



Hospices
Civils de
Lyon



“Timing of Surgery in Infective Endocarditis”



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Hôpital Louis Pradel
LYON - France***



<u>Affiliation/Financial Relationship</u>	<u>List of companies</u>
> Grant/Research Support	Boeringher, Saint Jude Medical, Abbott, Medtronic, Edwards
> Consulting Fees/Honoraria	Saint Jude Medical
> Major Stock Shareholder/Equity	
> Royalty Income	Landanger, Delacroix-Chevalier
> Ownership/Founder	
> Intellectual Property Rights	Landanger, Delacroix-Chevalier
> Other Financial Benefit	Medtronic, Sorin, Thoratec, Astra Zeneca



Indication of surgery is often difficult in IE and Timing is more complex.

- Incidence → 50/million
- Mortality → 20%
- Surgery → 50 %

Guidelines

Guidelines on Prevention, Diagnosis and Treatment of Infective Endocarditis Full Text

2004

37p 390 ref

The Task Force on Infective Endocarditis of the European Society of Cardiology

Task Force Members: Dieter Horstkotte, (Chairperson)* (Germany), Ferenc Follath (Switzerland), Erno Gutschik (Denmark), Maria Lengyel (Hungary), Ali Oto (Turkey), Alain Pavie (France), Jordi Soler-Soler (Spain), Gaetano Thiene (Italy), Alexander von Graevenitz (Switzerland)

Litterature

Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009)

2009

44p 386 ref

The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC)

Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and by the International Society of Chemotherapy (ISC) for Infection and Cancer

Authors/Task Force Members: Gilbert Habib (Chairperson) (France)*, Brana Haddad (France), Pilar Tomas (Spain), Franck Thuny (France), Bernard Proulx (UK), Ildre Wacziarg (Spain), Philippe Moreillon (Switzerland)

Meta Analysis

2015 ESC Guidelines for the management of infective endocarditis

2015

54p 483 ref

The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC)

Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM)

Authors/Task Force Members: Gilbert Habib* (Chairperson) (France), Patrizio Lancellotti* (co-Chairperson) (Belgium), Manuel J. Antunes (Portugal), Maria Grazia Bongiorni (Italy), Jean-Paul Casalta (France), Francesco Del Zotti (Italy),

Conclusion

Recommandations de la Société française de cardiologie **SFC 2005** la prise en charge des valvulopathies acquises et des dysfonctions de prothèse valvulaire

2006 Guidelines for the Management of Patients With Valvular Disease ACC/AHA 2006 Revise 1998

EuroEcho 2010 the practice of echocardiography in the management of infective endocarditis

2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: Executive Summary A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

British 2012 Infective endocarditis and antibiotic chemotherapy

Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications A Scientific Statement for Healthcare Professionals from the American Heart Association **2015 AHA**

Endorsed by the Infectious Diseases Society of America



Guidelines on Prevention, Diagnosis and Treatment of Infective Endocarditis Full Text

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2004

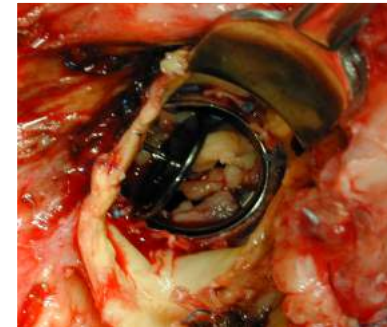


Table 11 Complications where surgery should be considered during active NVE

- Acute aortic or mitral regurgitation and CHF
- Evidence of perivalvular extension (locally uncontrolled infection)
- Persistent infection after 7–10 days of adequate antibiotic therapy
- Infection due to microorganisms with a poor response to antibiotic treatment (fungi, *Brucella spp.*, *Coxiella spp.*, *Staphylococcus lugdunensis*, enterococcus ssp. with high-level resistance to gentamicin, gram-negative organisms)
- Mobile vegetation >10 mm size before or during the first week of antibiotic treatment
- Recurrent emboli despite appropriate antibiotic therapy
- Obstructive vegetations

Table 12 Complications where surgery should be considered during active PVE

- Early PVE
- Haemodynamically significant prosthetic valve malfunction
- Evidence of perivalvular extension
- Persistent infection after 7–10 days of adequate antibiotic therapy
- Recurrent emboli despite appropriate antibiotic therapy
- Infections due to microorganisms with a poor response to antibiotic treatment
- Obstructive vegetations



Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009)

The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC)

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Authors/Task Force Members: Gilbert Habib (Chairperson) (France)*, Bruno Hoen (France), Pilar Tornos (Spain), Franck Thuny (France), Bernard Prendergast (UK), Isidre Vilacosta (Spain), Philippe Moreillon (Switzerland),



2009
Emergency < 24h
Urgent < 7j
Elective → hospit



Table 19 Indications and timing of surgery in left-sided native valve infective endocarditis

Recommendations: Indications for surgery	Timing*	Class*	Level†
A - HEART FAILURE			
Aortic or mitral IE with severe acute regurgitation or valve obstruction causing refractory pulmonary oedema or cardiogenic shock	Emergency	I	B
Aortic or mitral IE with fistula into a cardiac chamber or pericardium causing refractory pulmonary oedema or shock	Emergency	I	B
Aortic or mitral IE with severe acute regurgitation or valve obstruction and persisting heart failure or echocardiographic signs of poor haemodynamic tolerance (early mitral closure or pulmonary hypertension)	Urgent	I	B
Aortic or mitral IE with severe regurgitation and no HF	Elective	IIa	B
B - UNCONTROLLED INFECTION			
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent	I	B
Persisting fever and positive blood cultures > 7–10 days	Urgent	I	B
Infection caused by fungi or multiresistant organisms	Urgent/elective	I	B
C - PREVENTION OF EMBOLISM			
Aortic or mitral IE with large vegetations (> 10 mm) following one or more embolic episodes despite appropriate antibiotic therapy	Urgent	I	B
Aortic or mitral IE with large vegetations (> 10 mm) and other predictors of complicated course (heart failure, persistent infection, abscess)	Urgent	I	C
Isolated very large vegetations (> 15 mm)†	Urgent	IIb	C

