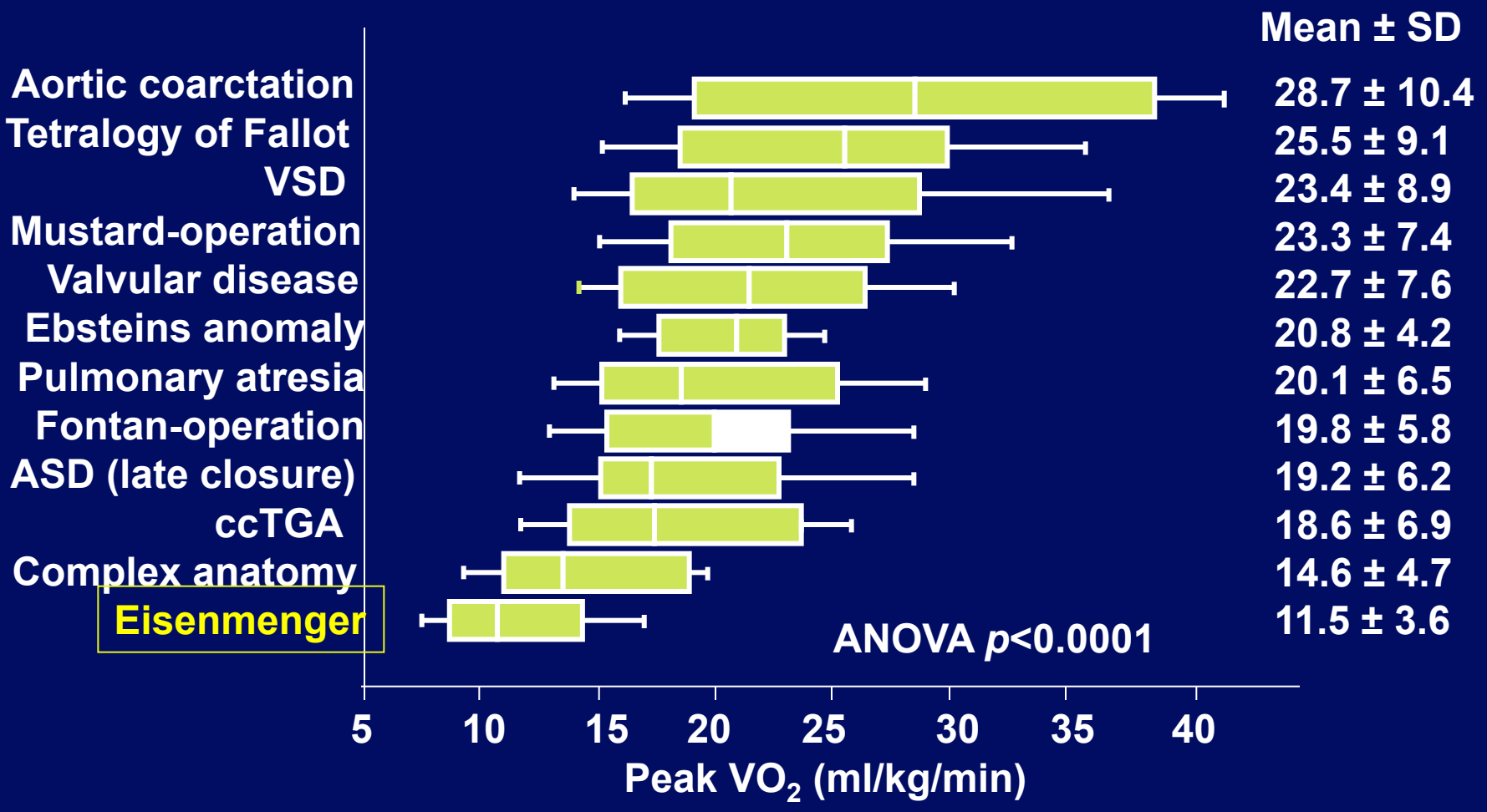
Conflicts of interest

- Honoraria and Advisory Boards from Actelion, AstraZeneca

The number of Eisenmenger Patients under FU at the Royal Brompton Hospital is increasing at 5%/year

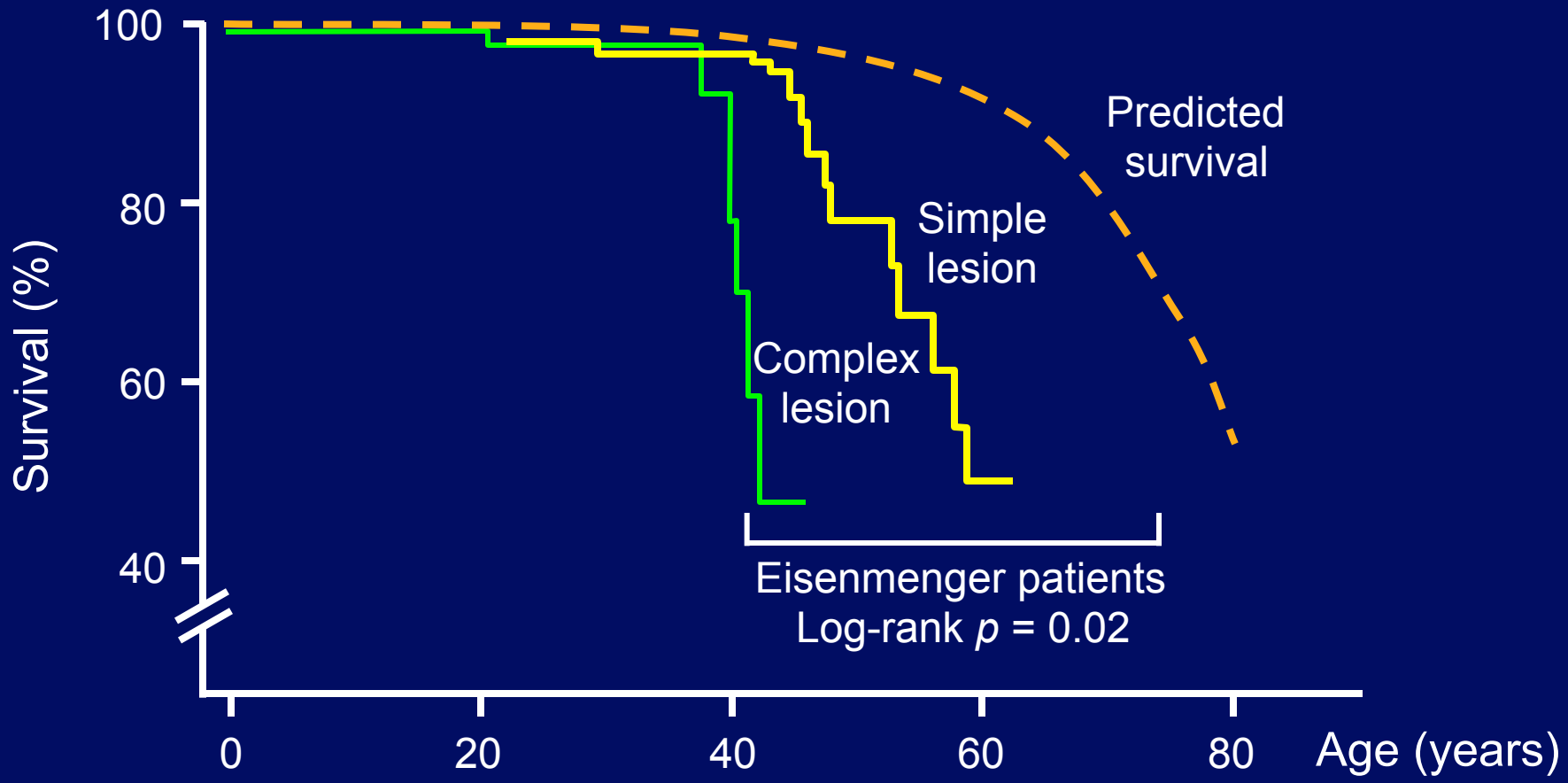


PAH-CHD and particularly Eisenmenger patients are severely compromised



Diller GP, *et al. Circulation* 2005; 112:828-35.

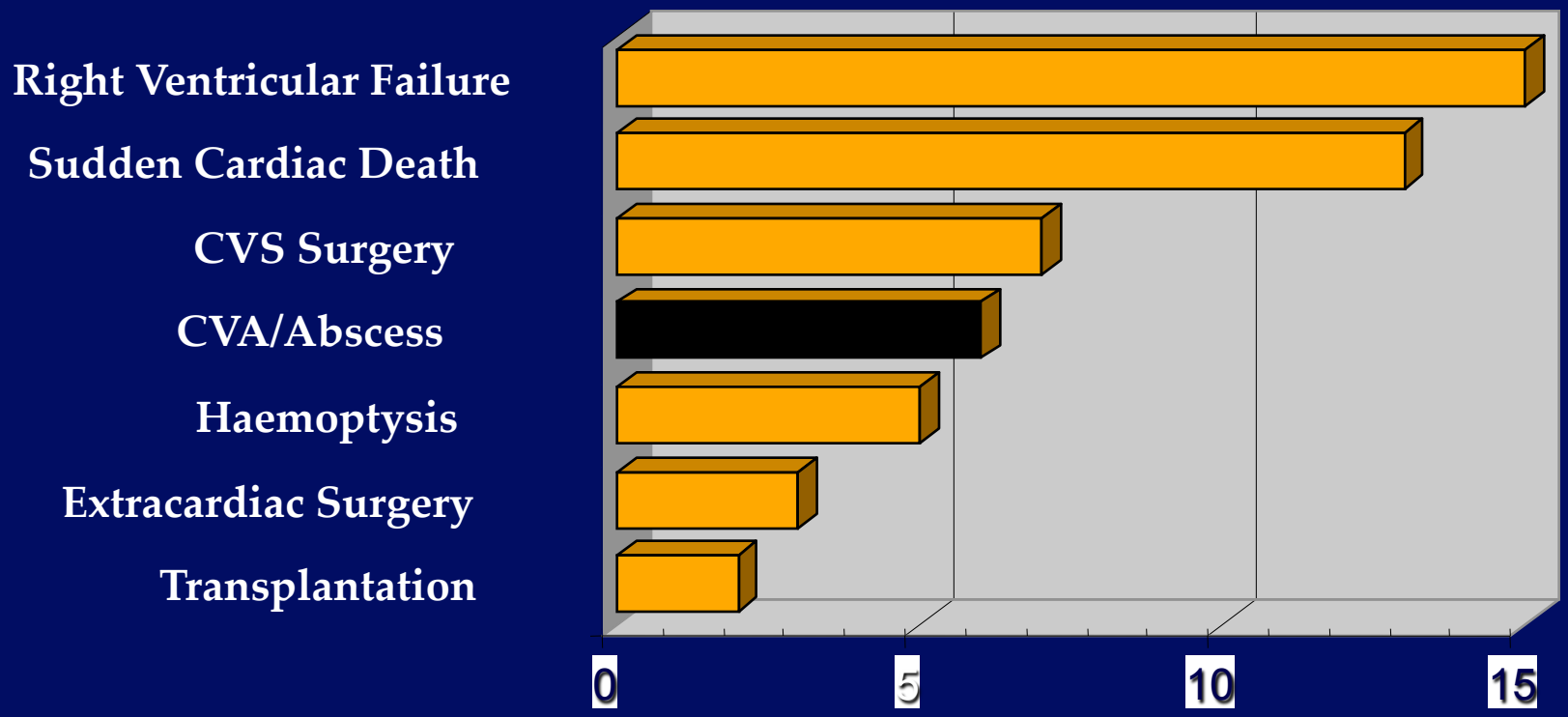
Survival in adults



Standardised mortality ratio 3.8; 95% CI 2.0 – 7.0; p <0.0001

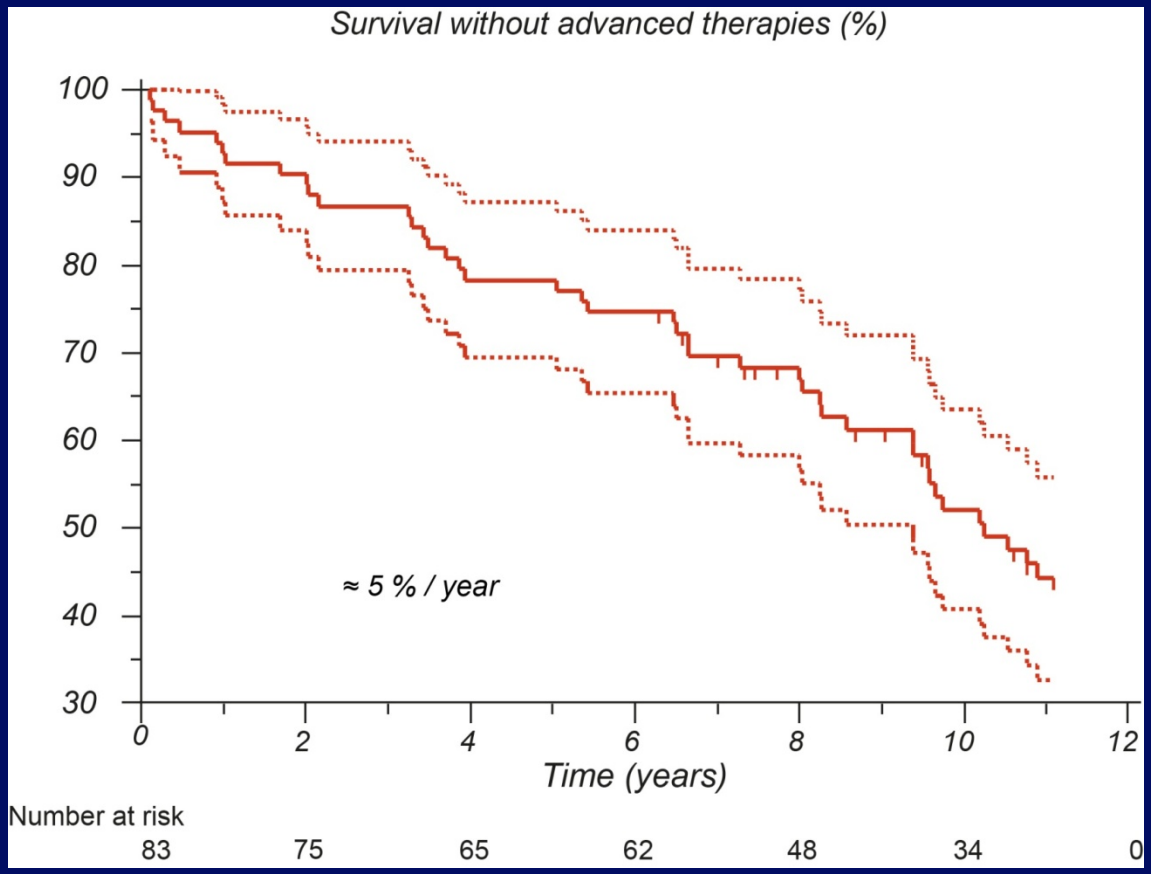
Diller GP, *et al. Eur Heart J* 2006; 27:1737-42.

Mode of Death in Eisenmenger Syndrome



Somerville J, IJC 1998

Deterioration of ES



5% annual risk of deteriorating to class III necessitating advanced therapies or dying

Deterioration of ES

Predictor	*p*-Value	Exp(b)	95% CI
Age	**0.034**	**1.024**	**1.002-1.046**
Down Syndrome	**0.014**	**0.2730**	**0.098 – 0.761**
WHO class I	0.069	0.2672	0.065 – 1.100
Phlebotomy	0.097	1.77	0.906 – 3.443
Syncope	0.056	2.217	0.985 – 4.989
Arrhythmia	**0.0160**	**2.408**	**1.820- 4.905**
Palpitations	0.0699	1.750	0.958-3.196
HF/Diuretics	**0.0015**	**2.911**	**1.511-5.607**
Digoxin	0.072	2.215	0.935-5.247

Univariate Predictors of Death or need for AT ($p < 0.10$)

Clinical classification of PAH-CHD

A. Eisenmenger's syndrome (ES)

ES includes all left-to-right shunts due to large defects leading to a severe increase in PVR and resulting in a reversed right-to-left or bidirectional shunt. Cyanosis, erythrocytosis, and multiple organ involvement are present.

B. PAH associated with systemic-to-pulmonary shunts

In these patients with moderate to large defects, the increase in PVR is mild to moderate, left-to-right shunt is still largely present, and no cyanosis is present at rest.

C. PAH with small defects

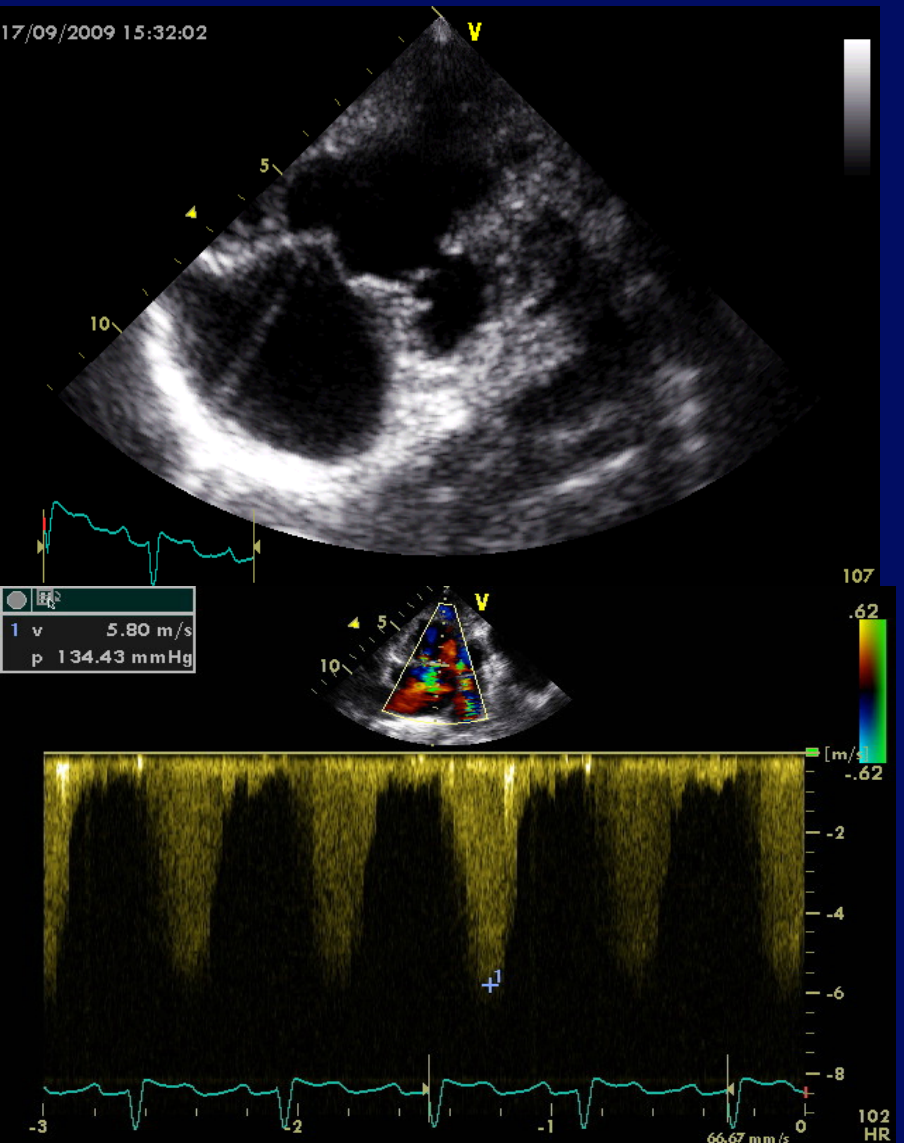
In cases with small defects (usually VSD < 1 cm and ASD < 2 cm of effective diameter assessed by echocardiography) the clinical picture is very similar to IPAH.

