STS/EACTS Latin America Cardiovascular Surgery Conference

November 15-17, 2018

Hilton Cartagena | Cartagena, Colombia

Ischemic Ventricular Septal Rupture

Optimal Management Strategies

Juan P. Umaña, M.D.
Chief Medical Officer
FCI – Institute of Cardiology

Disclosures

- Abbott Mitraclip – Royalties
- Johnson & Johnson – Proctor
- Edwards - Consultant

VSD in the Era of Thrombolysis

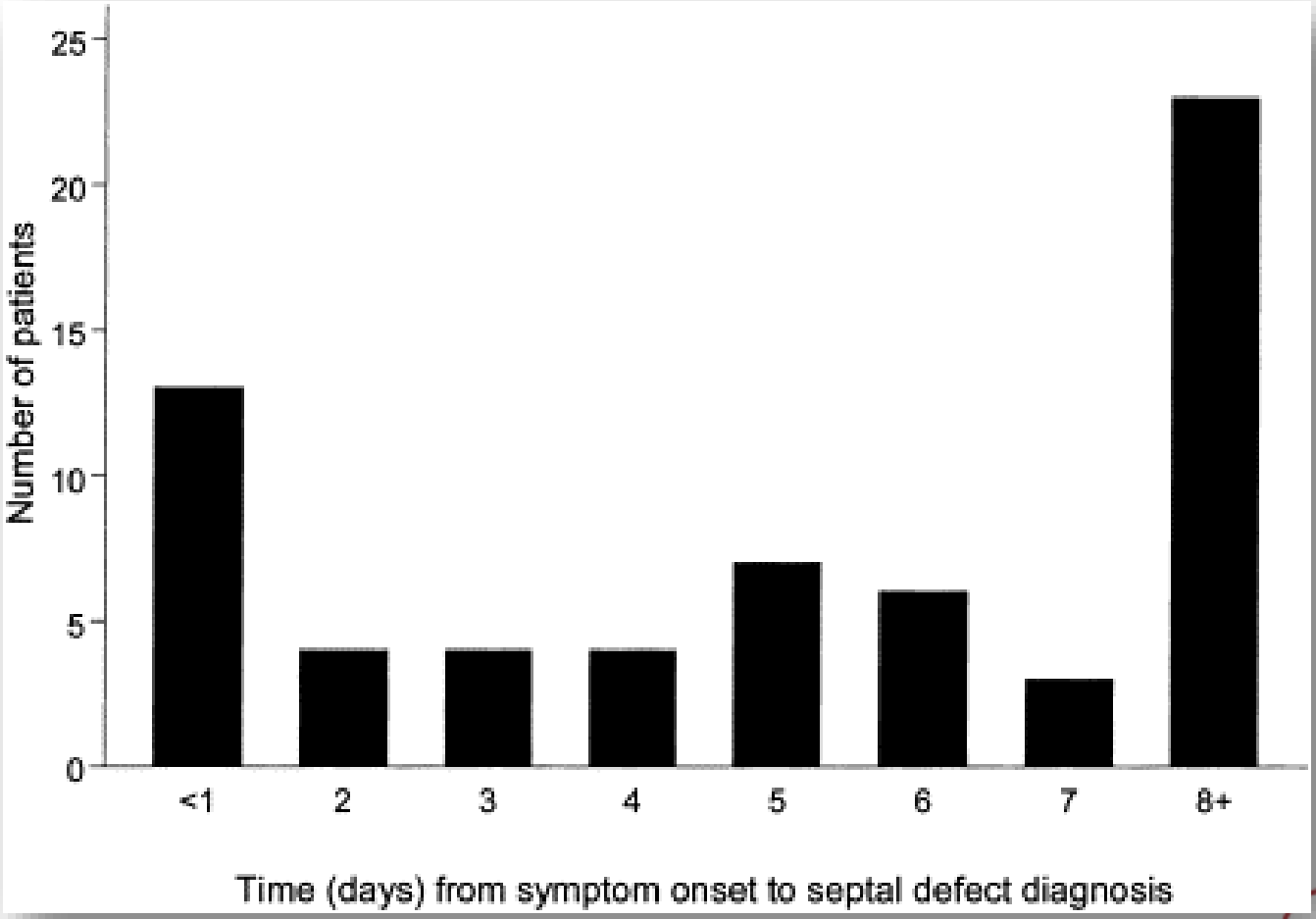
- 2% incidence pre-thrombolytics
- Incidence declining:
  - ✓ 0.2% with early reperfusion therapies (GUSTO)
  - ✓ Aggressive control of BP post-MI

VSD - Predictors

- Advanced age
- Female gender
- **NO** smoking history
- Anterior location of MI