Table 23 Indications and timing of surgery in prosthetic valve infective endocarditis (PVE)

Indications for surgery in PVE	Timing*	Class*	Level†
A - HEART FAILURE			
PVE with severe prosthetic dysfunction (dehiscence or obstruction) causing refractory pulmonary oedema or cardiogenic shock	Emergency	I	B
PVE with fistula into a cardiac chamber or pericardium causing refractory pulmonary oedema or shock	Emergency	I	B
PVE with severe prosthetic dysfunction and persisting heart failure	Urgent	I	B
Severe prosthetic dehiscence without HF	Elective	I	B
B - UNCONTROLLED INFECTION			
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent	I	B
PVE caused by fungi or multiresistant organisms	Urgent/elective	I	B
PVE with persisting fever and positive blood cultures > 7–10 days	Urgent	I	B
PVE caused by staphylococci or gram negative bacteria (most cases of early PVE)	Urgent/elective	IIa	C
C - PREVENTION OF EMBOLISM			
PVE with recurrent emboli despite appropriate antibiotic treatment	Urgent	I	B
PVE with large vegetations (> 10 mm) and other predictors of complicated course (heart failure, persistent infection, abscess)	Urgent	I	C
PVE with isolated very large vegetations (> 15 mm)	Urgent	IIb	C

Case1

Case2

Conclusion



2015 ESC Guidelines for the management of infective endocarditis

The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC)

Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM)

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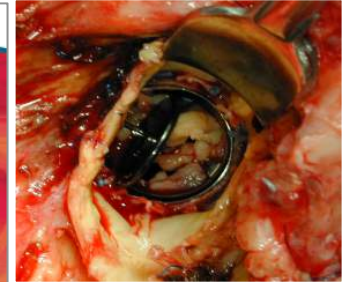


Table 22 Indications and timing of surgery in infective endocarditis (native valve endocarditis and prosthetic valve endocarditis)

2015

Indications and timing of surgery in infective endocarditis (native valve endocarditis and prosthetic valve endocarditis)

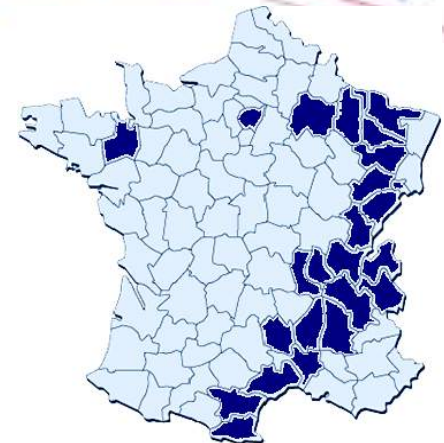
Indications for surgery	Timing ^a	Class ^b	Level ^c	Ref. ^d
1. Heart failure				
Aortic or mitral NVE or PVE with severe acute regurgitation, obstruction or fistula causing refractory pulmonary oedema or cardiogenic shock	Emergency	I	B	111,115, 213,216
Aortic or mitral NVE or PVE with severe regurgitation or obstruction causing symptoms of HF or echocardiographic signs of poor haemodynamic tolerance	Urgent	I	B	37,115, 209,216, 220,221
2. Uncontrolled infection				
Locally uncontrolled infection (abscess, false aneurysm, fistula, enlarging vegetation)	Urgent	I	B	37,209, 216
Infection caused by fungi or multiresistant organisms	Urgent/elective	I	C	
Persisting positive blood cultures despite appropriate antibiotic therapy and adequate control of septic metastatic foci	Urgent	IIa	B	123
PVE caused by staphylococci or non-HACEK gram-negative bacteria	Urgent/elective	IIa	C	
3. Prevention of embolism				
Aortic or mitral NVE or PVE with persistent vegetations > 10 mm after one or more embolic episode despite appropriate antibiotic therapy	Urgent	I	B	9,58,72, 113,222
Aortic or mitral NVE with vegetations > 10 mm, associated with severe valve stenosis or regurgitation, and low operative risk	Urgent	IIa	B	9
Aortic or mitral NVE or PVE with isolated very large vegetations (> 30 mm)	Urgent	IIa	B	113
Aortic or mitral NVE or PVE with isolated large vegetations (> 15 mm) and no other indication for surgery ^e	Urgent	IIb	C	

Temporal Trends in Infective Endocarditis in the Context of Prophylaxis Guideline Modifications

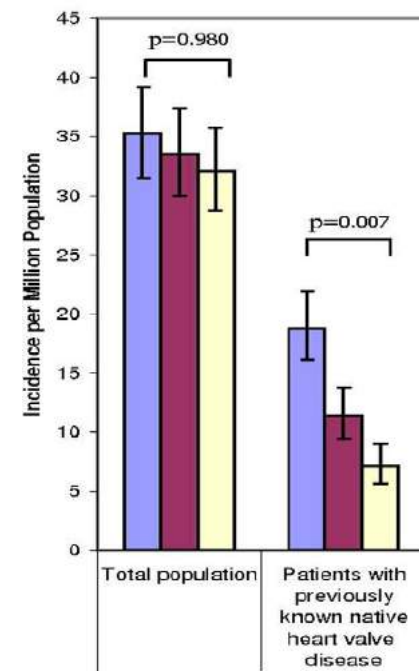
Three Successive Population-Based Surveys **JACC Vol. 59, No. 22, 2012**

Xavier Duval, MD, PhD,*†‡ François Delahaye, MD, PhD,§|| François Alla, MD, PhD,¶||| Pierre Tattevin, MD, PhD,** Jean-François Obadia, MD, PhD,†† Vincent Le Moing, Thanh Doco-Lecompte, MD,¶|| Marie Celard, MD,||| Claire Poyart, MD, PhD,¶||##** Christophe Strady, MD, PhD,††† Catherine Chirouze, MD,‡‡‡ Michelle Bes, PhD,||| Emmanuelle Cambau, MD, PhD,‡§§§ Bernard Iung, MD,‡||| Christine Selton-Suty, Bruno Hoen, MD, PhD,‡‡‡¶||| on behalf of the AEPEI Study Group