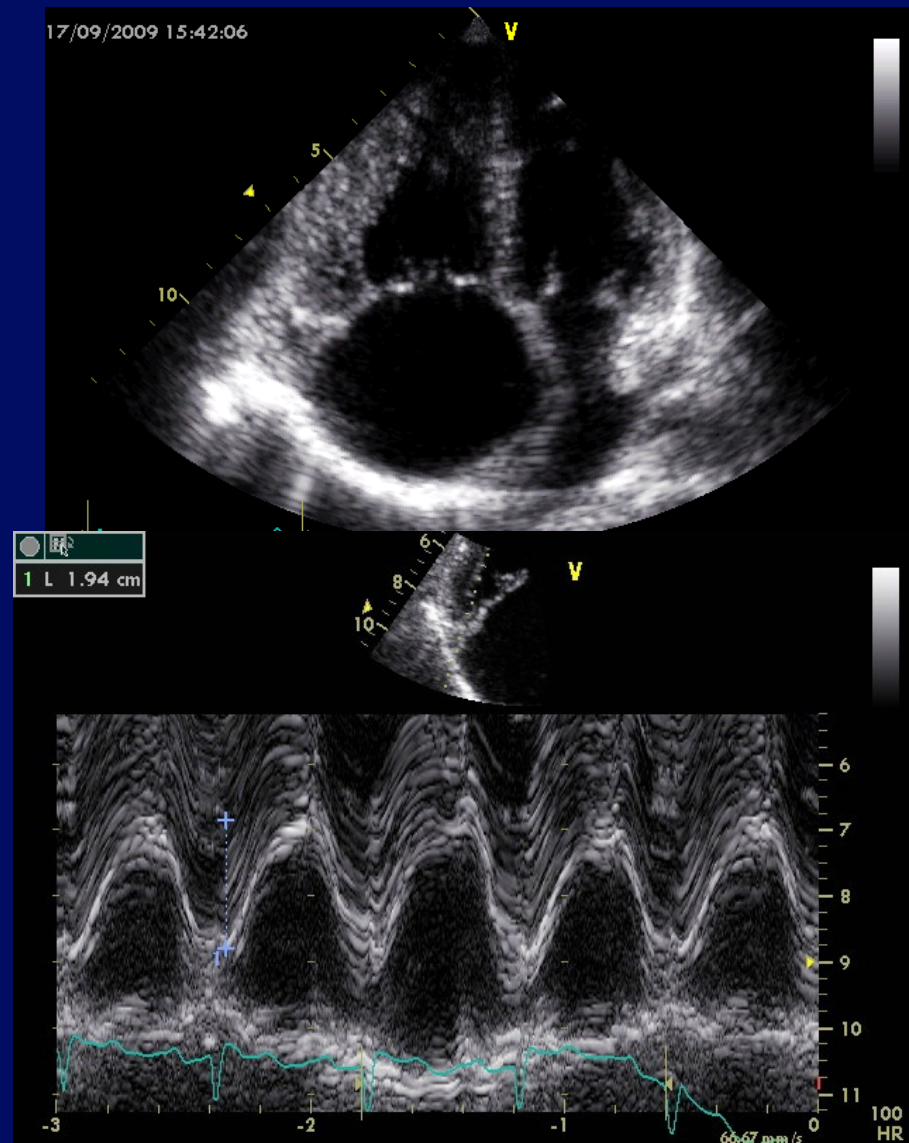
D. PAH after corrective cardiac surgery

CHD has been corrected but PAH is either still present immediately after surgery or has recurred several months or years after surgery in the absence of significant post-operative residual congenital lesions or defects that originate as a sequela to previous surgery.

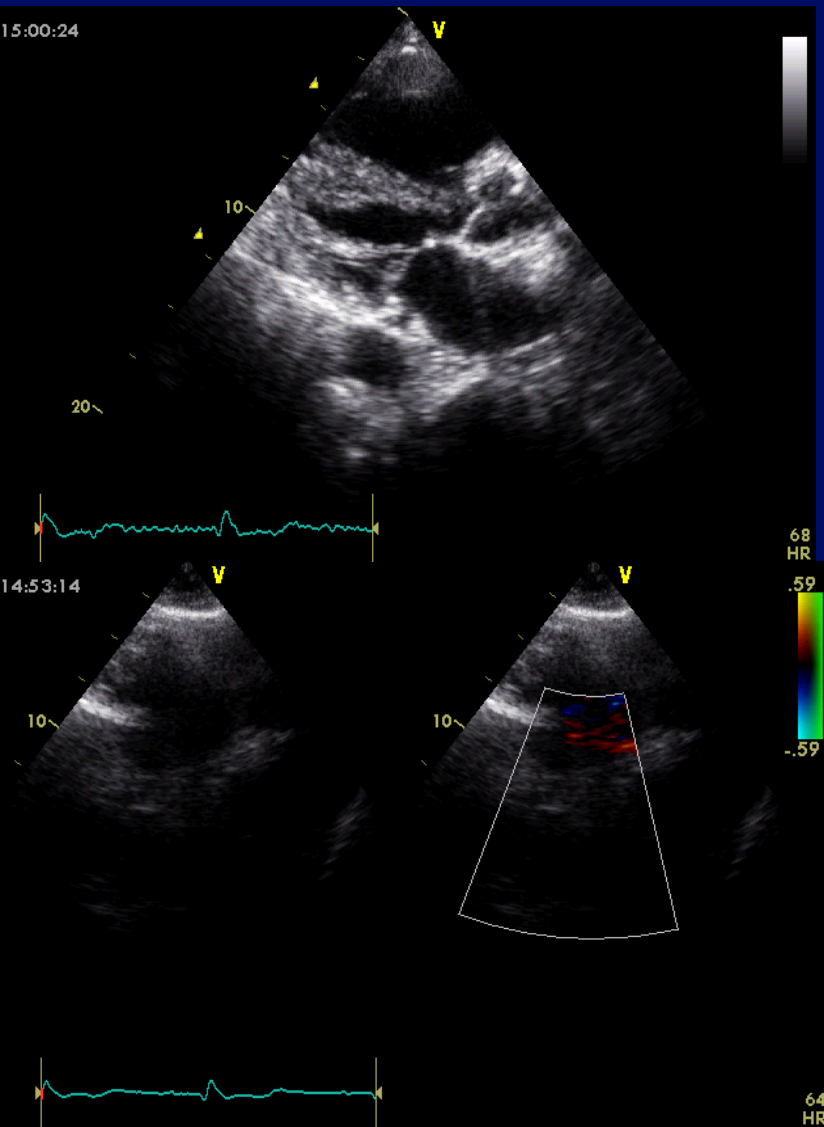
Galiè N, *et al. Eur Heart J* 2009; 30:2493-537.

Eisenmenger syndrome





L- R shunts


15:00:24
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68
HR
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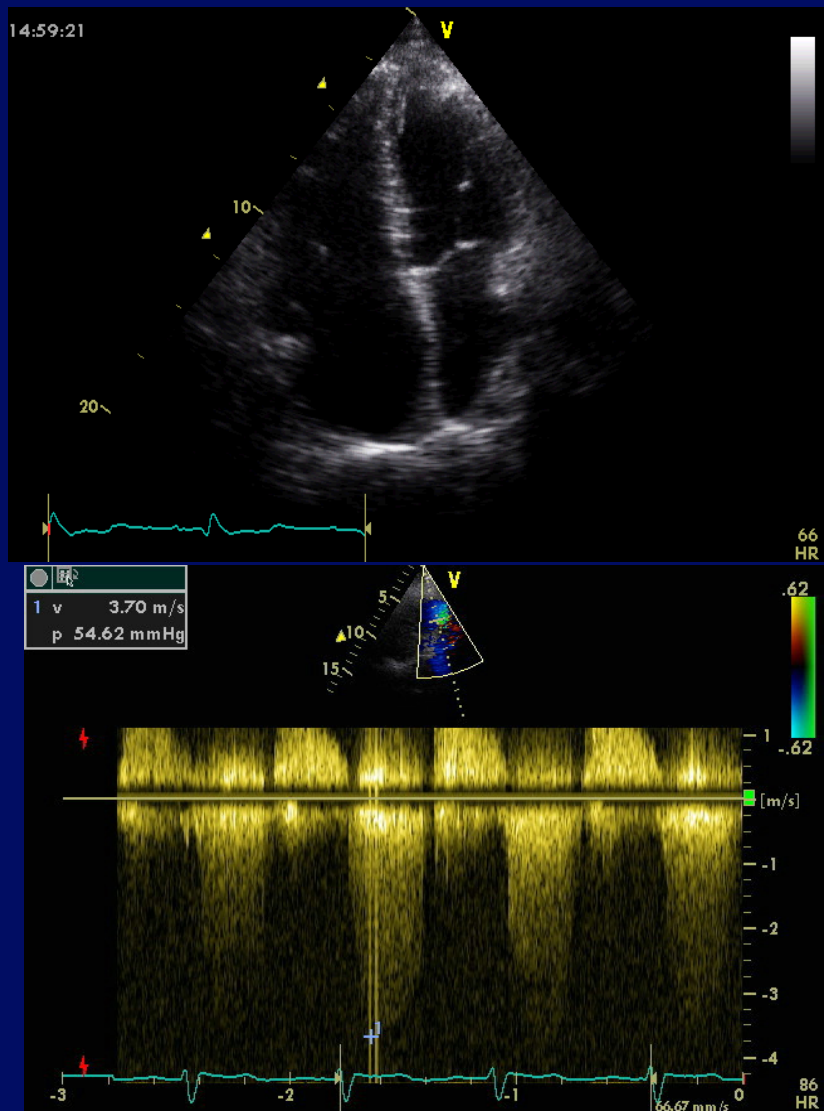
64
HR


14:59:21
10
20
66
HR
1 v 3.70 m/s
p 54.62 mmHg
5
10
15
.62
-.62
[m/s]
-1
-2
-3
-4
-3
-2
-1
0
86
HR

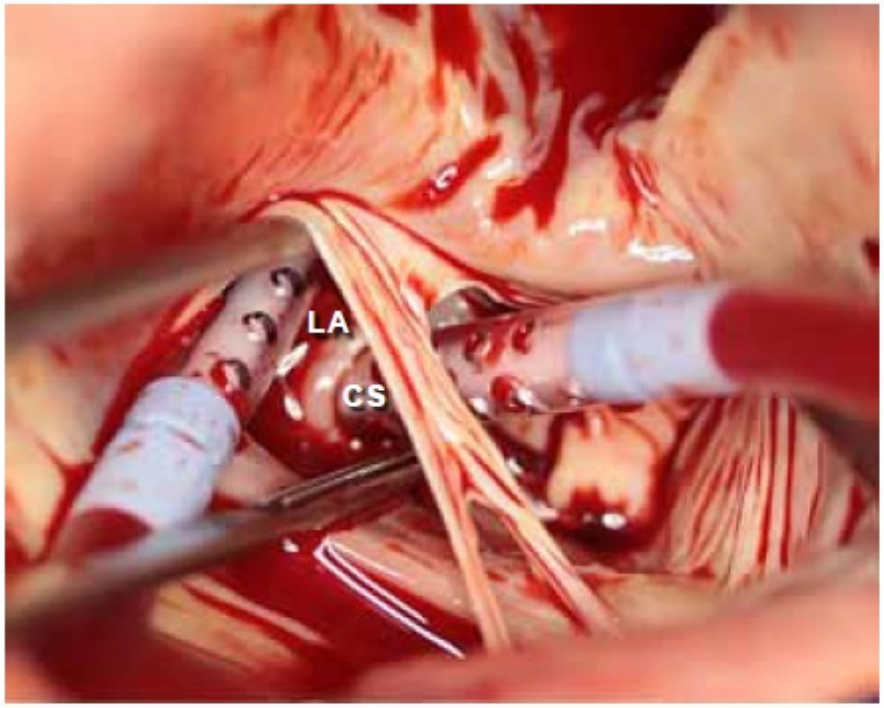


Figure 3. Intraoperative identification of the defect.

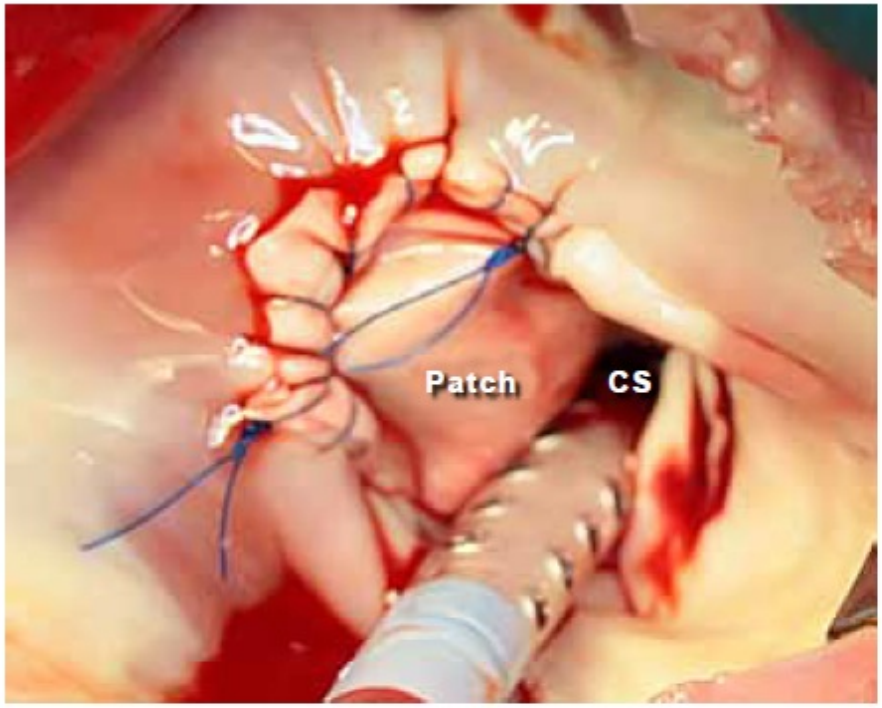
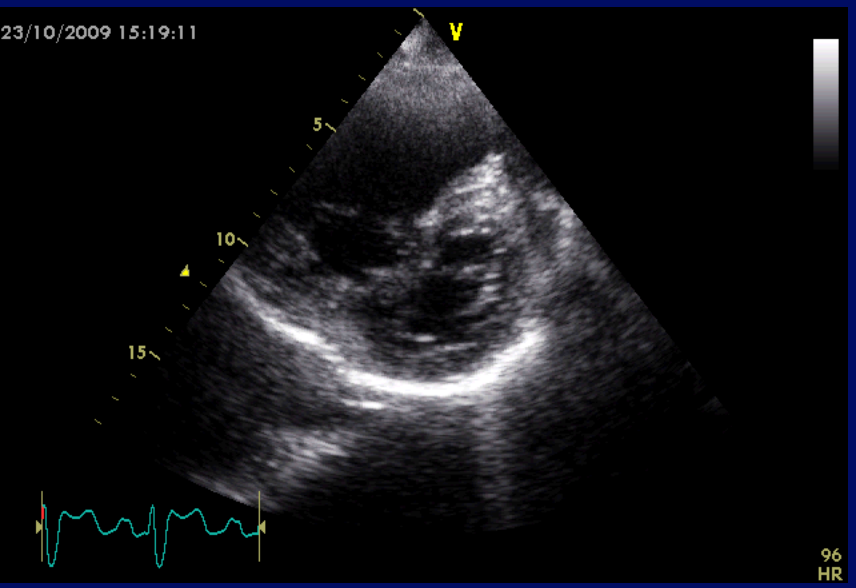
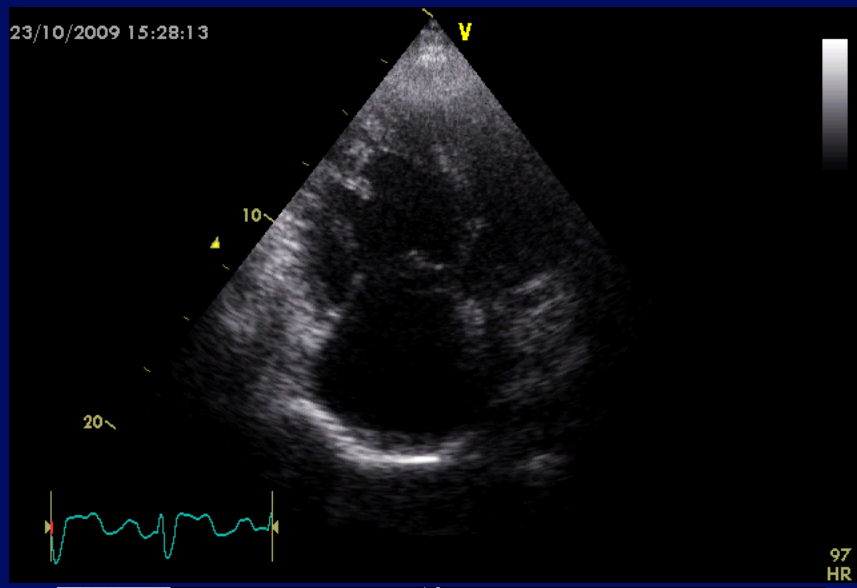
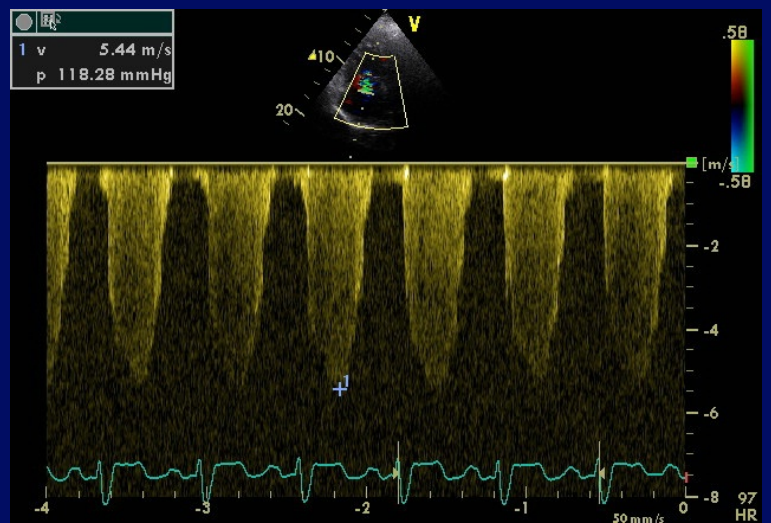


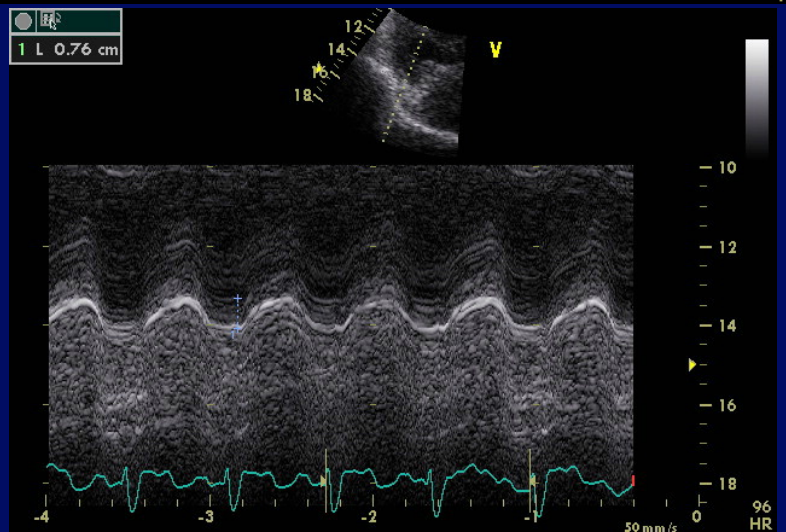
Figure 4. Closure of the defect by placing a prosthetic patch.

PAH after corrective cardiac surgery

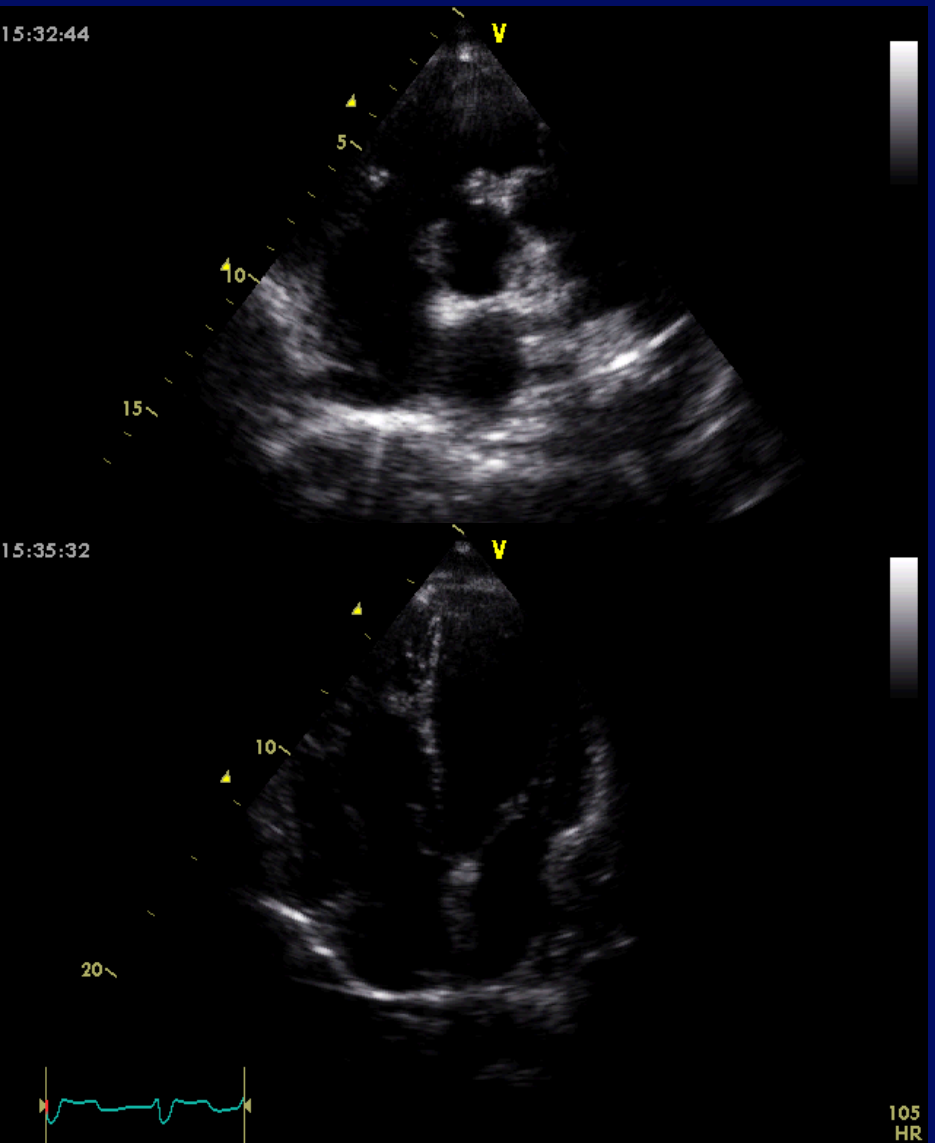


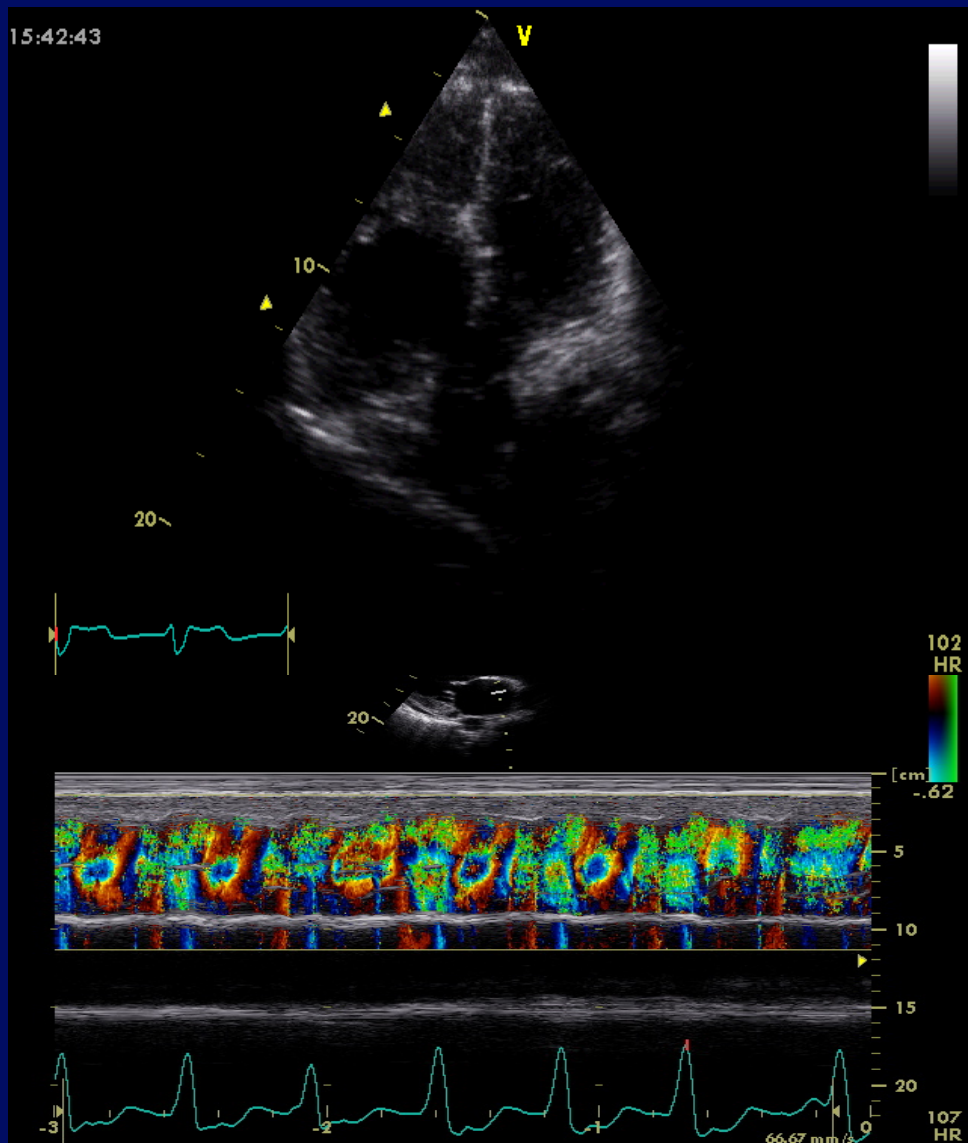




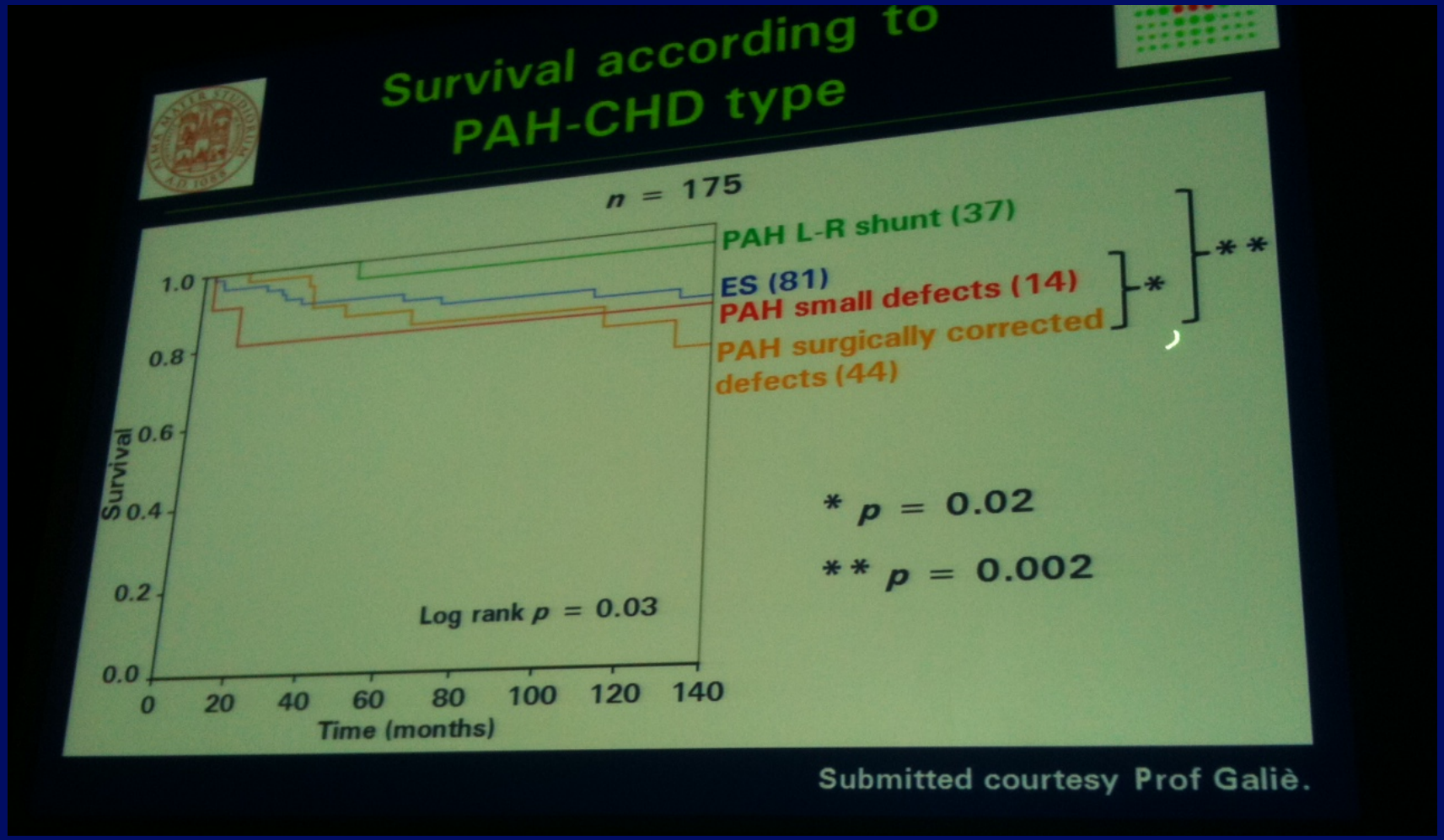


Unclassified cases
28 y, man, class III under bosentan





Survival depends on the PAH CHD-type

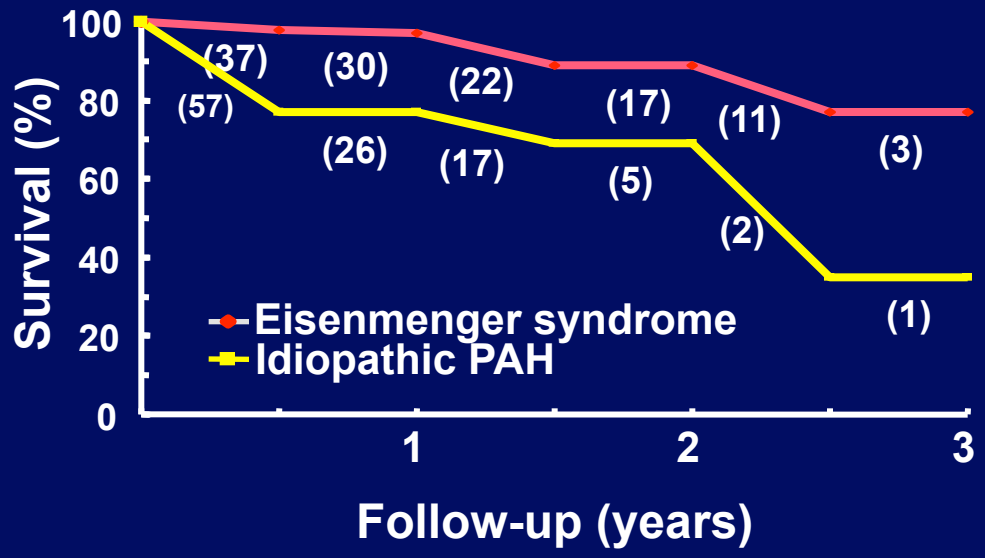


Survival curve compared to IPAH

- Similar lung histology

but

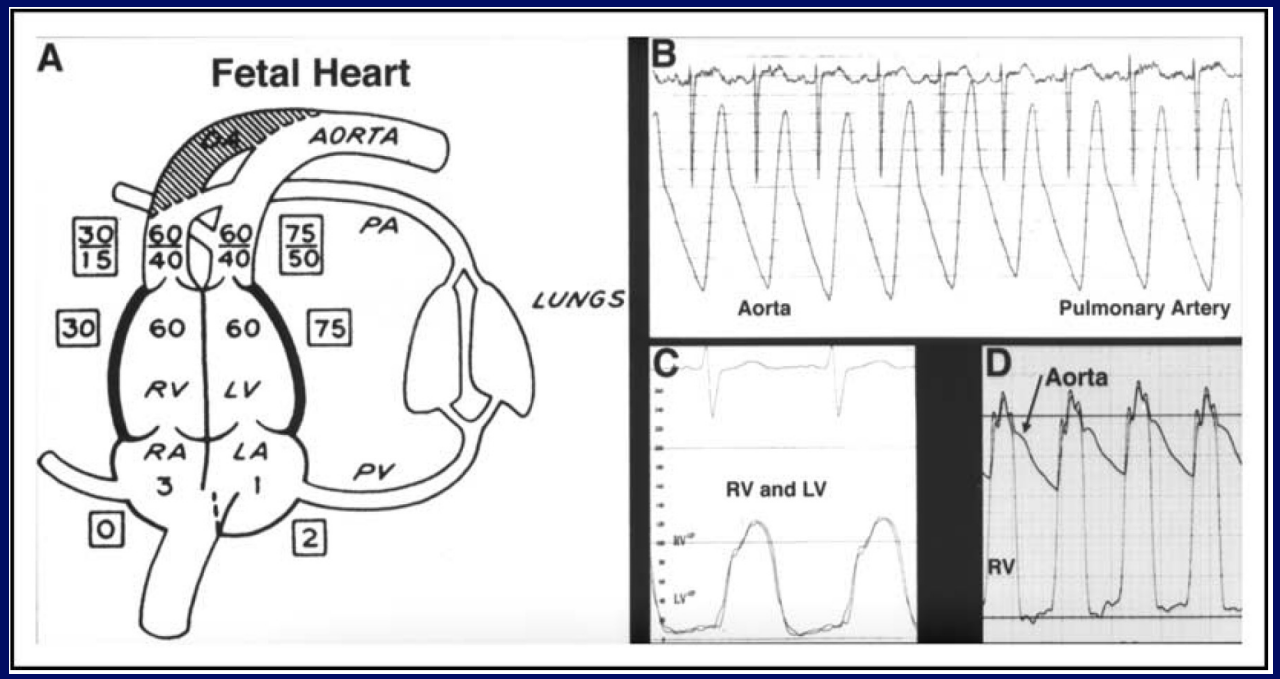
- Different survival



Hopkins WE, *et al*. *J Heart Lung Transplant* 1996.

Severe Pulmonary Hypertension Without Right Ventricular Failure: The Unique Hearts of Patients With Eisenmenger Syndrome

William E. Hopkins, MD, and Alan D. Waggoner, MHS, RDCS



Eisenmenger syndrome
Multi-organ disease

Exercise intolerance, dyspnoea, fatigue, dizziness

Hyperviscosity symptoms

- Headache, dizziness, visual disturbances, paresthesias

Severe cyanosis

Renal dysfunction

Haematologic involvement

- Secondary erythrocytosis
- Thrombocytopenia
- Iron deficiency

Thrombotic and bleeding diathesis

- Dilation of the pulmonary arteries, in situ thrombosis
- Haemoptysis, pulmonary haemorrhage
- Neoangiogenesis (GI, pulmonary, other bleeding)
- Cerebrovascular events

Arrhythmias

- Supraventricular tachycardias
- Ventricular tachycardia, sudden cardiac death

Rheumatologic complications

- Hyperuricemia and gout
- Hypertrophic osteoarthropathy, clubbing

Gastrointestinal complications

- Gallstones, cholecystitis

Bacterial infectious diseases

- Endocarditis
- Cerebral abscess
- Respiratory tract infection

Dimopoulos K, Giannakoulas G. ***Eisenmenger Complex. In: Pulmonary Arterial Hypertension: Oxford Cardiology Library***

Pseudohypoglycemia in Eisenmenger syndrome

Suggested mechanisms

- **in vitro consumption of glucose by high levels of cells (secondary erythrocytosis) in the blood after the sample is drawn and before it is processed (venous blood)**

- **impaired blood flow in the digital microcirculation, which leads to a local increase in glucose consumption (finger stick blood)**

Theofilogiannakos EK, Giannakoulas G, *et al*. Ann Intern Med 2010

Burden of Coronary Artery Disease in Adults With Congenital Heart Disease and Its Relation to Congenital and Traditional Heart Risk Factors

Georgios Giannakoulas, MD, PhD[a,*], Konstantinos Dimopoulos, MD, PhD[a,b], Reto Engel, MD[a], Omer Goktekin, MD[a], Zekeriya Kucukdurmaz, MD[a], Mehmet Akif Vatankulu, MD[a], Elisabeth Bedard, MD[a], Gerhard Paul Diller, MD[a,b], Maria Papaphylactou, MD[a], Darrel P. Francis, MD[c], Carlo Di Mario, MD, PhD[b], and Michael A. Gatzoulis, MD, PhD[a,b]

As adult patients with congenital heart disease (CHD) grow older, the risk of developing coronary artery disease (CAD) increases. We sought to estimate the prevalence of CAD in adult patients with CHD, the safety of coronary angiography in this setting, and the potential relation of CAD to clinical and hemodynamic parameters. Two hundred fifty adult patients with CHD (mean age 51 ± 15 years; 53% men) underwent selective coronary angiography in our center for reasons other than suspected CAD. Clinical and hemodynamic data were retrieved retrospectively from medical records and echocardiographic and angiographic databases, respectively. Significant CAD using quantitative coronary angiography was found in 9.2% of adult patients with CHD. No patient with cyanosis or age <40 years had significant CAD. Systolic and diastolic systemic ventricular dimensions were significantly higher in patients with CAD, even after adjustment for age (odds ratio [OR] for 10-mm increase 2.59, 95% confidence interval [CI] 1.29 to 5.21, p = 0.007; OR 2.31, 95% CI 1.24 to 4.31, p = 0.008, respectively). Systemic arterial hypertension and hyperlipidemia were strong predictors of CAD (OR 4.54, 95% CI 1.82 to 12.0, p = 0.001; OR 9.08, 95% CI 3.56 to 24.54, p <0.0001, respectively), whereas no relation to chest pain was found. Only 1 major adverse event was recorded during coronary angiography. In conclusion, the prevalence of significant CAD in a hospital adult CHD cohort was similar to that in the general population. This study supported the performance of selective coronary angiography in patients >40 years referred for cardiac surgery, with low risk of major complications. Traditional cardiovascular risk factors for CAD also applied to adult patients with CHD, in whom primary prevention of CAD was as important as in the general population. **© 2009 Elsevier Inc.** **(Am J Cardiol 2009;103:1445–1450)**

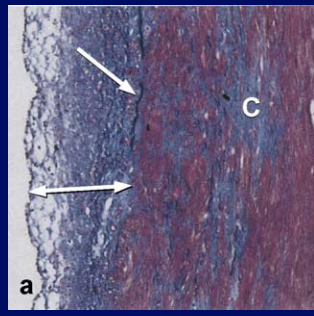


Fig. 3. Histologic appearance of the ectatic coronary artery show
arrow), increased medial collagen (C) that stains blue, and fibroint
(blue) scattered throughout the media. Medial smooth muscle ce

No patient with cyanosis developed significant CAD

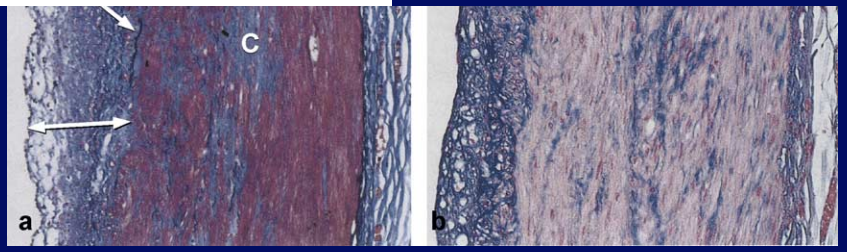


Fig. 5. Histologic appearance of the ectatic coronary artery shown in Fig. 2. (a) Trichrome stain showing disruption of the internal elastic lamina (left up
arrow), increased medial collagen (C) that stains blue, and fibrointimal hyperplasia (paired arrows). (b) Alcian blue stain showing increased extracellular ma
(blue) scattered throughout the media. Medial smooth muscle cells are pink. There was no atherosclerosis.

Risk Stratification

ESC/ERS 2009 PAH guidelines

Table 15 Parameters with established importance for assessing disease severity, stability and prognosis in PAH (adapted from McLaughlin and McGoon[94])

Better prognosis	Determinants of prognosis	Worse prognosis
No	Clinical evidence of RV failure	Yes
Slow	Rate of progression of symptoms	Rapid
No	Syncope	Yes
I, II	WHO-FC	IV
Longer (>500 m)[a]	6MWT	Shorter (<300 m)
Peak O_2 consumption >15 mL/min/kg	Cardio-pulmonary exercise testing	Peak O_2 consumption <12 mL/min/kg
Normal or near-normal	BNP/NT-proBNP plasma levels	Very elevated and rising
No pericardial effusion TAPSE[b] >2.0 cm	Echocardiographic findings[b]	Pericardial effusion TAPSE[b] <1.5 cm
RAP <8 mmHg and CI ≥2.5 L/min/m^2	Haemodynamics	RAP >15 mmHg or CI ≤2.0 L/min/m^2

[a]Depending on age.
[b]TAPSE and pericardial effusion have been selected because they can be measured in the majority of the patients.
BNP = brain natriuretic peptide; CI = cardiac index; 6MWT = 6-minute walking test; RAP = right atrial pressure; TAPSE = tricuspid annular plane systolic excursion; WHO-FC = WHO functional class.

Galie N *et al, Eur Heart J* 2009;doi:10.1093/eurheartj/ehp297.