Factor	N	In-Hospital Death	
		n	%
Survey year †			
1991	305	63	20.7
1999	331	51	15.4
2008	339	72	21.2
Cardiac surgery			
1991	9431%	21	22.3
1999	16650%	17	10.2
2008	16850%	30	17.9



11 Million = 24 % pop>20y

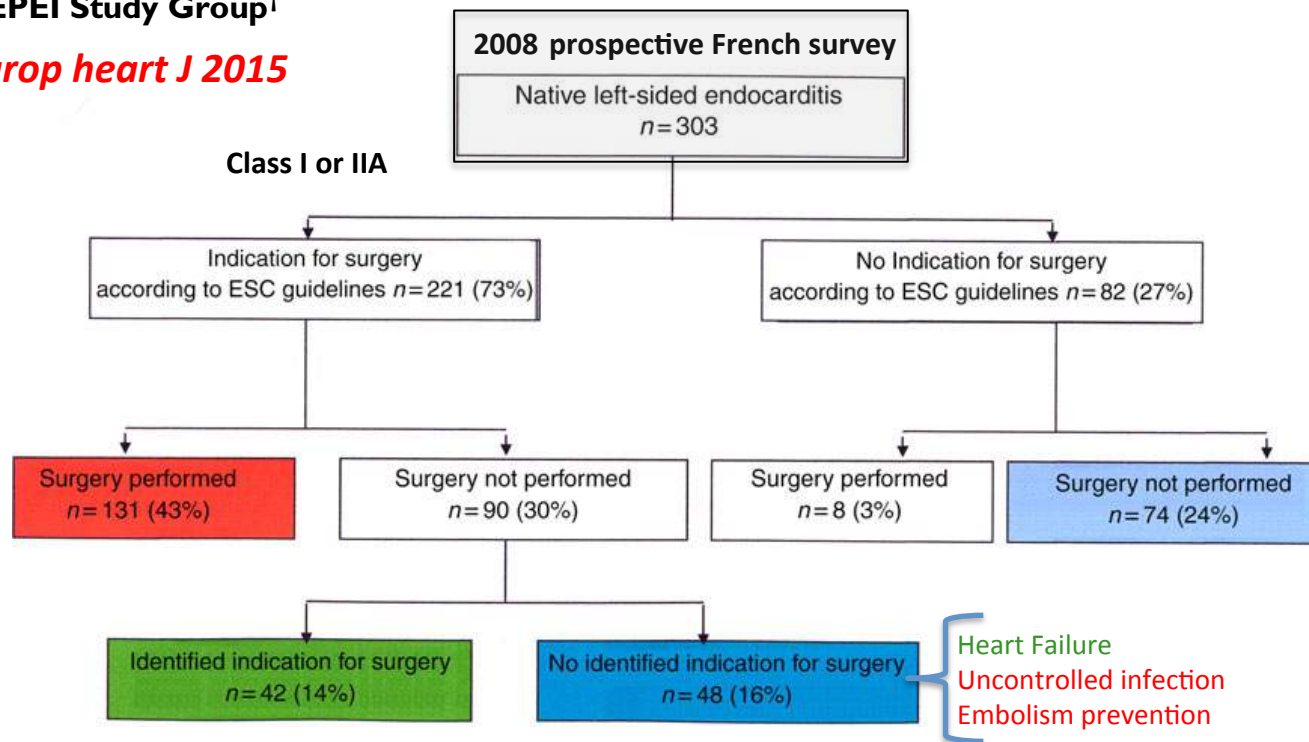




Cardiac surgery during the acute phase of infective endocarditis: discrepancies between European Society of Cardiology guidelines and practices

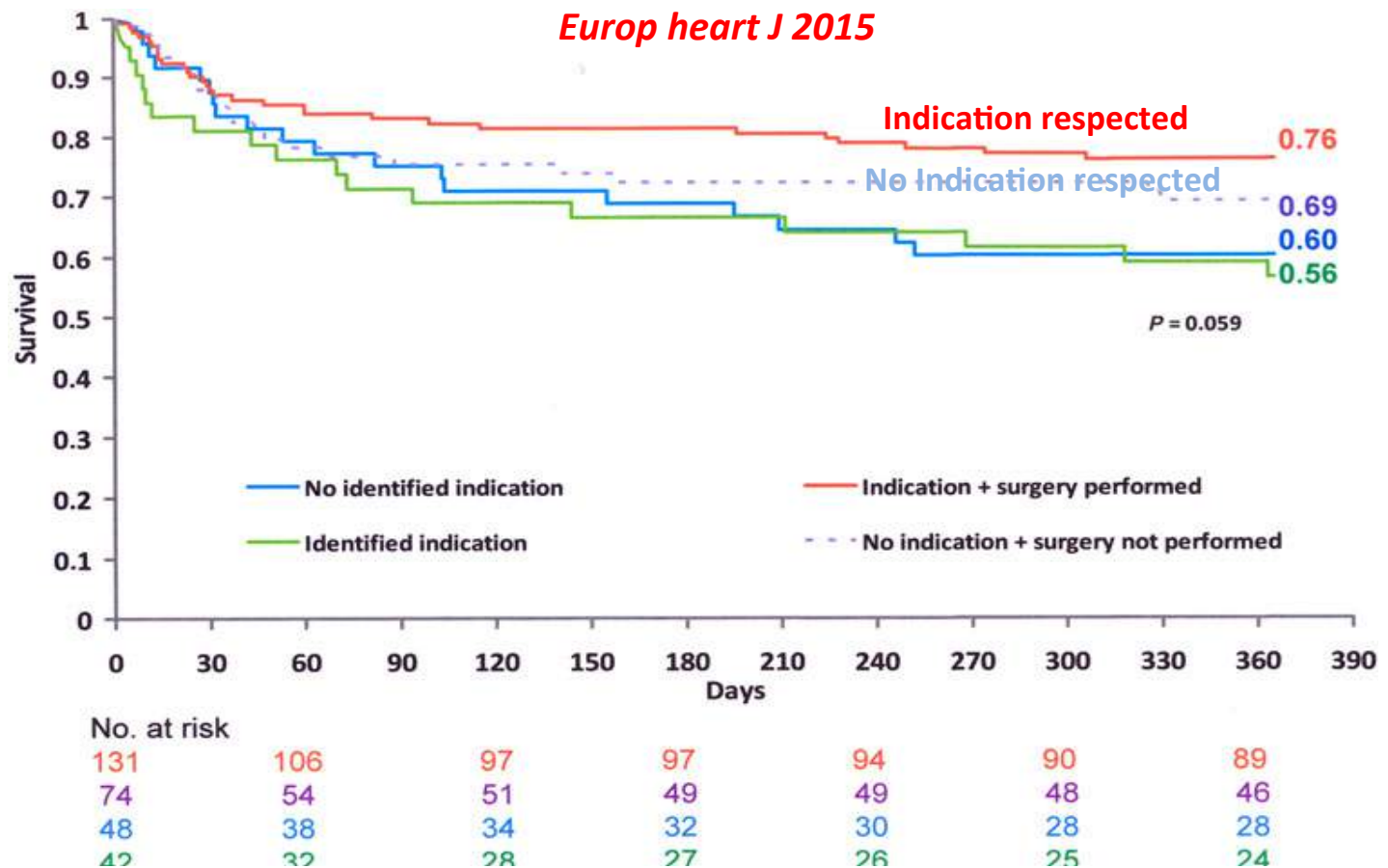
Bernard Iung^{1*}, Thanh Doco-Lecompte², Sidney Chocron³, Christophe Strady⁴, François Delahaye⁵, Vincent Le Moing^{6,7}, Claire Poyart^{8,9,10}, François Alla^{11,12}, Emmanuelle Cambau^{13,14}, Pierre Tattevin¹⁵, Catherine Chirouze¹⁶, Jean-François Obadia¹⁷, Xavier Duval¹⁸, and Bruno Hoen^{19,20}, on behalf of the AEPEI Study Group[†]