Natriuretic peptides

Congenital heart disease

ORIGINAL ARTICLE

B-type natriuretic peptide concentrations in contemporary Eisenmenger syndrome patients: predictive value and response to disease targeting therapy

Gerhard-Paul Diller,[1,2] Rafael Alonso-Gonzalez,[1] Aleksander Kempny,[1] Konstantinos Dimopoulos,[1,2] Ryo Inuzuka,[1] Georgios Giannakoulas,[1] Lianne Castle,[1] Astrid E Lammers,[1] James Hooper,[3] Anselm Uebing,[1] Lorna Swan,[1] Michael Gatzoulis,[1,2] Stephen J Wort[1,2]

BNP as a predictor of outcome

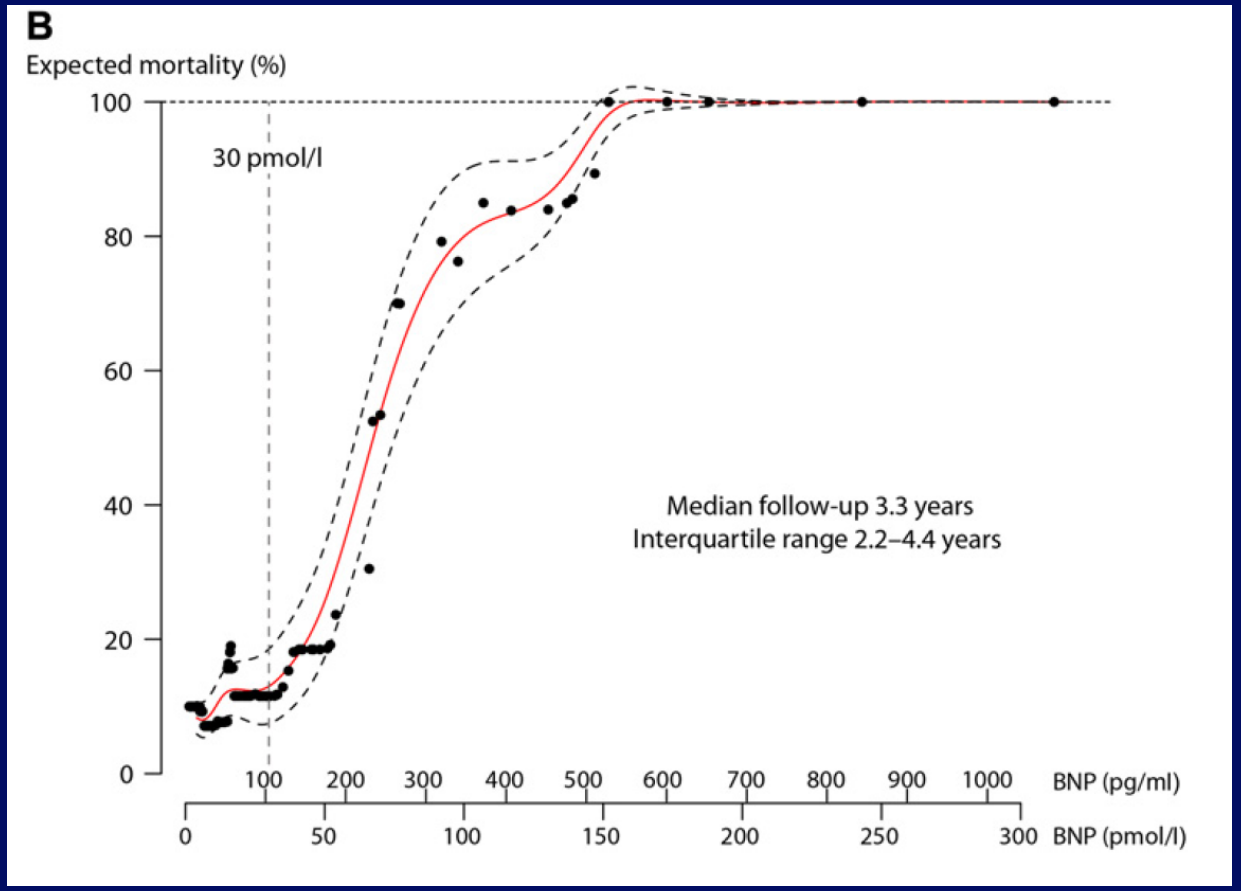
Table 3 Multivariable predictors of mortality on Cox proportional hazards analysis

Variables	HR (95% CI)	p Value
Multivariable analysis		
BNP (per 100 pg/ml)	1.71 (1.07 to 2.73)	**0.02**
Creatinine (per 10 μm/l)	0.70 (0.50 to 0.97)	**0.03**
6 min walk test distance (per 10 m)	0.93 (0.87 to 0.99)	**0.02**
Down syndrome	2.11 (0.47 to 9.39)	0.33

BNP, B-type natriuretic peptide, WHO, World Health Organization functional class.
Significant variables are printed in bold.

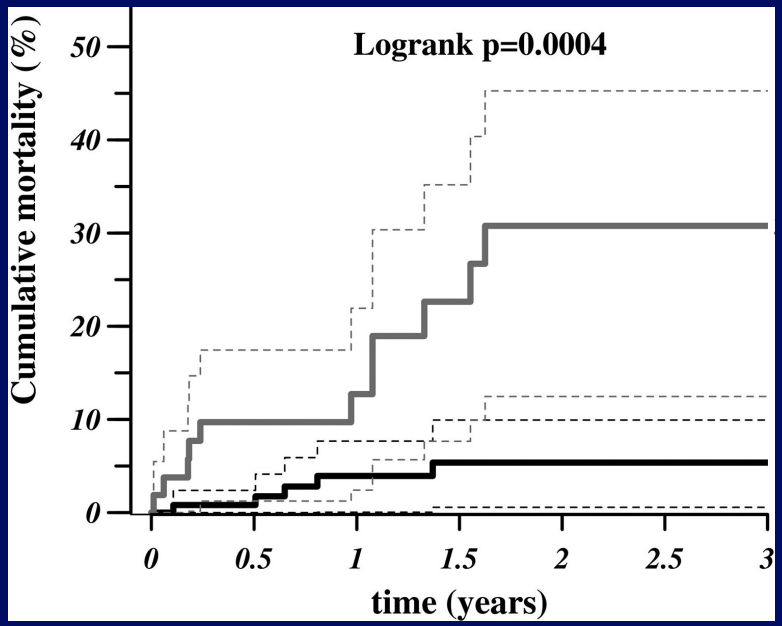
Diller G et al. Heart 2012

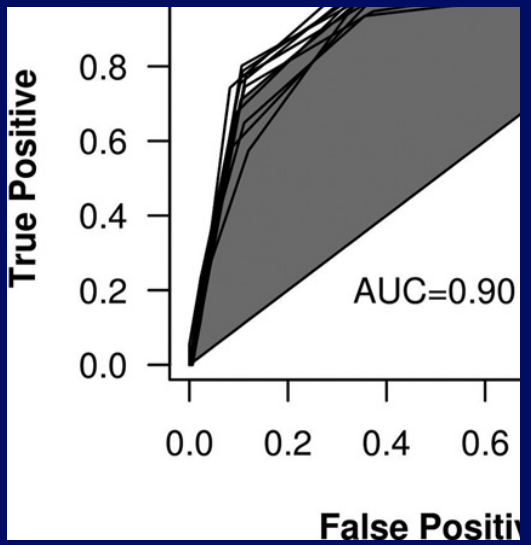
BNP as a predictor of outcome



Diller G et al. Heart 2012

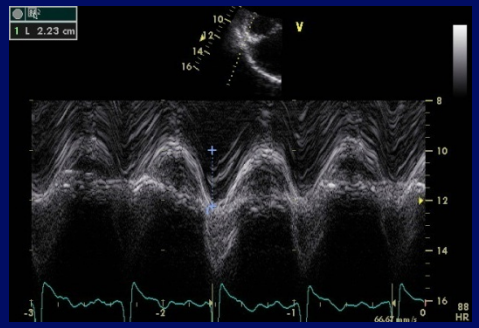
Echo in risk stratification





Downl

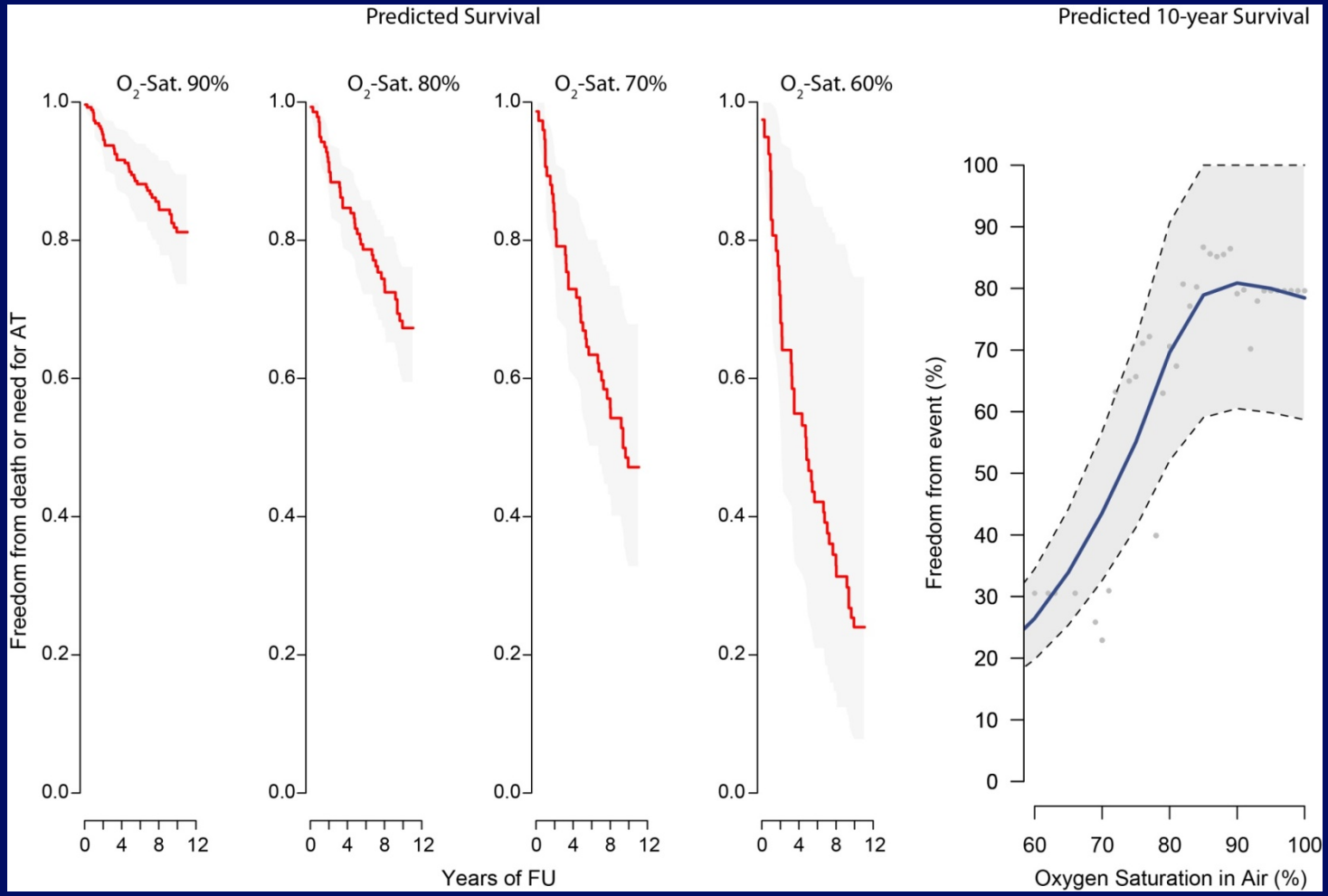
Figure 3. Kaplan-Meier curve for tricuspid annular plane excursion (TAPSE). Patients with TAPSE <15 mm had h mortality rates than patients with TAPSE ≥15 mm.



TAPSE<15mm
RA area>25cm^2
RA area/LA area>1.5
RV systolic/RV diastolic duration>1.5

Moceri et al. Circulation 2012

Prognostic value of cyanosis



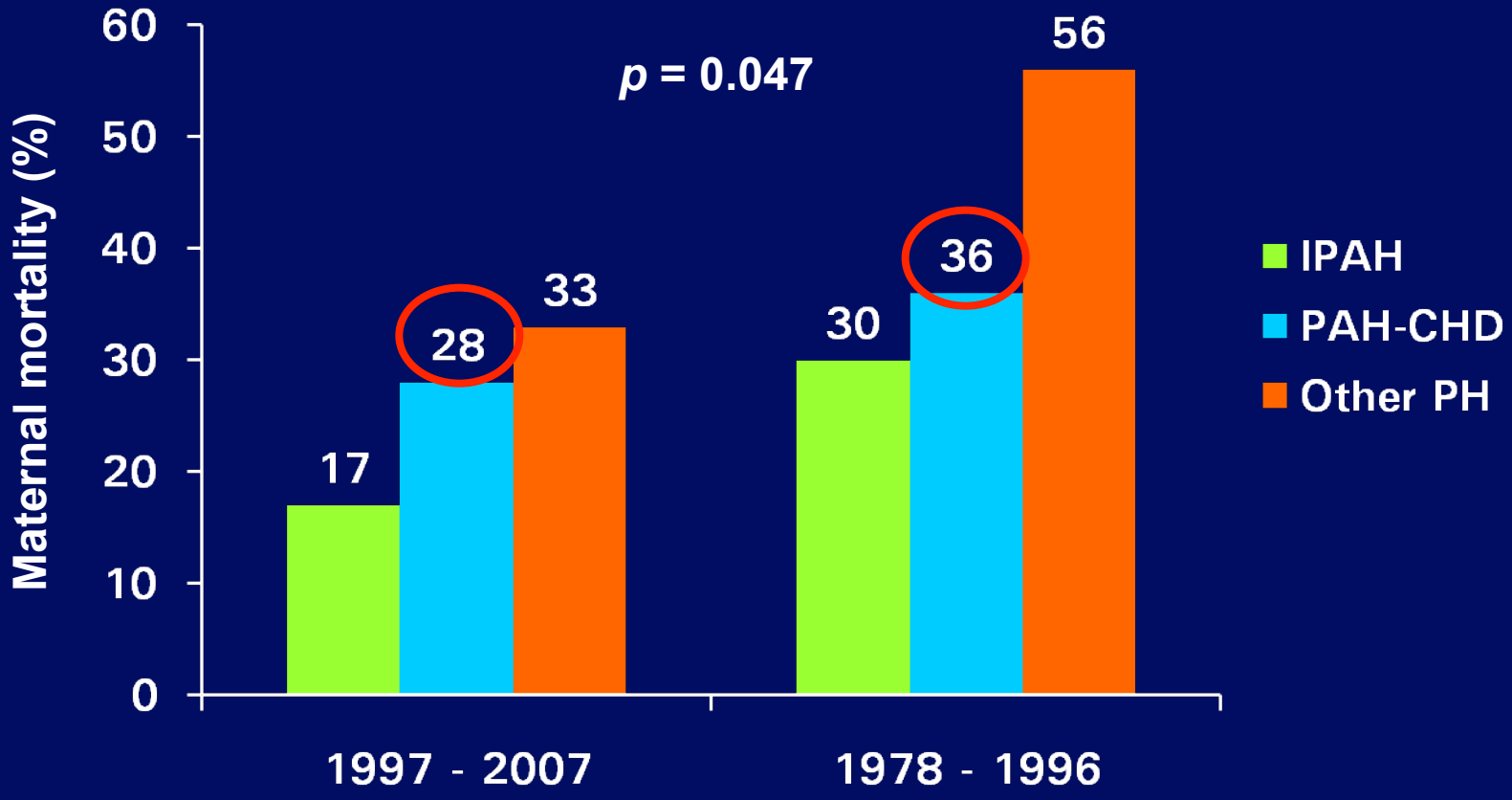
Diller GP, *unpublished*

Summary - Predictors of outcome

	Diller et al n=171	*Daliento et al n=188*	*Cantor et al n=109*	*Previous studies**
Functional class	+	+	+	Uric acid
Arrhythmia	+	-	+	
Age	*(NA)*	+	+ **younger worse**	RA-pressure
Complex lesions	+	+	-	Syncope
Laboratory param.	K, alb, γGT	Creatinine	*NA*	
ECG parameters	QTc, QRSd	(-)	RV_1+SV_5	Haemoptysis
RV dysfunction	-	+	*NA*	**O_2 saturation**
Non cardiac surgery	*(NA)*	+	*NA*	
Syncope	-	-	-	Down S.
Haemoptysis	-	-	-	**Renal dysf.**

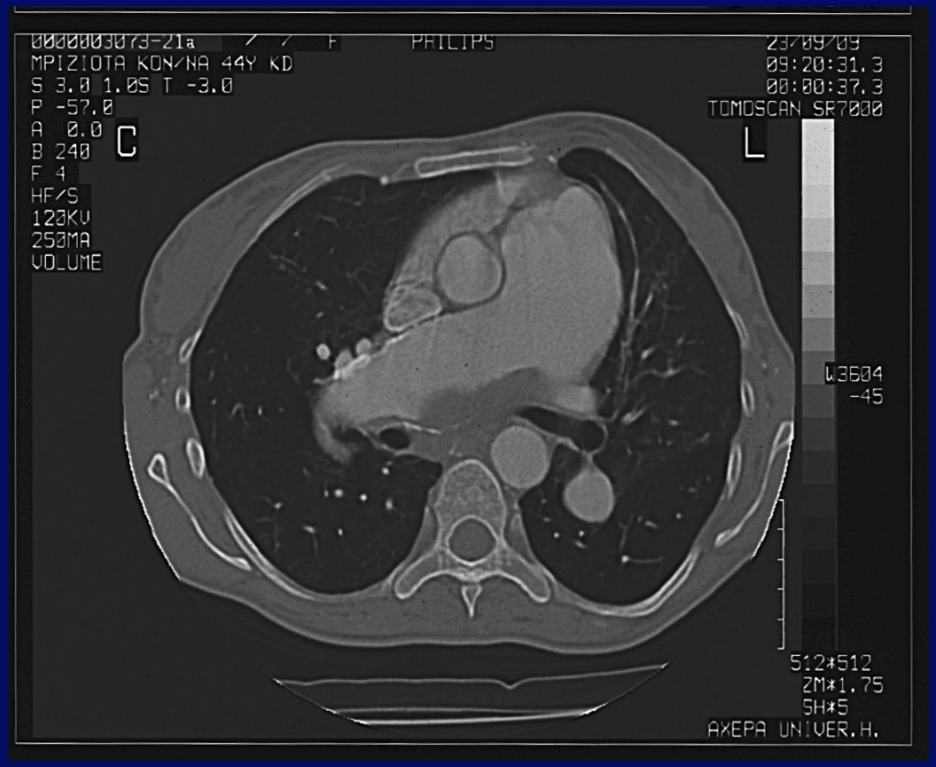
- Oya et al Heart 2000, Saha et al IJC 1994, Clarkson et al Circ 1968, P Wood BMJ 1958 ,
- Diller et al EHJ 2006

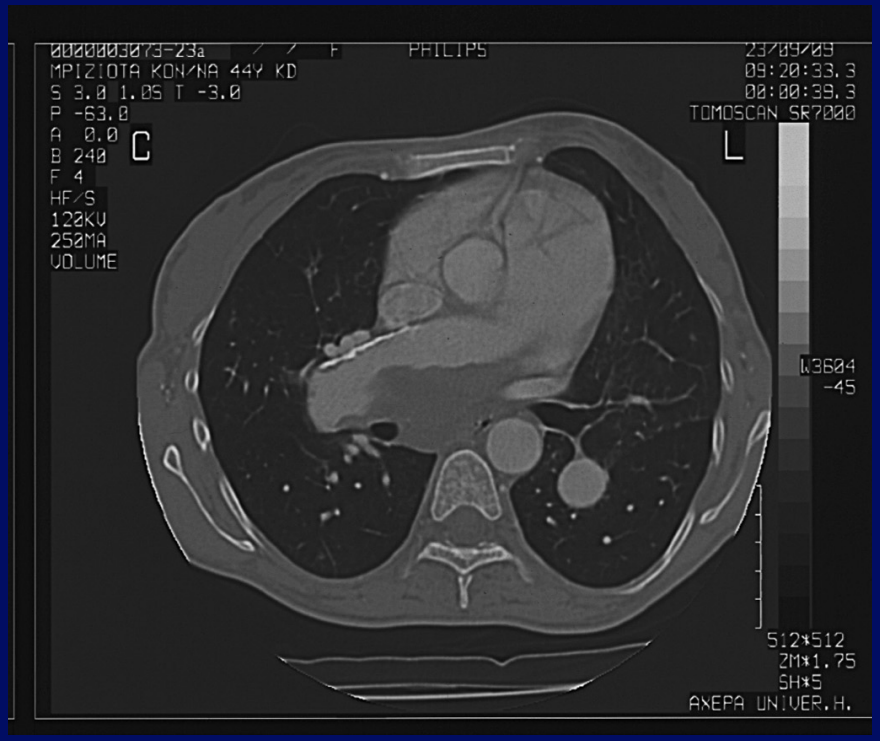
Pregnancy and PAH in association with CHD



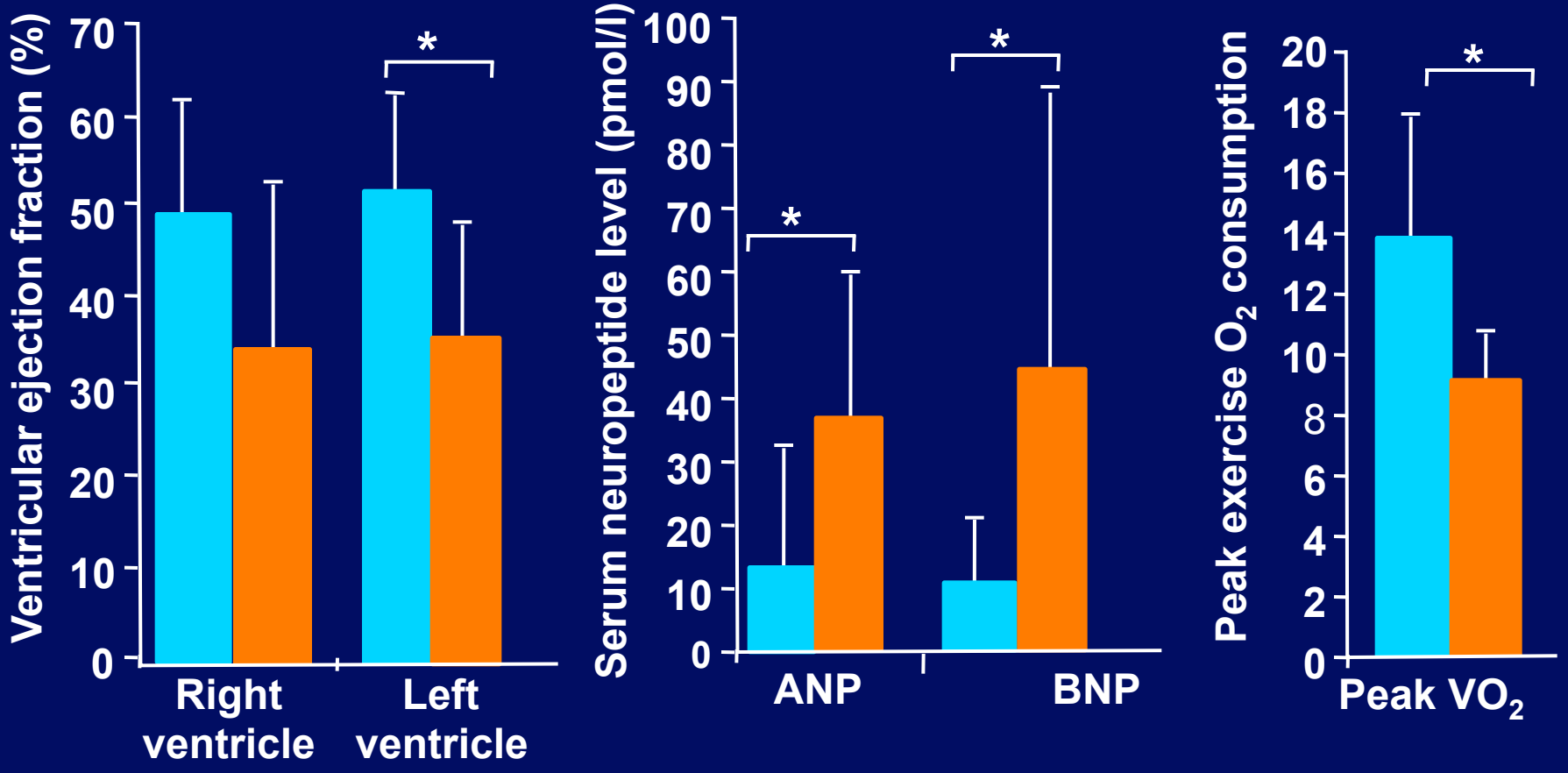
1. Bedard E, *et al. Eur Heart* J 2009; 30:256-65.

Pulmonary arterial thrombus formation in Eisenmenger syndrome

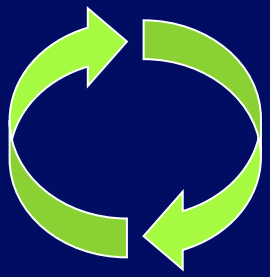




Pulmonary arterial thrombus formation in Eisenmenger syndrome

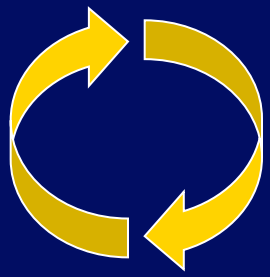


Broberg CS, *et al. J Am Coll Cardiol* 2007



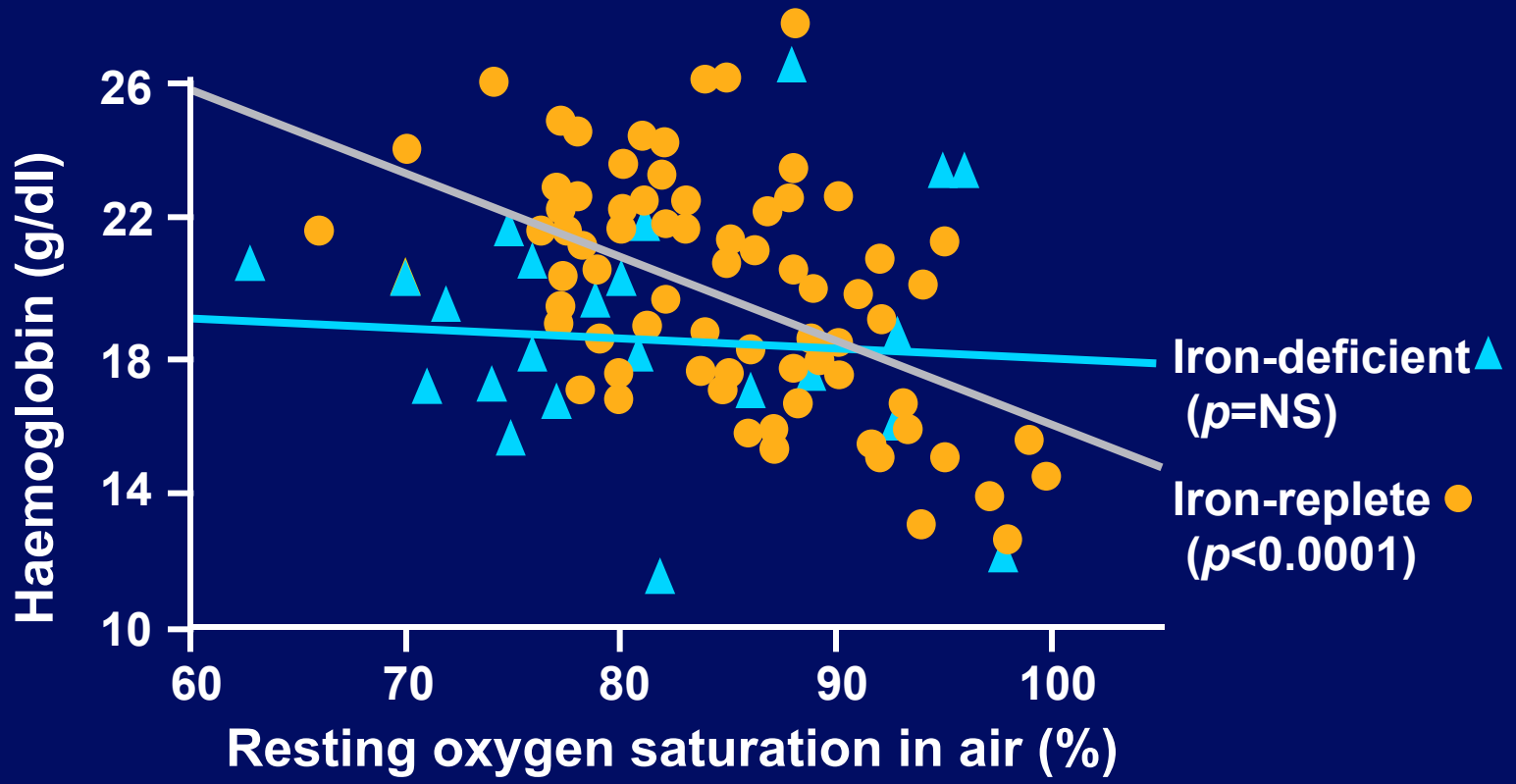
Ventilation

$Q_{p/s}$



O_2 carrying capacity

Muscle



Iron-deficient patients: Hb (mg/dl) = 40.13 – 0.24 * Sat (%). r=-0.39

Diller GP, *et al. Eur Heart J* 2006; 27:1737-42.

Iron deficiency and stroke

Risk of Stroke in Adults With Cyanotic Congenital Heart Disease

Joseph K. Perloff, MD; Ariane J. Marelli, MD; and Pamela D. Miner, RN, MN

Background. **Adults with cyanotic congenital heart disease and elevated hematocrit levels are often phlebotomized because of an assumed risk of cerebral arterial thrombotic stroke. Whether a relation exists between hematocrit level, symptomatic erythrocytosis (hyperviscosity), and stroke remains to be established in this patient population.**

Methods and Results. **Accordingly, 112 cyanotic patients 19–74 years old (mean, 36±11.7 years) in the UCLA Adult Congenital Heart Disease Center Registry were selected for study by virtue of continuous observation for 1–12 years (total, 748 patient-years). Patients with independent risk factors for embolic or vasospastic stroke were excluded. The study patients were then divided into two groups: 1) compensated erythrocytosis (stable hematocrit levels of 46.0–72.7% [mean, 57.5±7.2%], iron replete, absent or mild hyperviscosity symptoms), and 2) decompensated erythrocytosis (unstable rising hematocrit levels of 61.5–75.0% [mean, 69.5±10.6%], iron deficiency, marked-to-severe hyperviscosity symptoms). No patient with either compensated or decompensated erythrocytosis, irrespective of hematocrit level, iron stores, or the presence, degree, or recurrence of cerebral hyperviscosity symptoms, progressed to clinical evidence of a completed stroke (cerebral arterial thrombosis with brain infarction).**

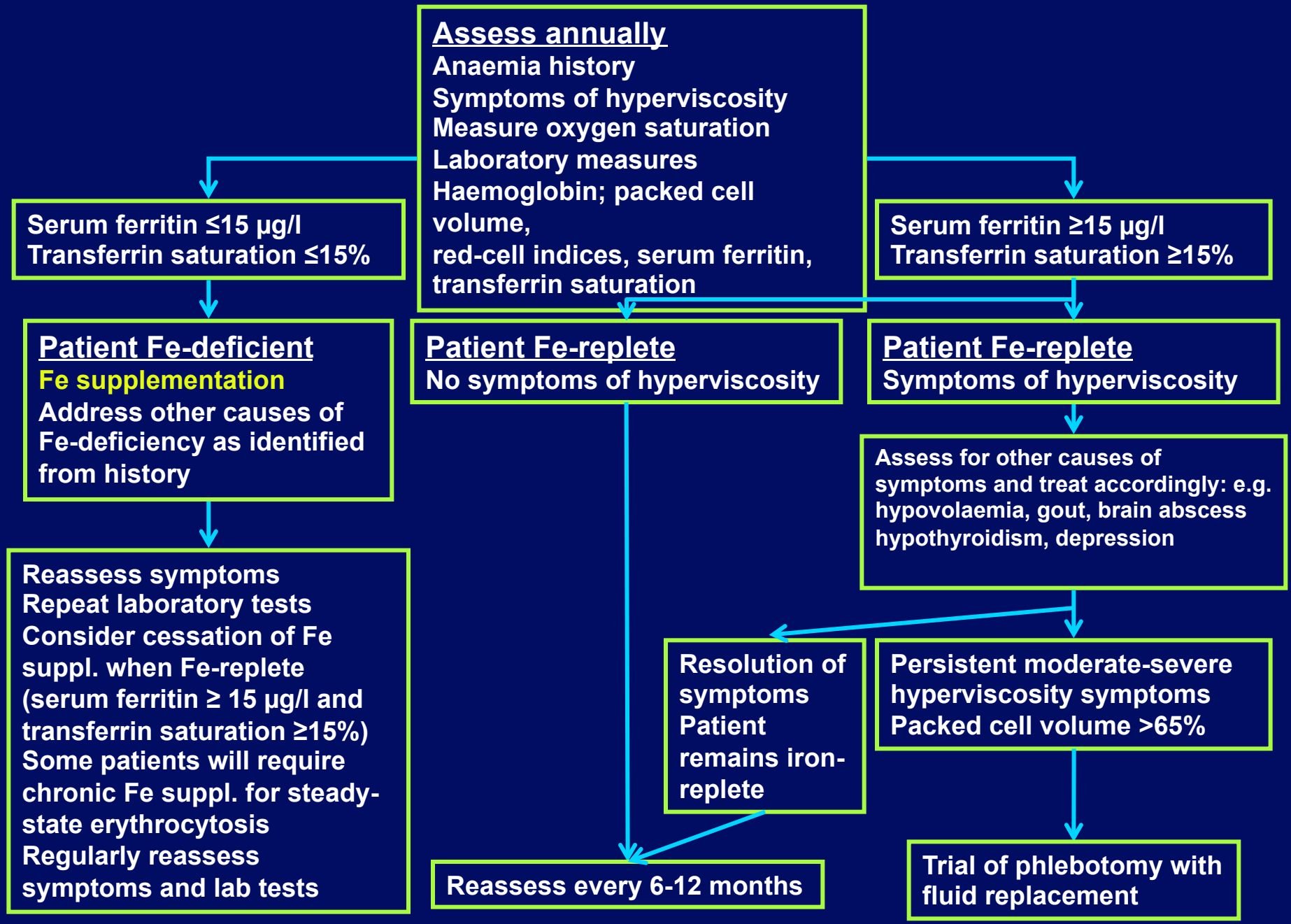
Conclusions. **Because a risk of stroke caused by cerebral arterial thrombosis was not demonstrated, because the circulatory effects of phlebotomy are transient, and because of the untoward sequelae of phlebotomy-induced iron deficiency, we recommend phlebotomy for the temporary relief of significant, intrusive hyperviscosity symptoms but not for the hematocrit level per se. According to our data, phlebotomy is not warranted to reduce an assumed risk of stroke because that risk did not materialize. (*Circulation* 1993;87:1954–1959)**

KEY WORDS • congenital heart disease • stroke • blood cells • hemodynamics

Table 2. Hemodynamic and Hematologic Variables

	Group I (no CVE) (n = 140)	Group II (CVE) (n = 22)	p Value
Continuous variable			
EF (%)			
Range	20–70	34–65	0.707
Mean ± SD	53 ± 9.8	52 ± 8.9	
Hemoglobin			
Range	14.5–23.5	14.5–23.1	0.081
Mean ± SD	17.7 ± 1.86	18.4 ± 2.2	
Hematocrit			
Range	41.7–70.1	41.3–63.1	0.11
Mean ± SD	53.3 ± 6.0	54.4 ± 6.7	
MCV			
Range	57.4–104.5	68.6–89.7	0.345
Mean ± SD	87.8 ± 9.7	85.7 ± 9.8	
Discrete variable			
Hypertension			
Yes	4	3	0.021
No	136	19	
Atrial fibrillation			
Yes	13	6	0.015
No	127	16	
Smoking			
Yes	17	2	0.68
No	123	20	
Phlebotomy			
Yes	35	11	0.016
No	105	11	
Iron deficiency anemia/ microcytosis			
Yes	30	11	0.004
No	110	11	
Antiplatelet intake			
Yes	17	2	0.68
No	123	20	
Warfarin intake			
Yes	17	1	0.29
No	123	21	

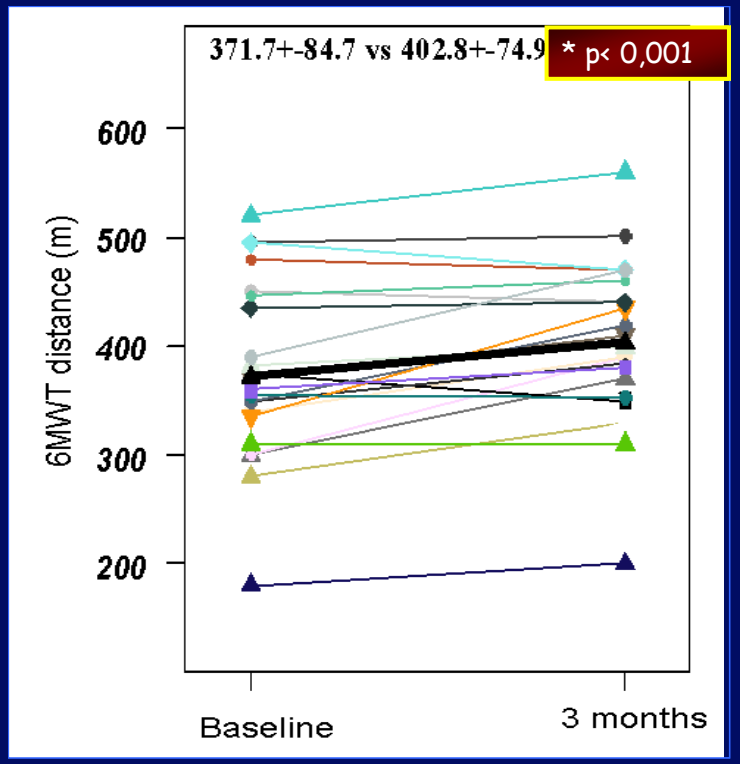
Ammash et al. JACC 1996

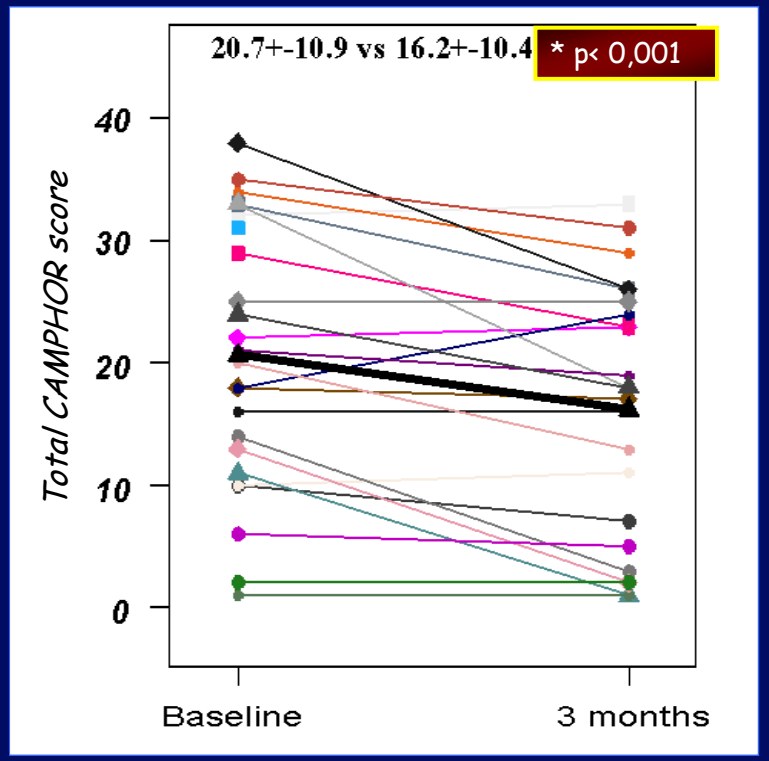


Spence MS, *et al. Lancet* 2007; 370:1530-2.

Replacement therapy for iron deficiency improves exercise capacity and quality of life in patients with cyanotic congenital heart disease and/or the Eisenmenger syndrome

Edgar L.W. Tay [a,*], Ana Peset [a], Maria Papaphylactou [a], Ryo Inuzuka [a], Rafael Alonso-Gonzalez [a], Georgios Giannakoulas [a], Aphrodite Tzifa [a], Sara Goletto [a], Craig Broberg [a], Konstantinos Dimopoulos [a,b], Michael A. Gatzoulis [a,b]





Prospective, single center, non-randomized study.