Europ heart J 2015





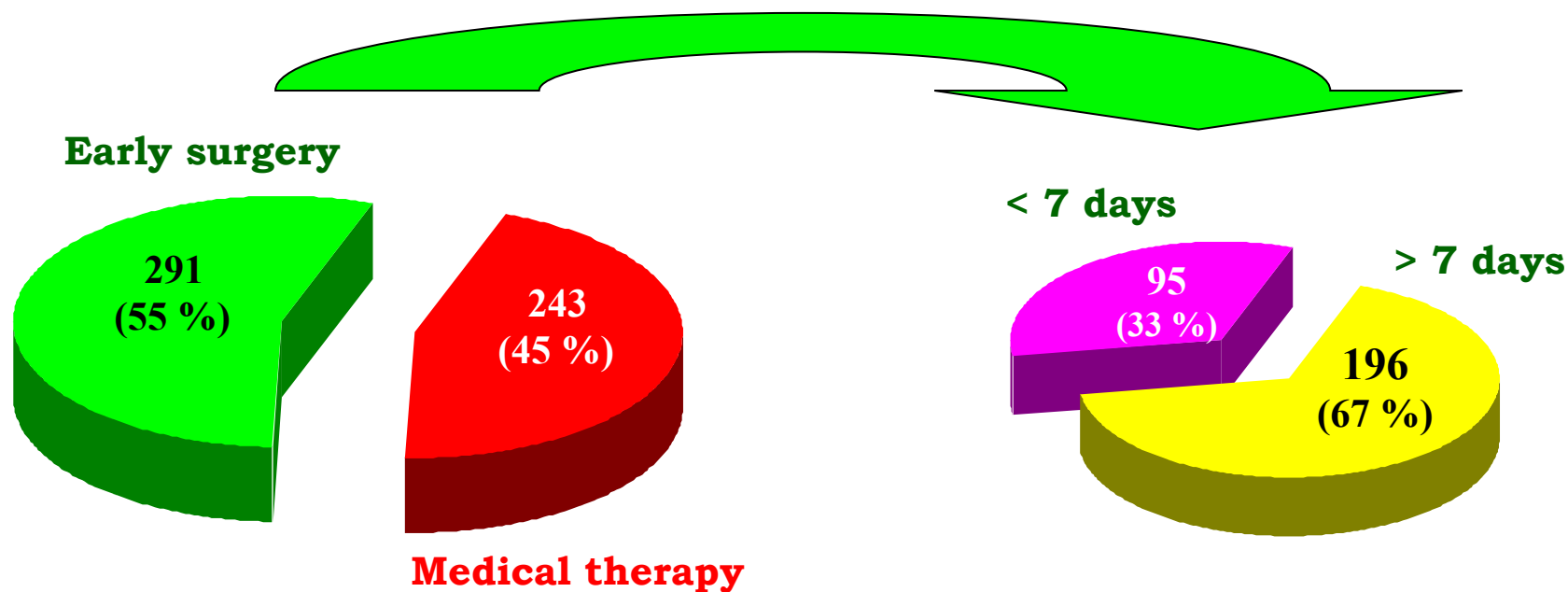
Cardiac surgery during the acute phase of infective endocarditis: discrepancies between European Society of Cardiology guidelines and practices





The timing of surgery influences mortality and morbidity in adults with severe complicated infective endocarditis: a propensity analysis

Franck Thuny¹, Sylvain Beurtheret², Julien Mancini³, Vlad Gariboldi², Jean-Paul Casalta⁴, Alberto Riberi², Roch Giorgi³, Frédérique Gouriet⁴, Laurence Tafanelli¹, Jean-François Avierinos¹, Sébastien Renard¹, Frédéric Collart², Didier Raoult⁴, and Gilbert Habib^{1*} **EHJ 2009**