N= 25 cyanotic ACHD with iron deficiency

Int J Cardiol 2011

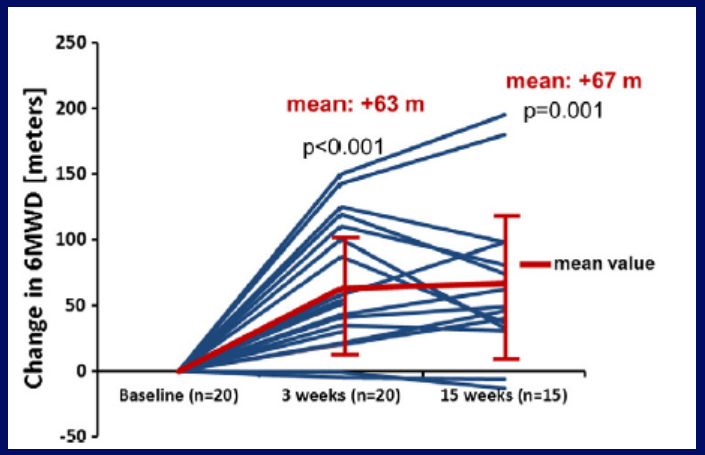
Contents lists available at SciVerse ScienceDirect

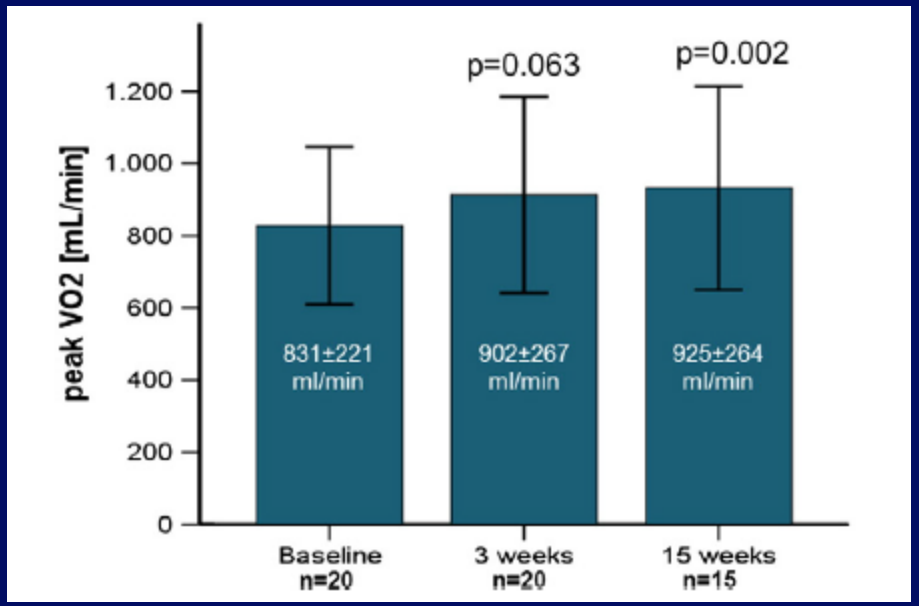
International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

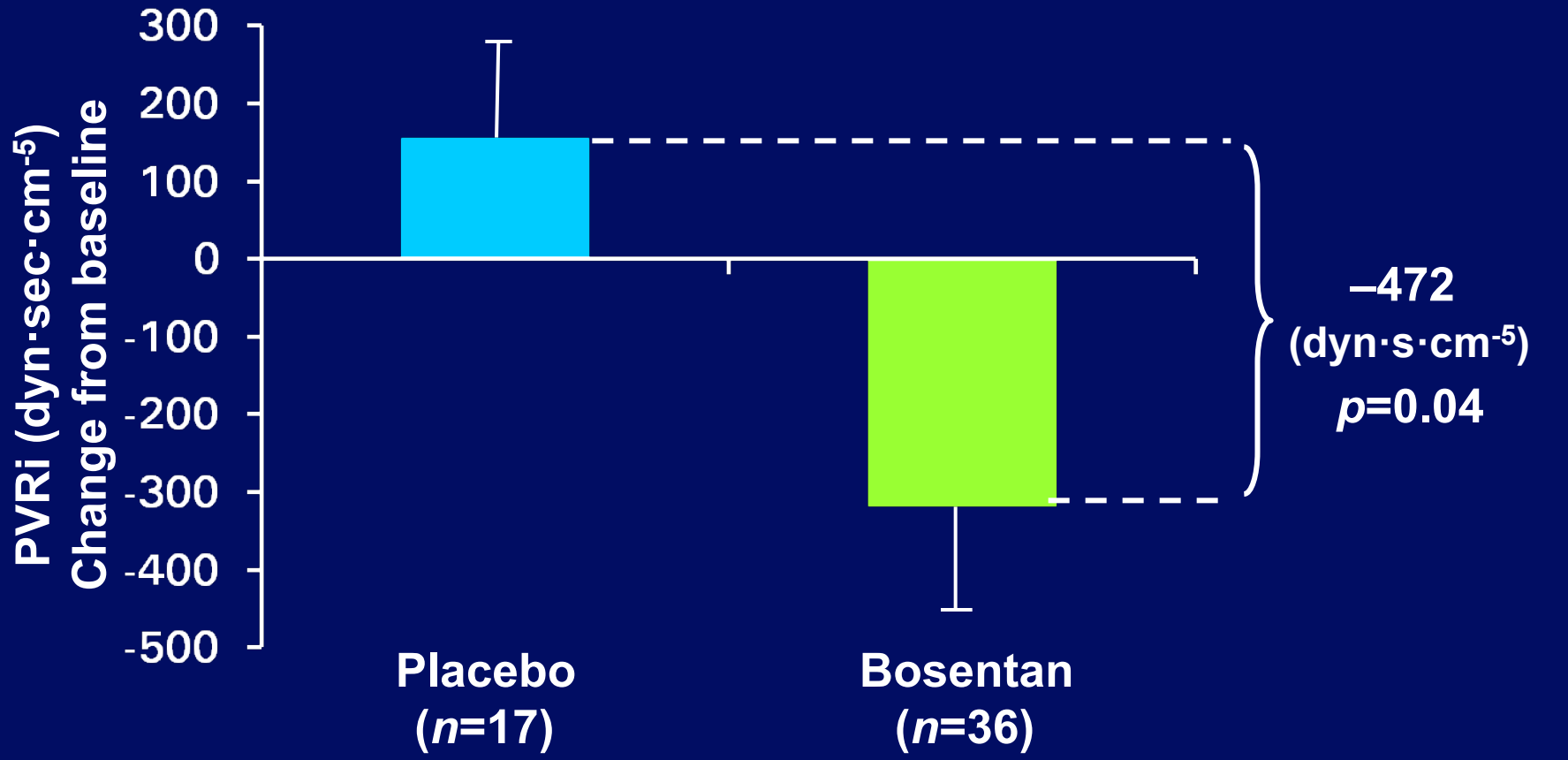
Efficacy of exercise training in pulmonary arterial hypertension associated with congenital heart disease☆,☆☆

Tabea Becker-Grünig [a,1], Hans Klose [i,1], Nicola Ehlken [a], Mona Lichtblau [a], Christian Nagel [a], Christine Fischer [b], Matthias Gorenflo [c], Henning Tiede [d], Dietmar Schranz [e], Alfred Hager [f], Harald Kaemmerer [f], Oliver Miera [g], Silvia Ulrich [h], Rudolf Speich [h], Sören Uiker [j], Ekkehard Grünig [a,*]



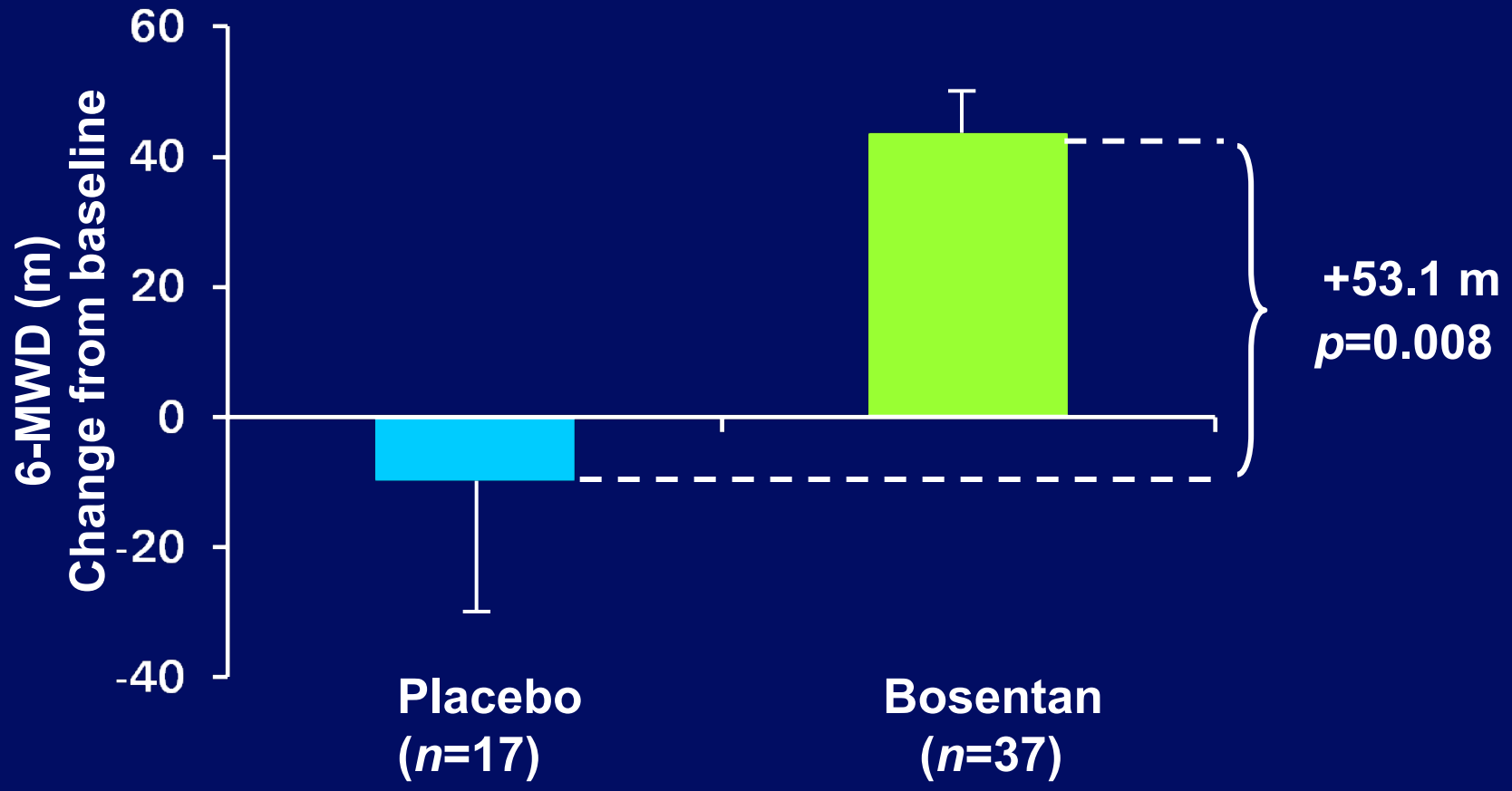


Bosentan significantly reduced PVR: BREATHE-5



Galiè N, *et al. Circulation* 2006; 114:48-54.

Bosentan significantly increased exercise capacity: BREATHE-5



Galiè N, *et al. Circulation* 2006; 114:48-54.

Sildenafil and quality of life

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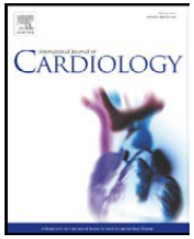


Quality of life and functional capacity can be improved in patients with Eisenmenger syndrome with oral sildenafil therapy

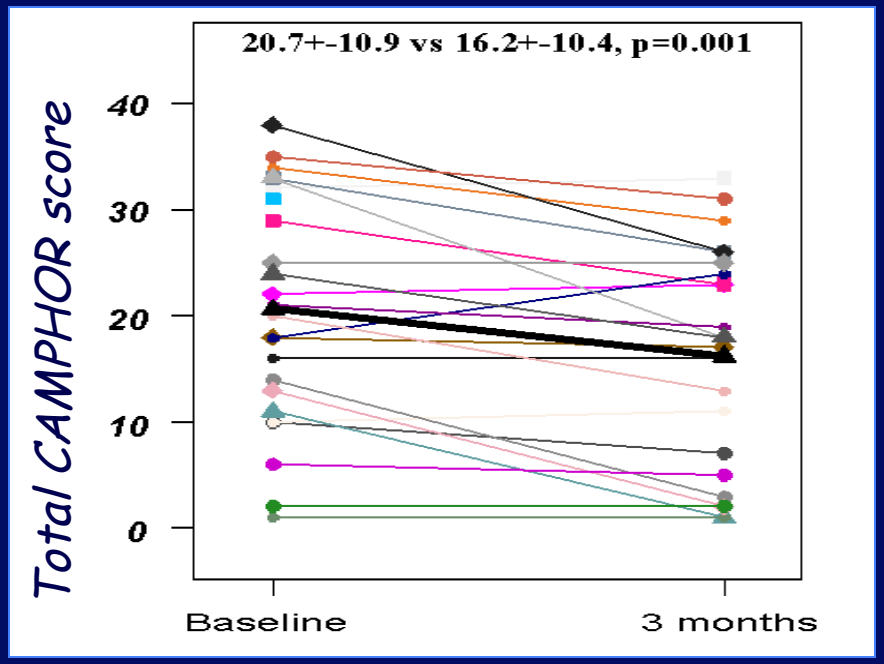
Edgar L.W. Tay [a], Maria Papaphylactou [a], Gerhard Paul Diller [a], Rafael Alonso-Gonzalez [a], Ryo Inuzuka [a], Georgios Giannakoulas [a], Carl Harries [a], Stephen John Wort [a], Lorna Swan [a], Konstantinos Dimopoulos [a,b,*], Michael A. Gatzoulis [a,b]

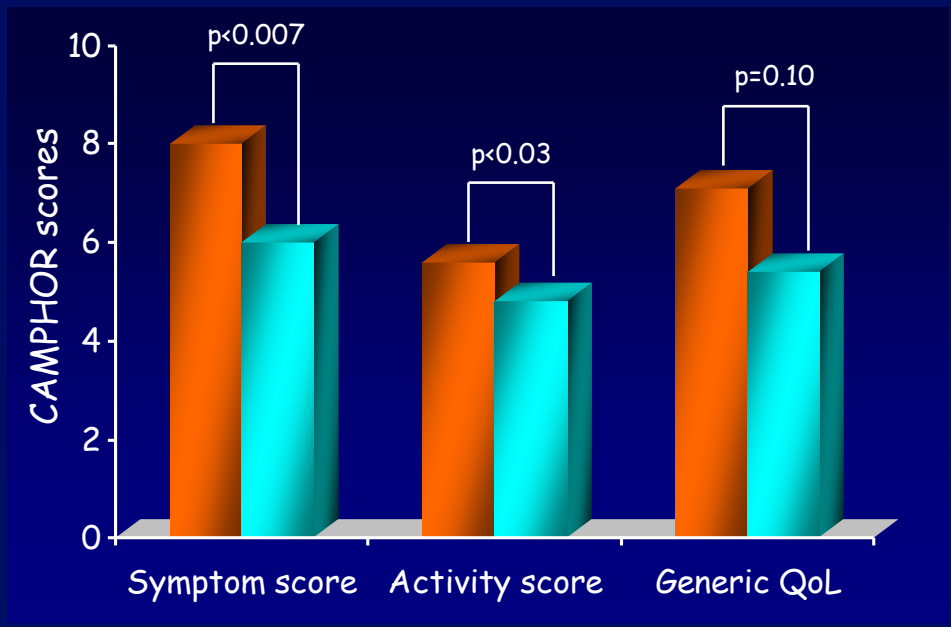
[a] *Adult Congenital Heart Centre and Centre for Pulmonary Hypertension, Royal Brompton Hospital, London, UK*
[b] *National Heart Lung Institute, Imperial College of Science and Medicine, London, UK*

Prospective study, n=12 patients with Eisenmenger syndrome,

NYHA class III, sildenafil for 3 months

Effect on quality of life





Tay ELT, *et al. Int J Cardiol 2010*

Have we improved survival?

Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION

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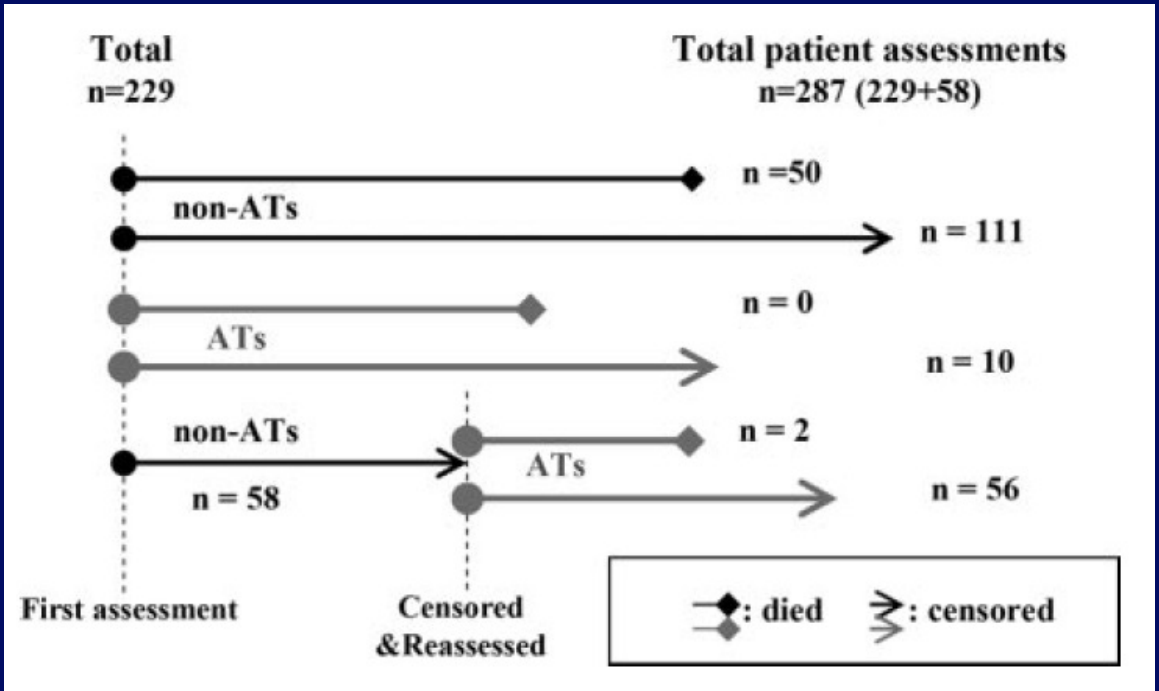
Improved Survival Among Patients With Eisenmenger Syndrome Receiving Advanced Therapy for Pulmonary Arterial Hypertension

Konstantinos Dimopoulos, Ryo Inuzuka, Sara Goletto, Georgios Giannakoulas, Lorna Swan, Stephen J. Wort and Michael A. Gatzoulis

Circulation published online Dec 21, 2009;
DOI: 10.1161/CIRCULATIONAHA.109.883876
Circulation is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 72514
Copyright © 2009 American Heart Association. All rights reserved. Print ISSN: 0009-7322. Online ISSN: 1524-4539

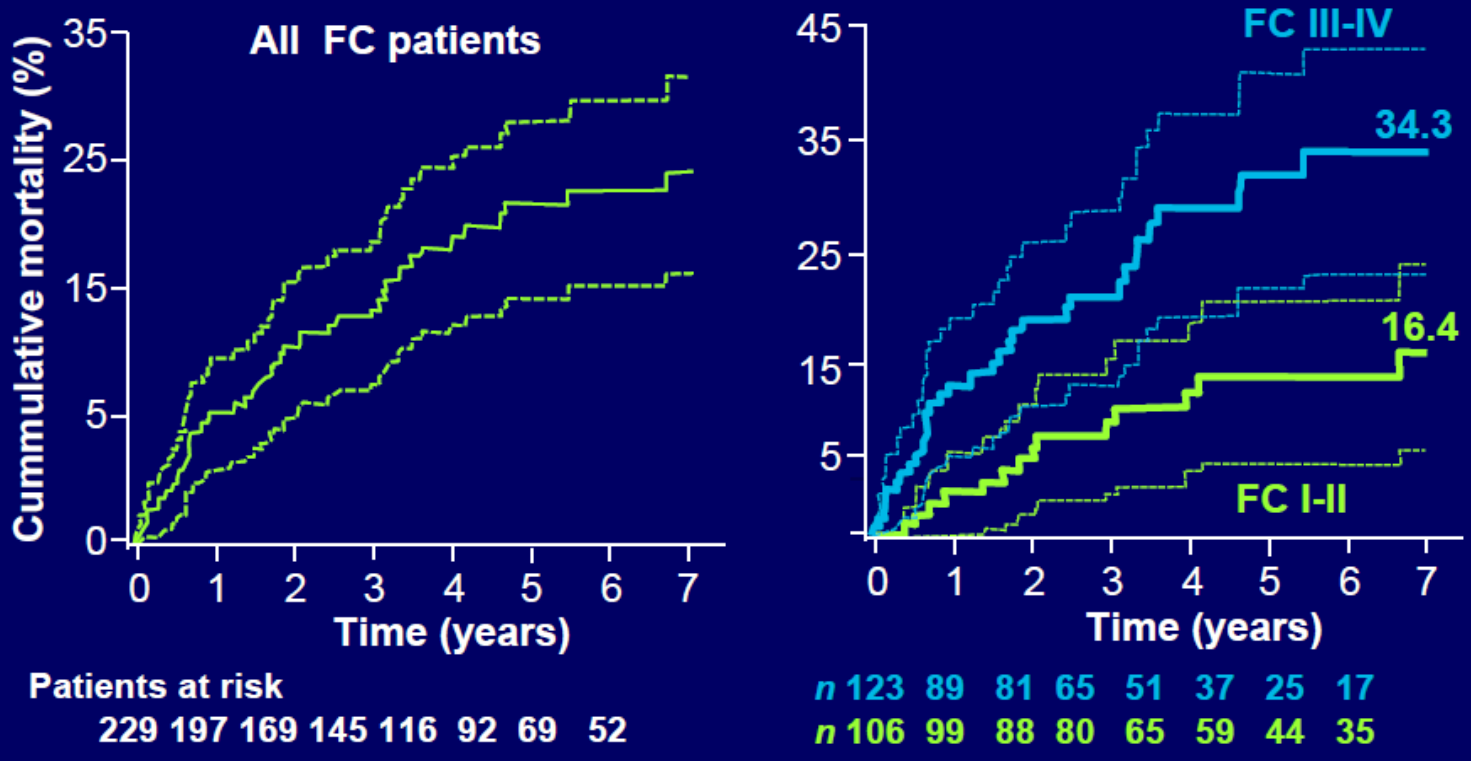
Study design



- 229 patients (34.5±12.6 years; 35% male)
- 54% NYHA class >III
- 30% Down syndrome
- Mean resting saturations 84%
- 68 patients (30%) either were on AT or had AT initiated during follow-up
- 73.5% bosentan, 25% sildenafil, 1.5% epoprostenol