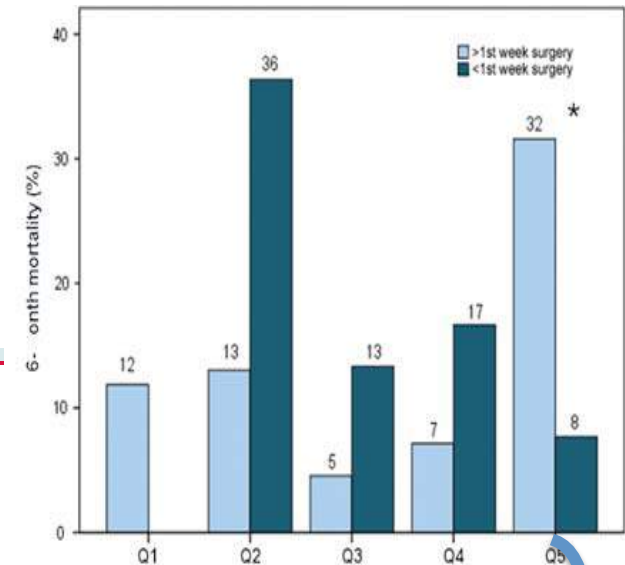


The timing of surgery influences mortality and morbidity in adults with severe complicated infective endocarditis: a propensity analysis

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Europ Heart J : 2011 : 32, 2027–2033

	≤1st week surgery group (n = 95)	>1st week surgery group (n = 196)	P-value
6-month mortality	14 (15)	23 (12)	0.47
Relapses and postoperative valvular dysfunction	15 (16)	7 (4)	0.0005
Relapses	8 (8)	4 (2)	0.02
Postoperative valvular dysfunction	7 (7)	3 (2)	0.02



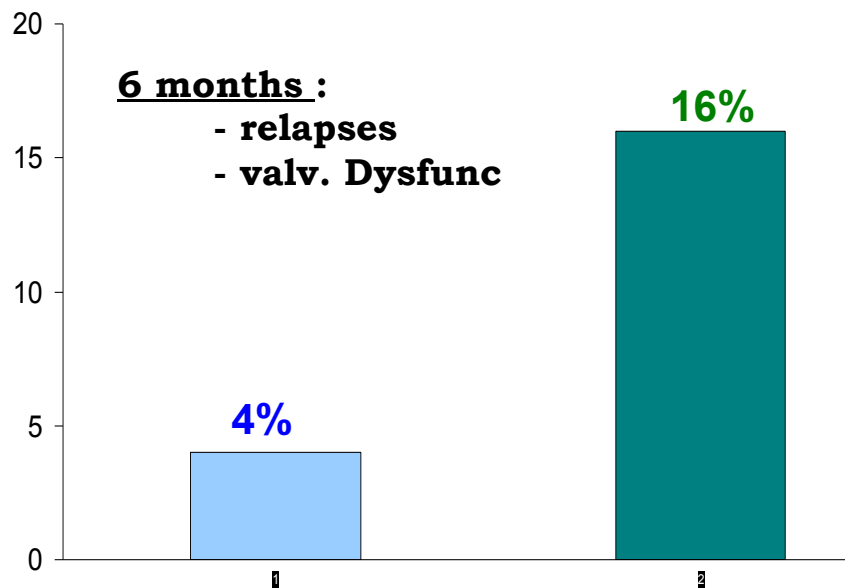
Young
Staph Aureus
Heart Failure
Large veget



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Europ Heart J : 2011 : 32, 2027–2033



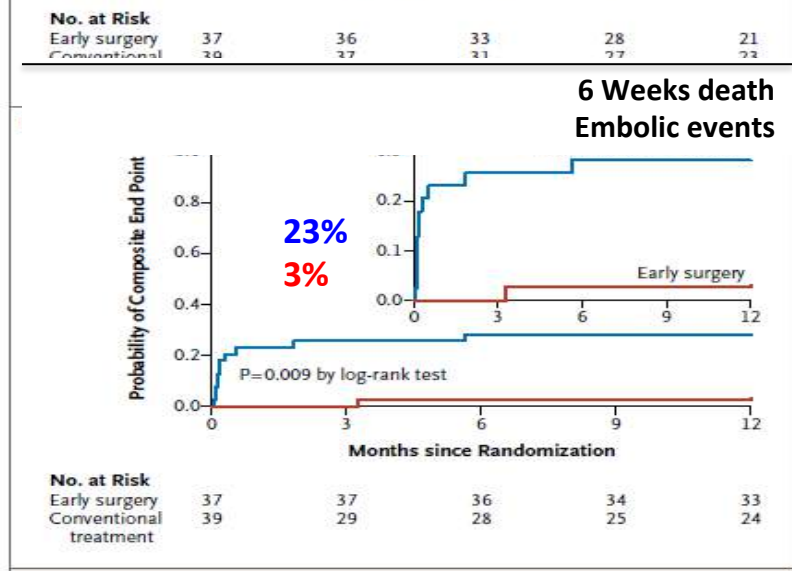
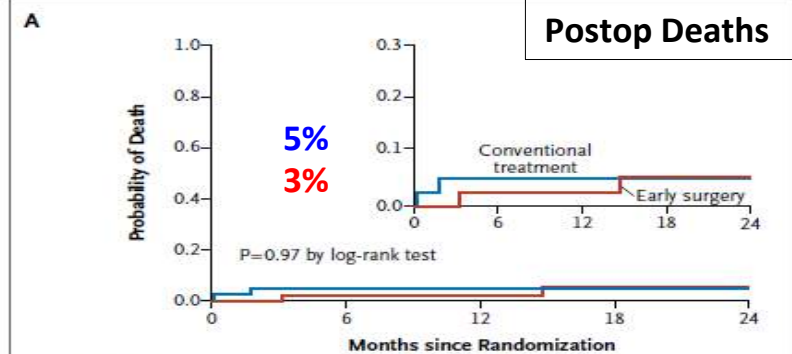
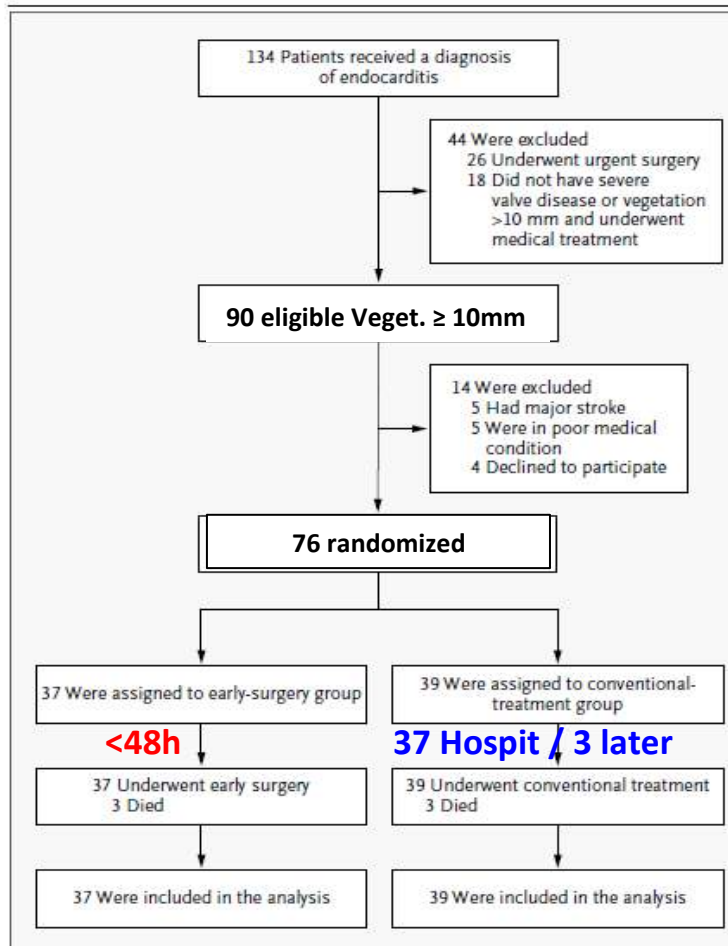
Adjusted OR=3.4, 95%CI, 1.24-9.60; P=0.02





Early Surgery versus Conventional Treatment for Infective Endocarditis

Kang DH – N Eng J Med 2012; 366:2466-73



The impact of valve surgery on short- and long-term mortality in left-sided infective endocarditis: do differences in methodological approaches explain previous conflicting results?

Aur lie Bannay^{1,2,3}, Bruno Hoen⁴, Xavier Duval⁵, Jean-Fran ois Obadia^{6,7} et al.
for the AEPEI Study Group[†]

Europ heart J 2009

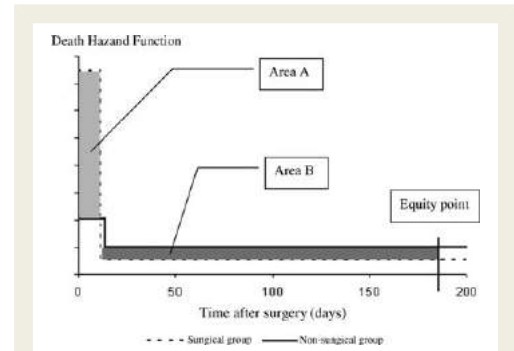


Figure 1 Death hazard functions over time. Equity point is the time at which the area between the surgical group curve and the non-surgical group curve during the short-term period (area A) is equal to the area between the surgical group curve and the non-surgical group during the long-term period (area B).

		Vikram et al. ⁸	Wang et al. ⁹	Cabell et al. ⁶	Aksoy et al. ⁵	Tleyjeh et al. ⁷
1. Previous studies: statistical methods and results	Population definition	Complicated left-sided native valve IE ^a	Prosthetic valve IE	Native valve IE	All IE	Left-sided IE
	Follow-up duration	6 months	Inhospital	Inhospital	5 years	6 months
	No. of patients	513	367	1516	426	546
	Modelling	Cox model	Logistic regression	Logistic regression	Cox model	Cox model
	Surgery coding	Binary variable	Binary variable	Binary variable	Binary variable	Partitioned time-dependent covariate
	Adjusted death rate HR or OR (95% CI) of valve surgery	0.40 (0.18–0.91)	0.56 (0.23–1.36)	NS ^d	0.27 (0.13–0.55)	6.21 (2.72–14.18) 0.92 (0.48–1.76)
2. Re-analysis from our database using the same statistical methods	No. of patients	372	82	447	559	449 449
	Adjusted death rate HR or OR (95% CI) of valve surgery	0.56 (0.31–0.99)	0.92 (0.11–7.42)	0.65 (0.33–1.29)	0.58 (0.41–0.82)	6.51 (3.74–11.31) 0.65 (0.35–1.21)

14 days → Increased Mortality HR = **3.69** (2.17–6.25; P,0.0001]

long-term → decrease mortality HR = **0.55** (0.35–0.87; P 1/4 0.01)

At least 188 days of FU required to provide a survival advantage.



Optimal timing for early surgery in IE: a meta-analysis.

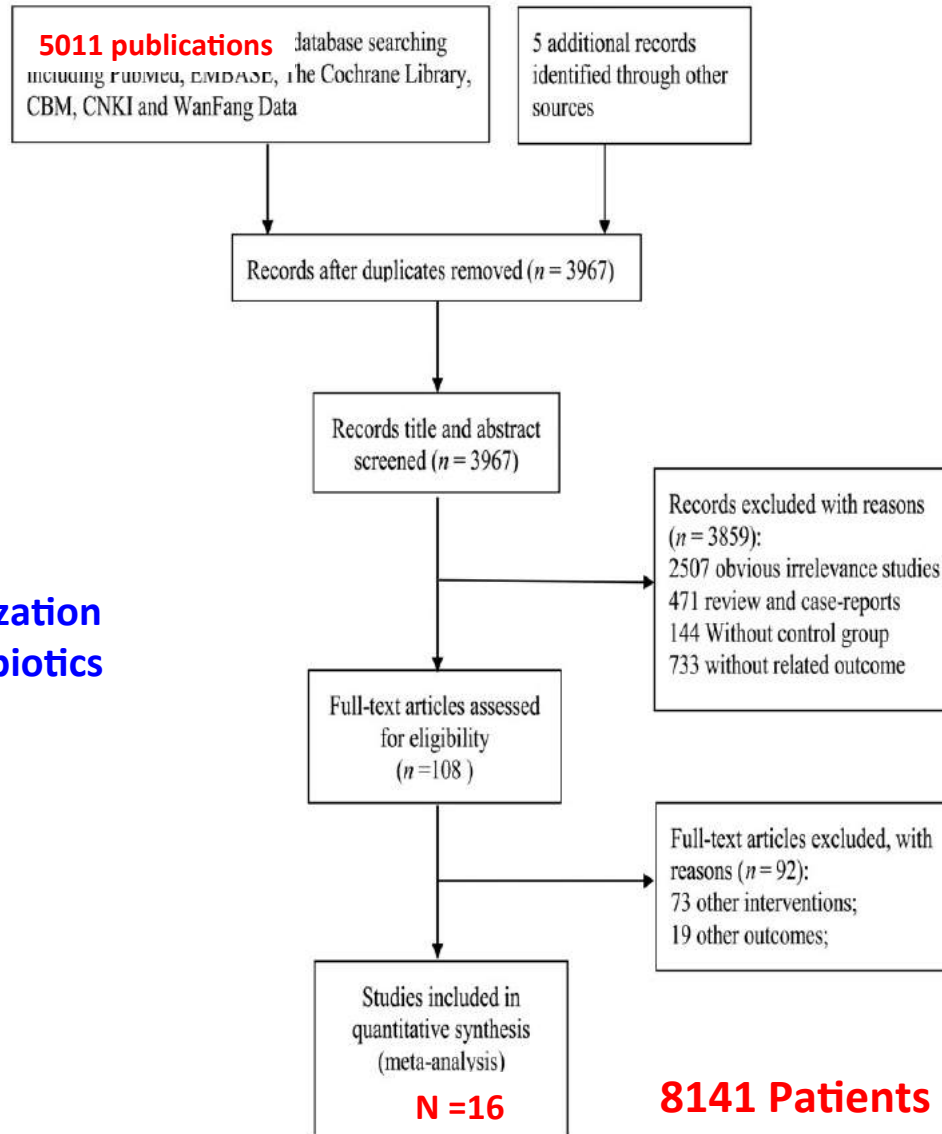
Fuxiang Liang et al.