Dimopoulos et al. Circulation 2010

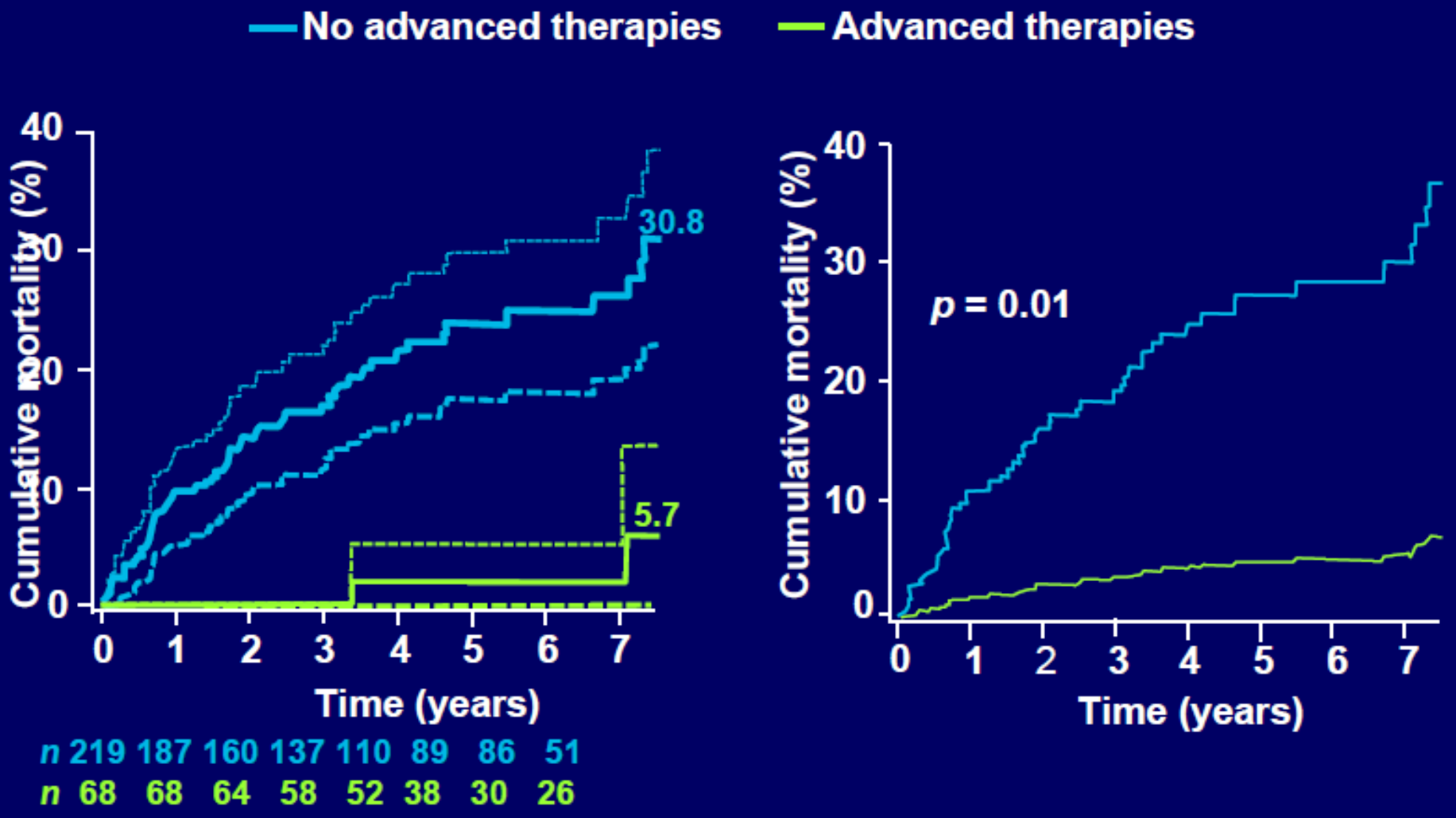
Contemporary survival in Eisenmenger syndrome: Relation to functional class



Dimopoulos et al Circulation 2010

The overall 5-year mortality rate was 23.3% and was higher in patients in NYHA class >III (32.2% versus 14.1% in class II or less; log rank P<0.006)

Cumulative mortality with advanced therapies



Dimopoulos et al Circulation 2010

Long term efficacy of disease targeting therapies in Eisenmenger syndrome

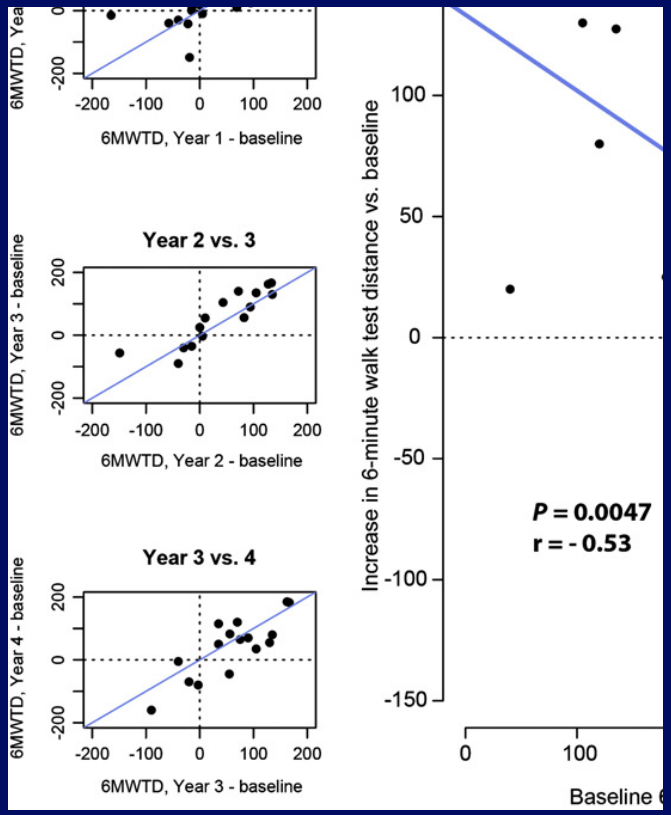
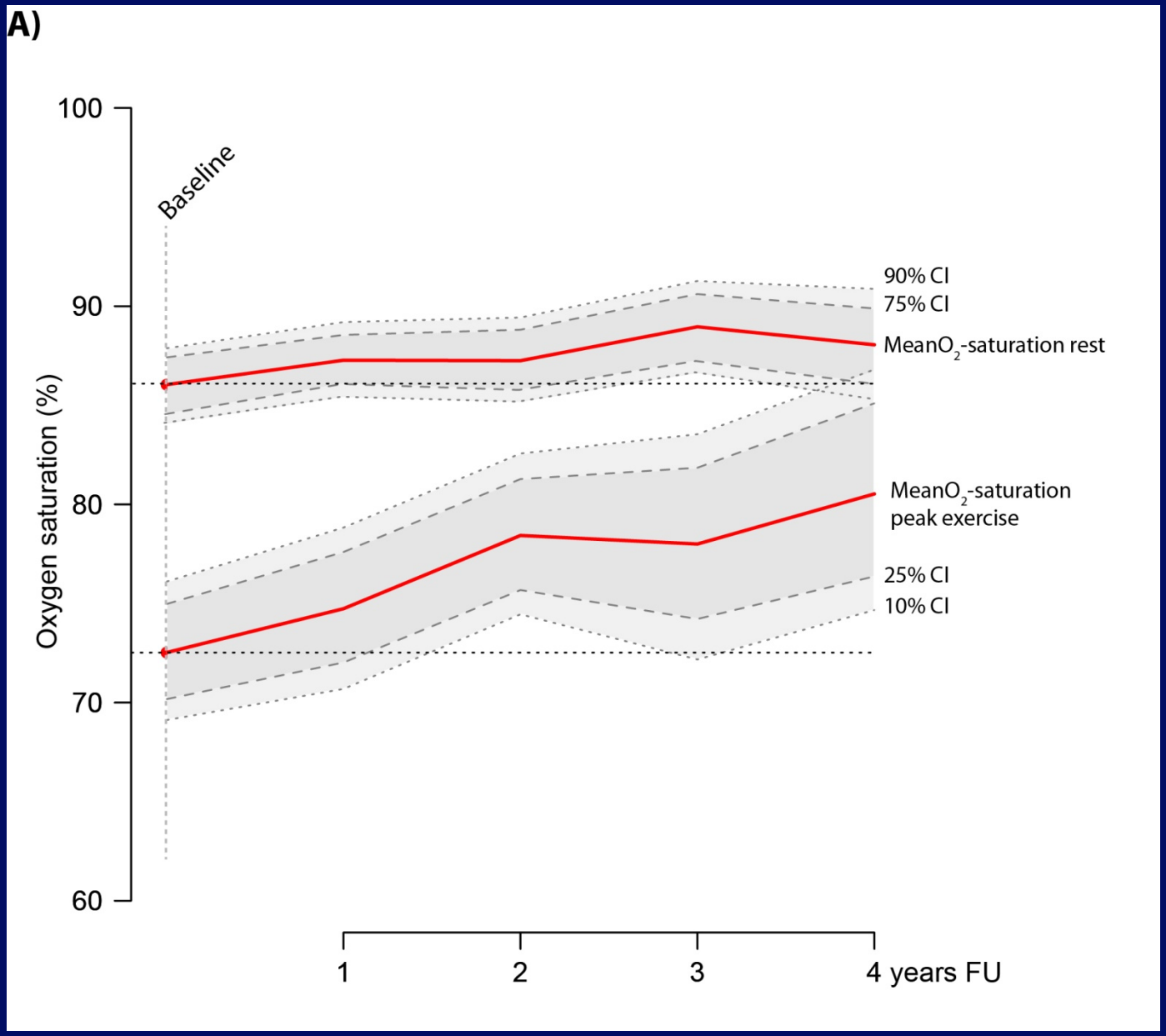


Fig. 3. Left hand panel: Scatterplots with superimposed lines of identity of change in 6-minute walk te
plot: Scatterplot illustrating the association between baseline 6MWTd and increase in 6MWTd at year

Please cite this article as: Diller G-P, et al, Disease targeting therapies in patients
long-term efficiency, Int J Cardiol (2012), doi:10.1016/j.ijcard.2012.02.007

Diller G et al. IJC 2012



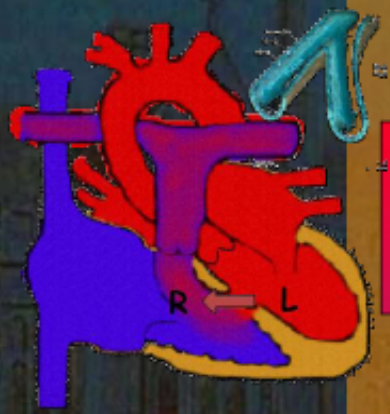
Diller GP, *IJC 2012*

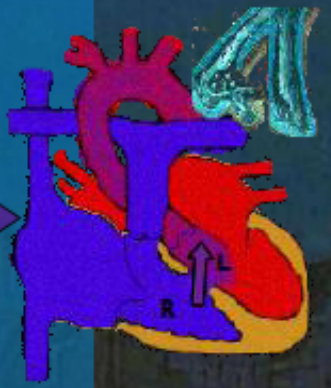
Areas for future research

Treat and repair approach

PAH associated with L-R shunts

Eisenmenger syndrome





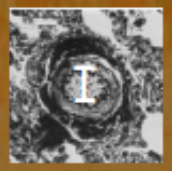
L-R

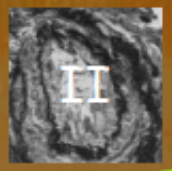
Bidirectional/RL shunt

R-L

Endothelial dysfunction

Shear stress & stretch Vascular Remodeling

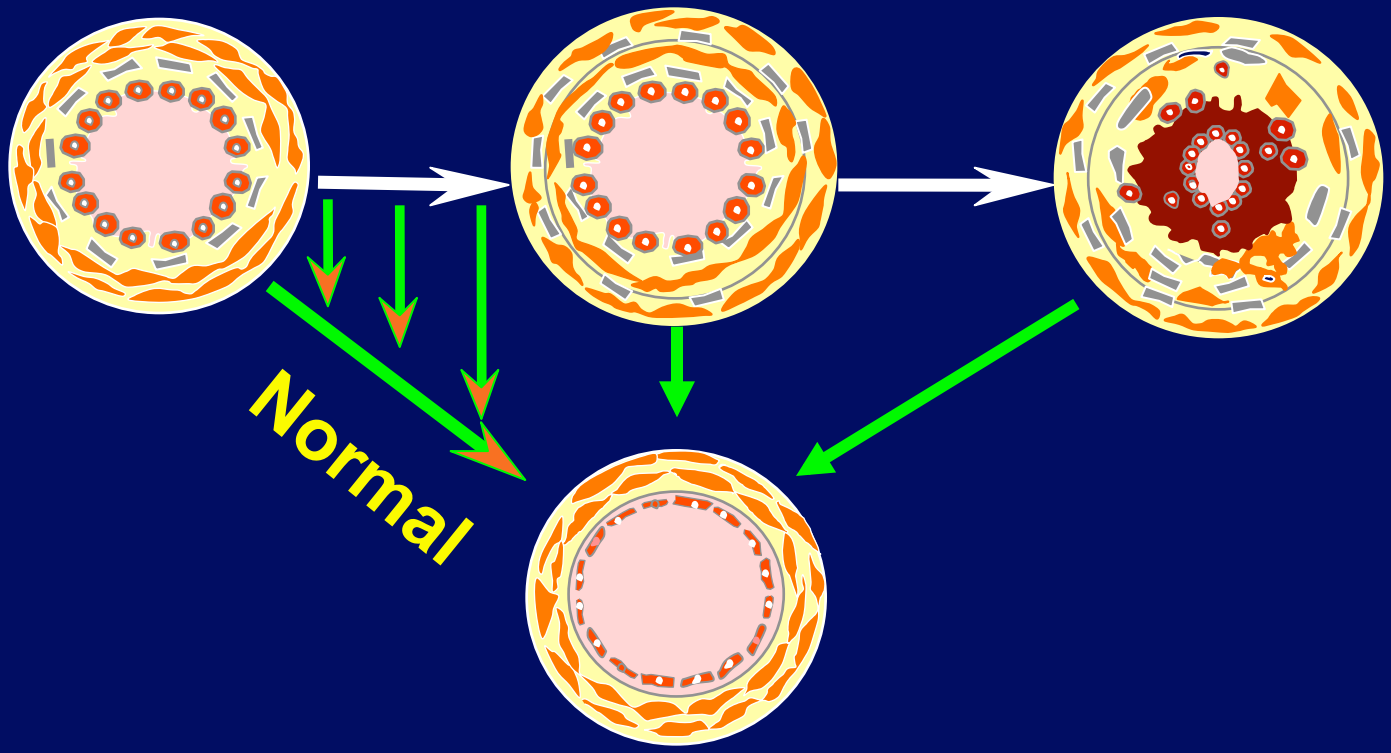




PVR

Borderline operative indications: Perspectives

- Opportunity to treat patients (new therapies) with increased PVR that contraindicate surgery, in order to remodel the vascular bed and to allow complete correction of the underlying anatomical lesions



Vasoreactivity in CHD-related PAH

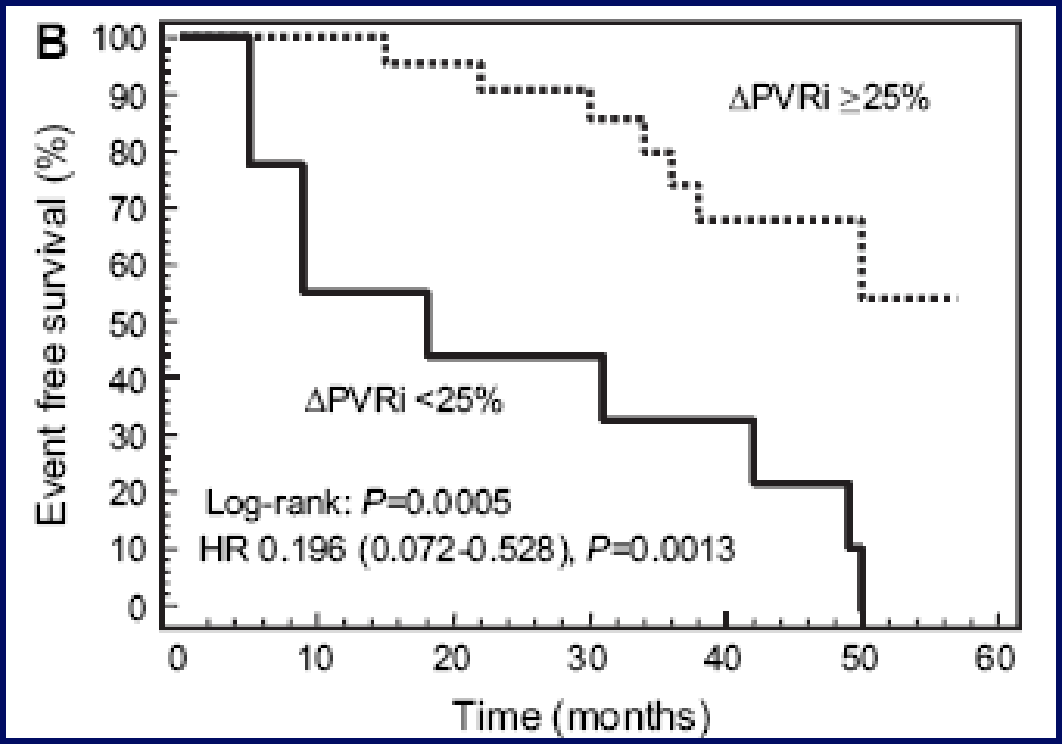
Table 11 Recommendations for right heart catheterization (A) and vasoreactivity testing (B)

	Class[a]	Level[b]
A		
RHC is indicated in all patients with PAH to confirm the diagnosis, to evaluate the severity, and when PAH specific drug therapy is considered	I	C
RHC should be performed for confirmation of efficacy of PAH-specific drug therapy	IIa	C
RHC should be performed for confirmation of clinical deterioration and as baseline for the evaluation of the effect of treatment escalation and/or combination therapy	IIa	C
B		
Vasoreactivity testing is indicated in patients with IPAH, heritable PAH, and PAH associated with anorexigen use to detect patients who can be treated with high doses of a CCB	I	C
Vasoreactivity testing may be performed in other types of PAH	IIb	C
nitric oxide as vasodilator		
Vasoreactivity testing may be performed in other types of PAH	IIb	C
Vasoreactivity testing may be performed using i.v. epoprostenol or i.v. adenosine	IIb	C
The use of an oral or i.v. CCB in acute vasoreactivity testing is not recommended	III	C
Vasoreactivity testing to detect patients who can be safely treated with high doses of a CCB is not recommended in patients with other PH groups (groups 2, 3, 4, and 5)	III	C

Galie et al. EHJ 2009

Pulmonary vasoreactivity predicts long-term outcome in patients with Eisenmenger syndrome receiving bosentan therapy

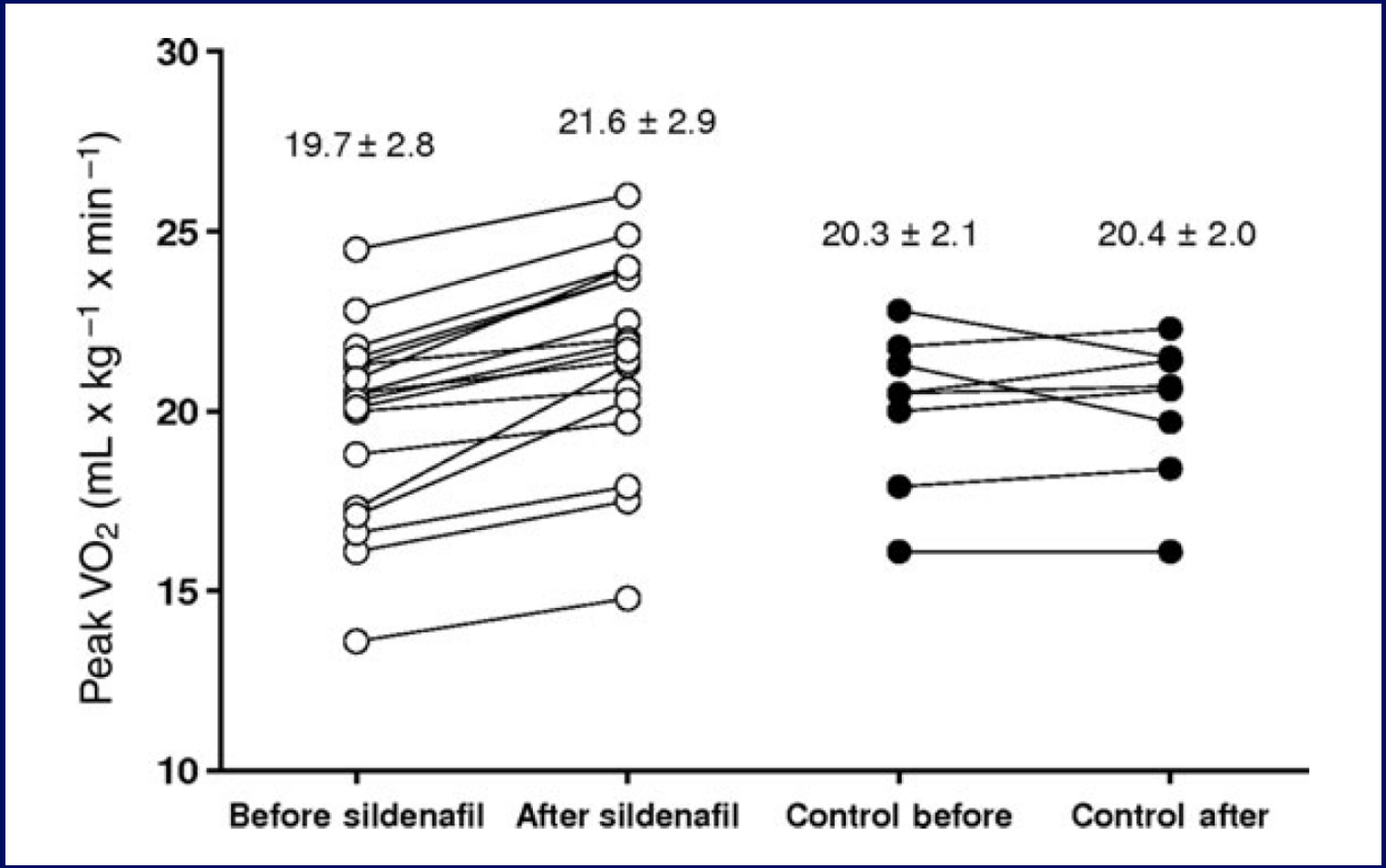
Michele D'Alto,[1] Emanuele Romeo,[1] Paola Argiento,[1] Giuseppe Santoro,[1] Berardo Sarubbi,[1] Giampiero Gaio,[1] Christian Mélot,[2] Maria Giovanna Russo,[1] Robert Naeije,[3] Raffaele Calabrò[1]



N=38 consecutive patients with CHD-PAH and Eisenmenger syndrome under bosentan treatment

Heart 2010

Sildenafil in Fontan patients

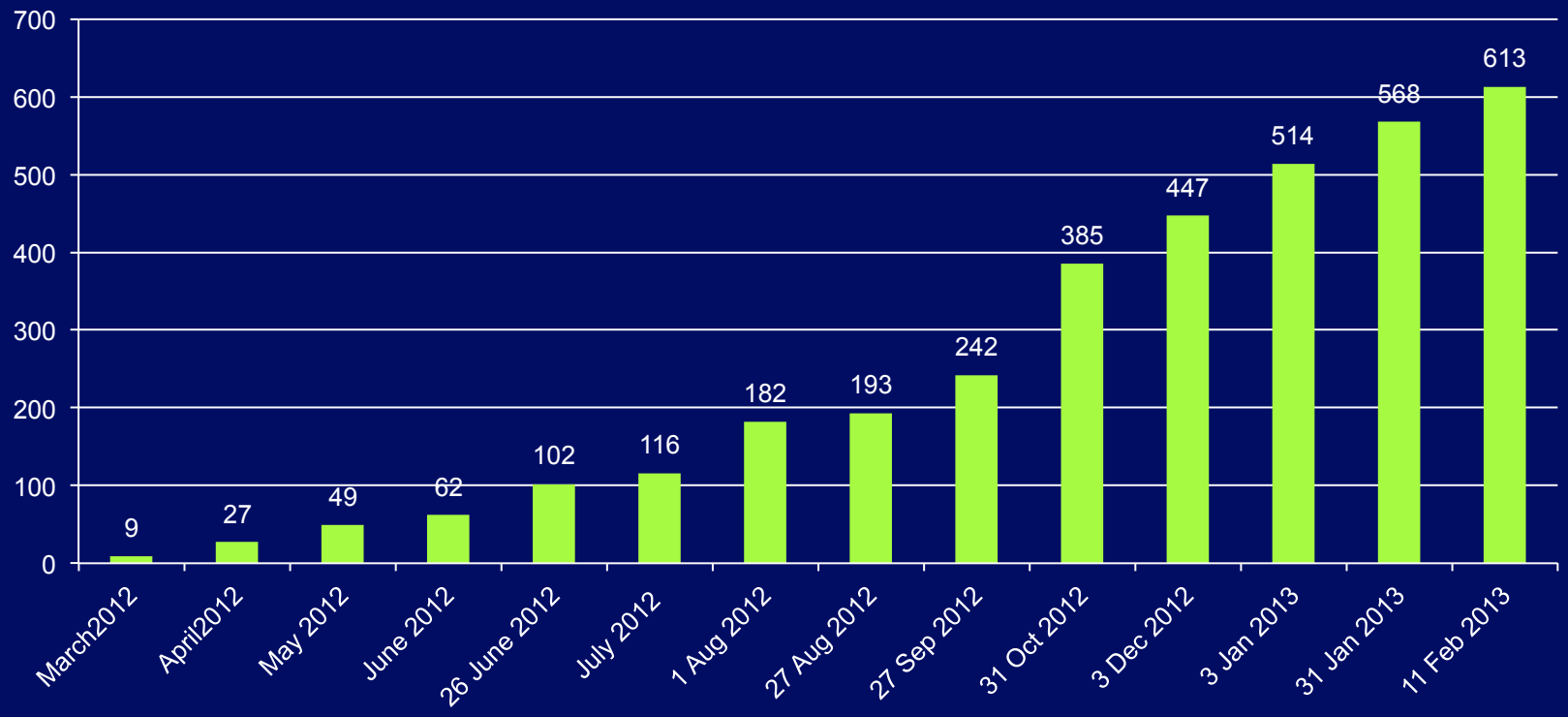


Giardini et al. EHJ 2008

ΕΛΛΗΝΙΚΗ ΚΑΡΔΙΟΛΟΓΙΚΗ ΕΤΑΙΡΕΙΑ
·1948·

Challenge

ΜΗΤΡΩΟ ΚΑΤΑΓΡΑΦΗΣ ΑΣΘΕΝΩΝ
ΜΕ ΣΥΓΓΕΝΕΙΣ ΚΑΡΔΙΟΠΑΘΕΙΕΣ



Thank you

giannak@med.auth.gr

BACK UP slides

Recommendation

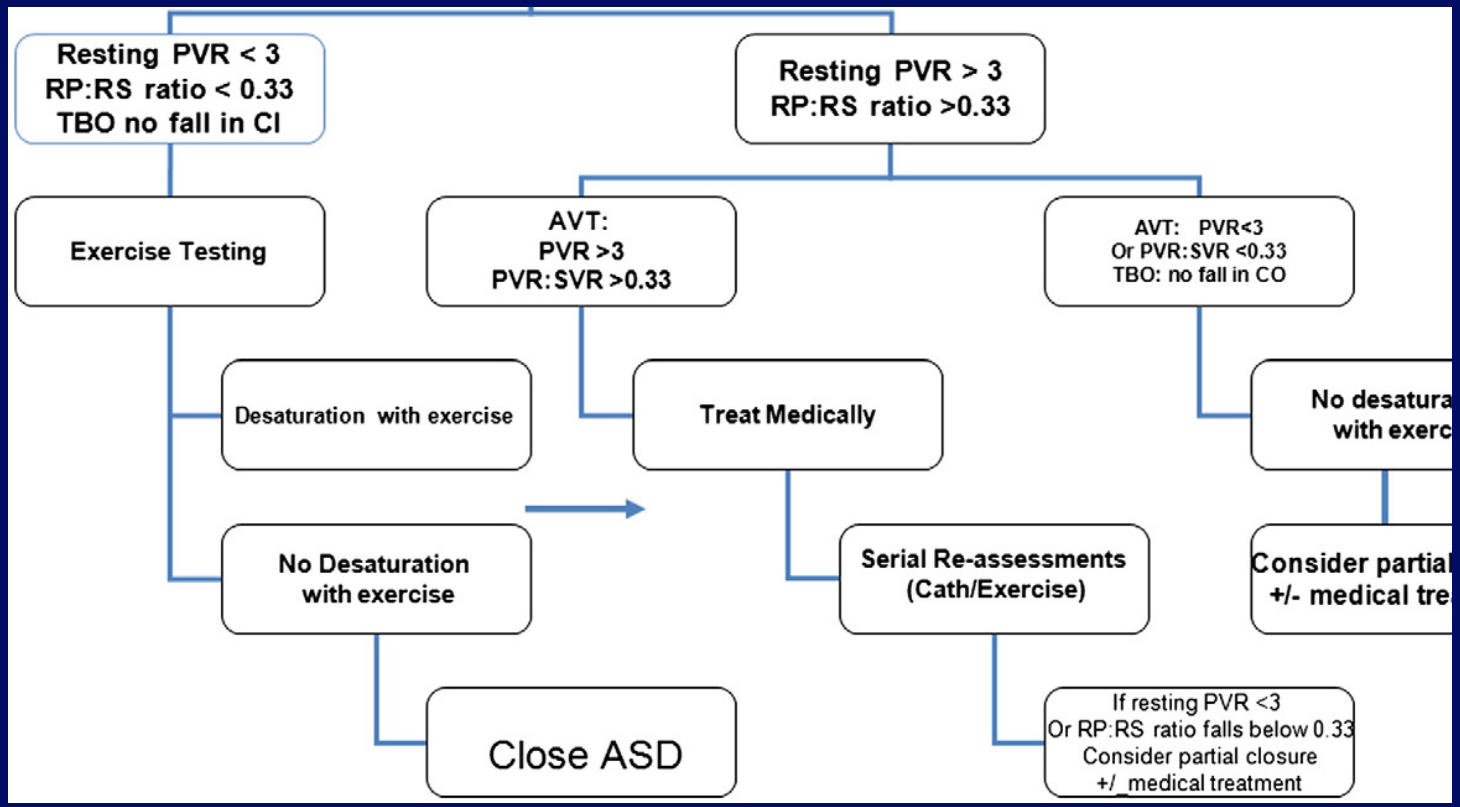
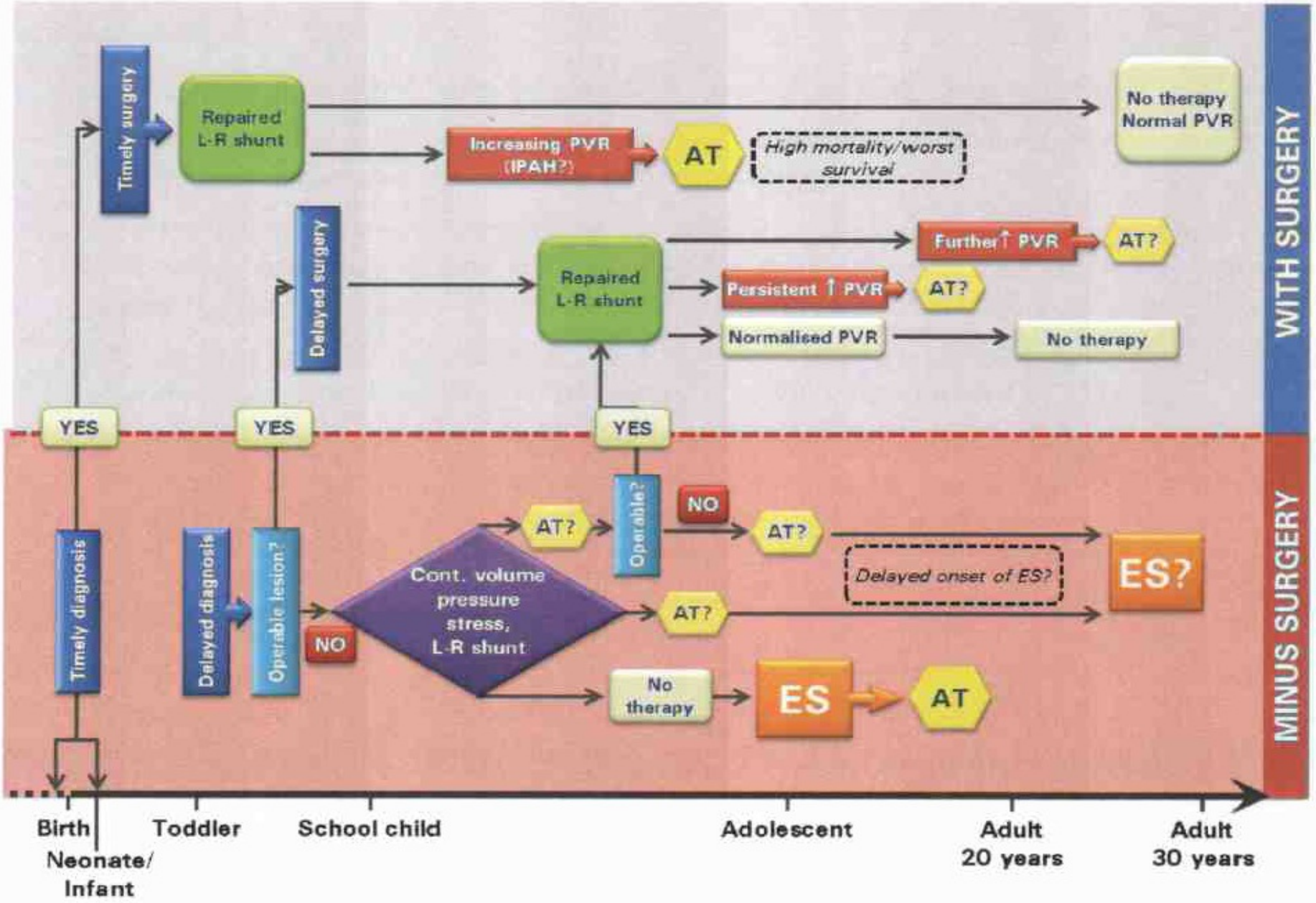


Fig. 1. CHD/PH (ASD) Clinical management algorithm: Individualized case approach.

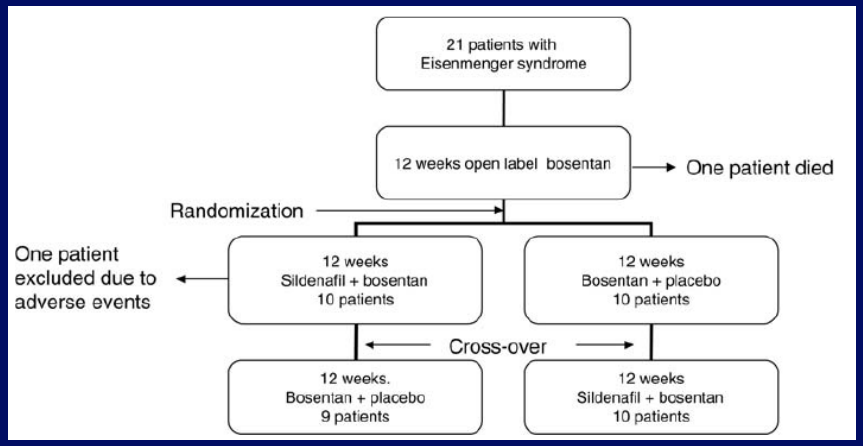
Rosenzweig EB, et al. Prog Card Dis 2012

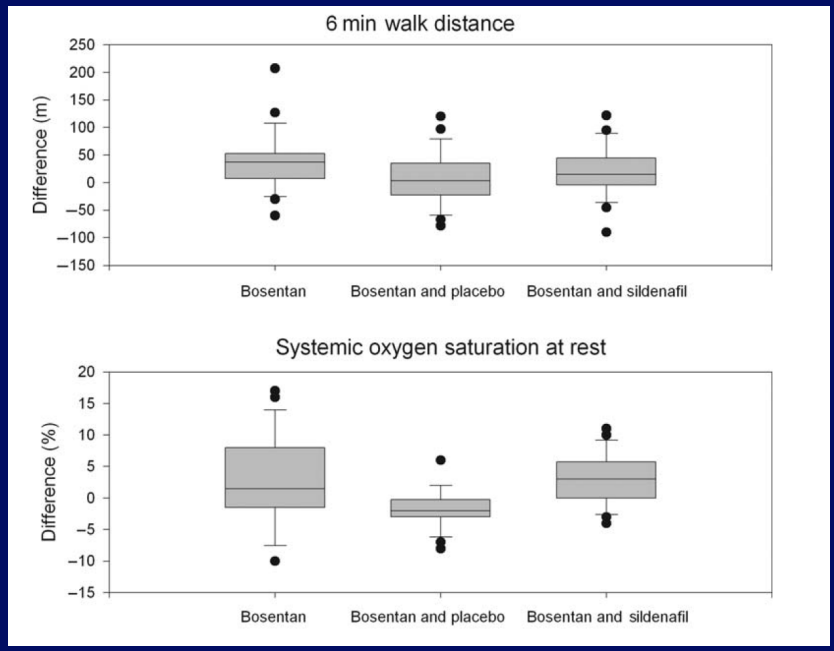
Figure 1: The PAH-CHD continuum: From operable disease to shunt reversal*



*Timelines may differ depending on anatomical features of the defect, including location and size.

Combination therapy





Adding sildenafil to bosentan did not improve the 6 MWD significantly (21 vs. 8 m, P = 0.48), but increased saturation at rest (2.9 vs. –1.8%, P<0.01)

Iversen et al. EHJ 2010

Escalation of therapy

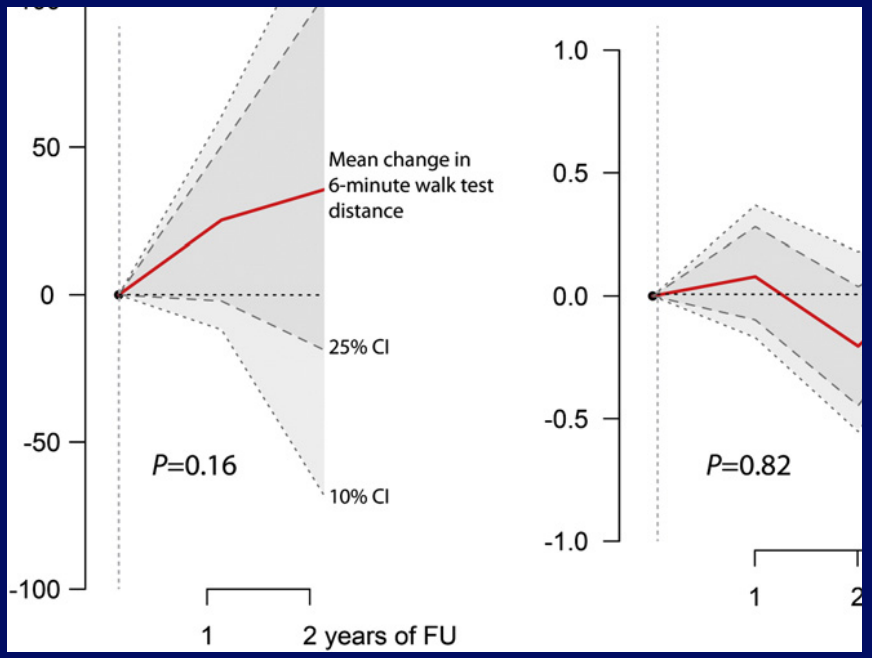


Fig. 6. Temporal change in 6-minute walk test distance (6MWTd) and functional class (FC) after escalation of advar

Please cite this article as: Diller G-P, et al, Disease targeting therapies in patients with Eis
long-term efficiency, Int J Cardiol (2012), doi:10.1016/j.ijcard.2012.02.007

Diller G et al. IJC 2012

Conclusions

- CHD-related PAH may encompass various phenotypes with different pathophysiology and natural history.
- Eisenmenger syndrome, the extreme end of the spectrum, is associated with multiple systemic complications and multiorgan failure
- More research is required in areas such as “treat and repair” approach, vasoreactivity testing

Conclusions

- Eisenmenger syndrome differs significantly from other types of pulmonary arterial hypertension in terms of pathophysiology and natural history.
- Eisenmenger syndrome is associated with multiple systemic complications and multiorgan failure
- Risk stratification and treat on target approach might be an option when assessing and providing therapy in these patients
- Advanced therapies have been shown to improve haemodynamics, exercise capacity and survival in Eisenmenger population