Interactive CardioVascular and Thoracic Surgery 22 (2016) 336–34

early versus non-early Surgery

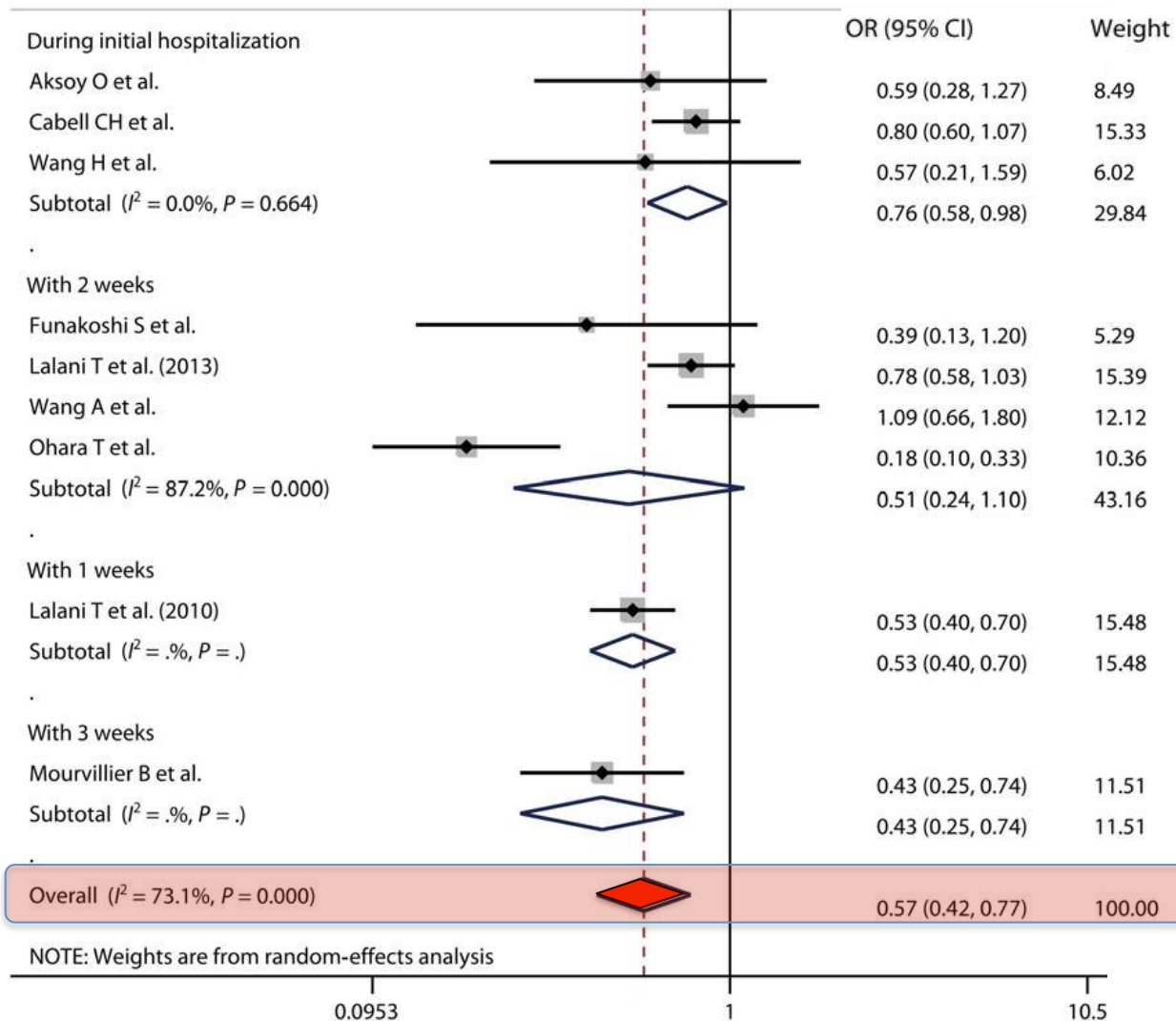
Early surgery → during initial hospitalization
before the end of antibiotics

Follow-up > 6 months





In-hospital mortality





Long term mortality

During initial hospitalization

Aksoy O et al.

Subtotal ($I^2 = .\%$, $P = .$)

Within 2 weeks

Funakoshi S et al.

Lalani T et al. (2013)

Wang H et al.

Subtotal ($I^2 = 39.4\%$, $P = 0.192$)

Within 3 weeks

Sy RW et al.

Bannay A et al.

Subtotal ($I^2 = 0.0\%$, $P = 0.608$)

Within 1 weeks

Thuny F et al.

Hill EE et al.

Subtotal ($I^2 = 52.4\%$, $P = 0.147$)

Within 4 weeks

Jia L et al.

Tleyjeh IM et al.

Subtotal ($I^2 = 59.9\%$, $P = 0.114$)

Not reported

Vikram HR et al.

Subtotal ($I^2 = .\%$, $P = .$)

Overall ($I^2 = 67.4\%$, $P = 0.001$)

NOTE: Weights are from random-effects analysis

OR (95% CI)

Weight

0.35 (0.20, 0.60) 10.17

0.35 (0.20, 0.60) 10.17

0.99 (0.47, 2.07) 7.91

0.64 (0.49, 0.84) 13.75

0.35 (0.15, 0.82) 6.78

0.63 (0.41, 0.97) 28.44

0.46 (0.25, 0.85) 9.30

0.38 (0.25, 0.56) 12.11

0.40 (0.29, 0.56) 21.41

1.30 (0.64, 2.66) 8.17

4.57 (0.96, 21.73) 2.95

2.00 (0.61, 6.53) 11.11

0.35 (0.13, 0.94) 5.77

0.84 (0.53, 1.31) 11.43

0.61 (0.27, 1.38) 17.20

0.39 (0.25, 0.59) 11.68

0.39 (0.25, 0.59) 11.68

0.57 (0.43, 0.77) 100.00

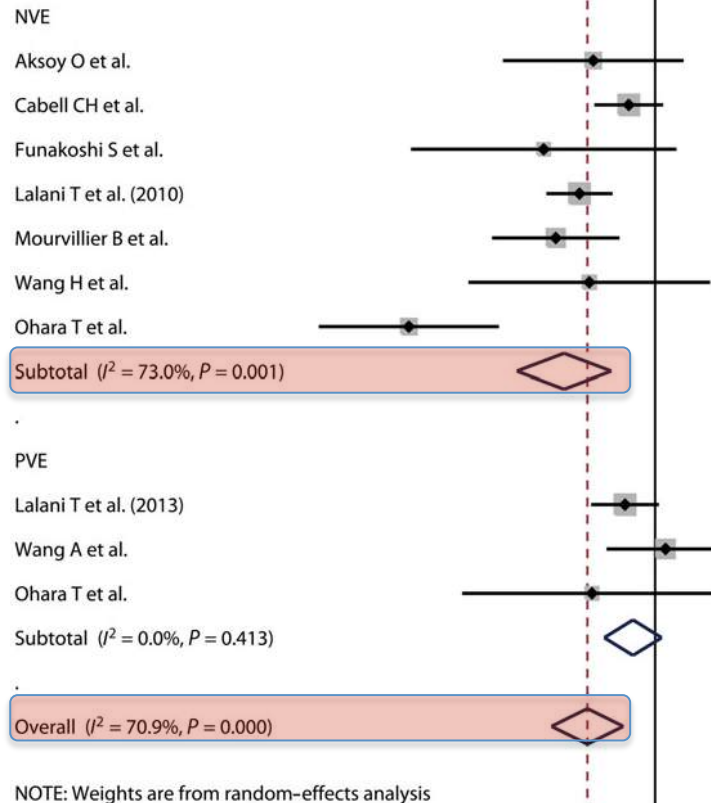
0.046

1

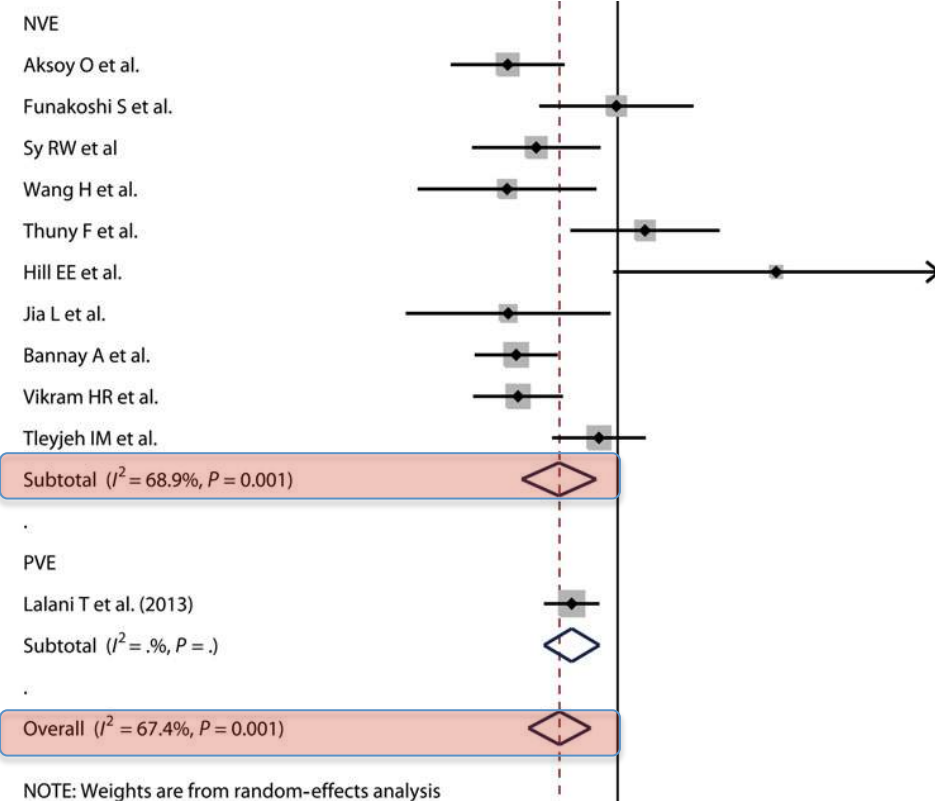
21.7



In Hospital mortality



Long term mortality





Regular meetings at a precise time (Weekly basis)
Pre-program announcing the files to discuss
a minimum of 3 different specialties
Several members / Specialties
Involving Coordinator/nurse
Written decisions recorded
Yearly evaluation