- Thrombolysis after 12 hours of MI

VSD Timing - Bimodal



Poulsen *et al. Ann Thorac Surg* 2008 85, 1591

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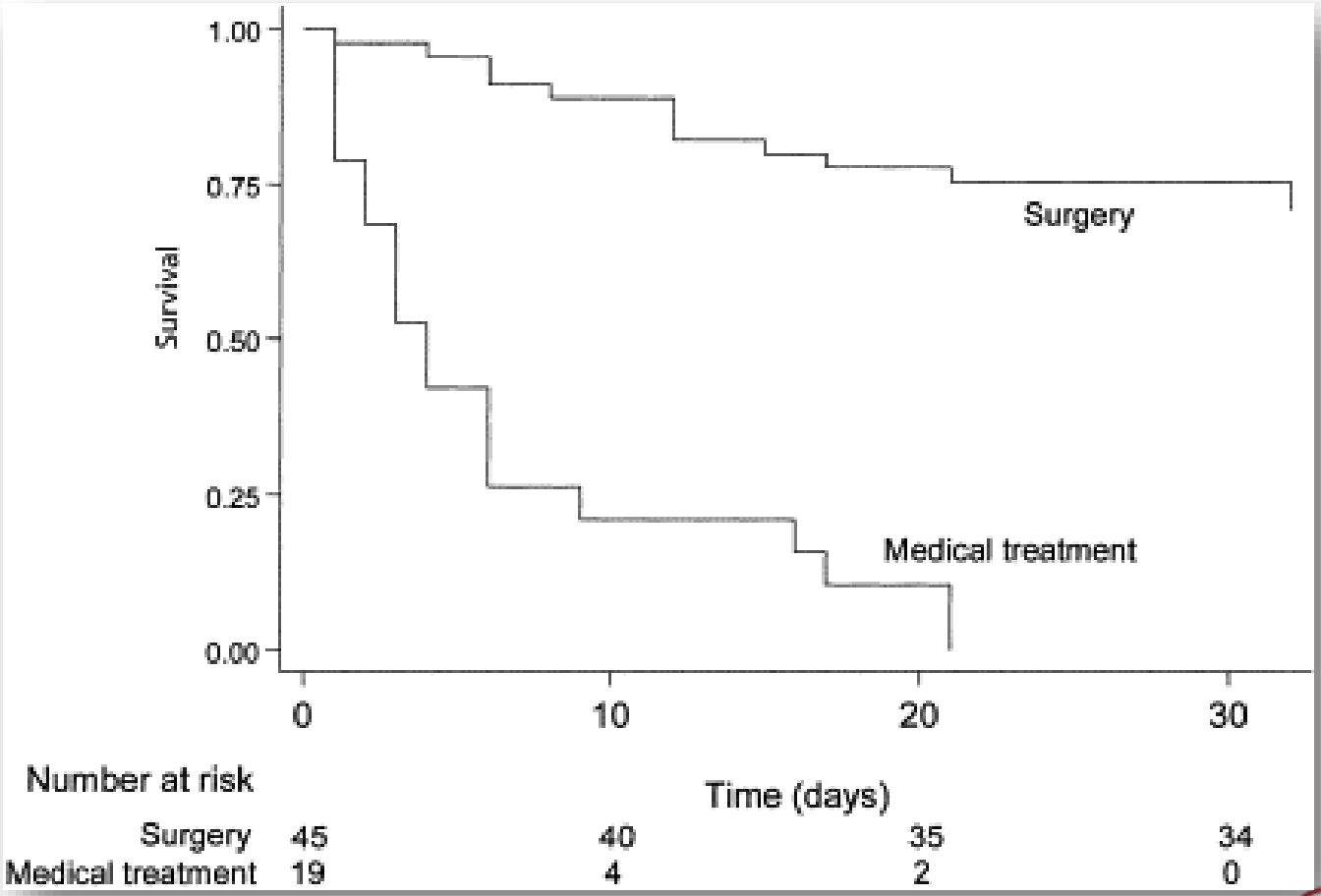
Medical *vs.* Surgical Treatment



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European Heart Journal (2012) **33**, 2569–2619
doi:10.1093/eurheartj/ehs215

ESC GUIDELINES

ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation

The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC)

- Surgical repair is required urgently, but *optimal timing is unclear*

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VSD – Timing of Surgery

- Early Surgery:
  - ✓ High mortality rate
  - ✓ High risk of recurrent ventricular rupture
- Delayed Surgery:
  - ✓ Easier repair on scarred tissue
  - ✓ Risk of complications/death while-u-wait

- Mortality high "across the board"

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European Heart Journal (2012) **33**, 2569–2619

Surgical Mortality

Year	Author	No. pts	Mean delay VSD-surgery in days	Location of the VSD		Hospital mortality (%)	Recurrence of VSD (%)
				Ant (%)	Post (%)		
1996	Cox [4]	109	5–6	50	50	27.5	22.9
1998	Chaux [6]	31	–	42	58	32	6
1998	Dalrymple-hay [5]	150	2	59	41	32	–
1998	David [9]	52	3	50	50	19	5.7
1999	Deja [2]	110	–	69	31	37	43
1999	Prete [3]	54	2	44.5	55.5	26	–
2000	Crenshaw [1]	84	3.5	71.5	28.5	47	–
2003	Barker [8]	65	11.5	46	54	23.1	–
2004	Deville one patch	56	3.4	55.5	44.5	50	7
	two patches	37	3.1	59.5	40.5	27	0

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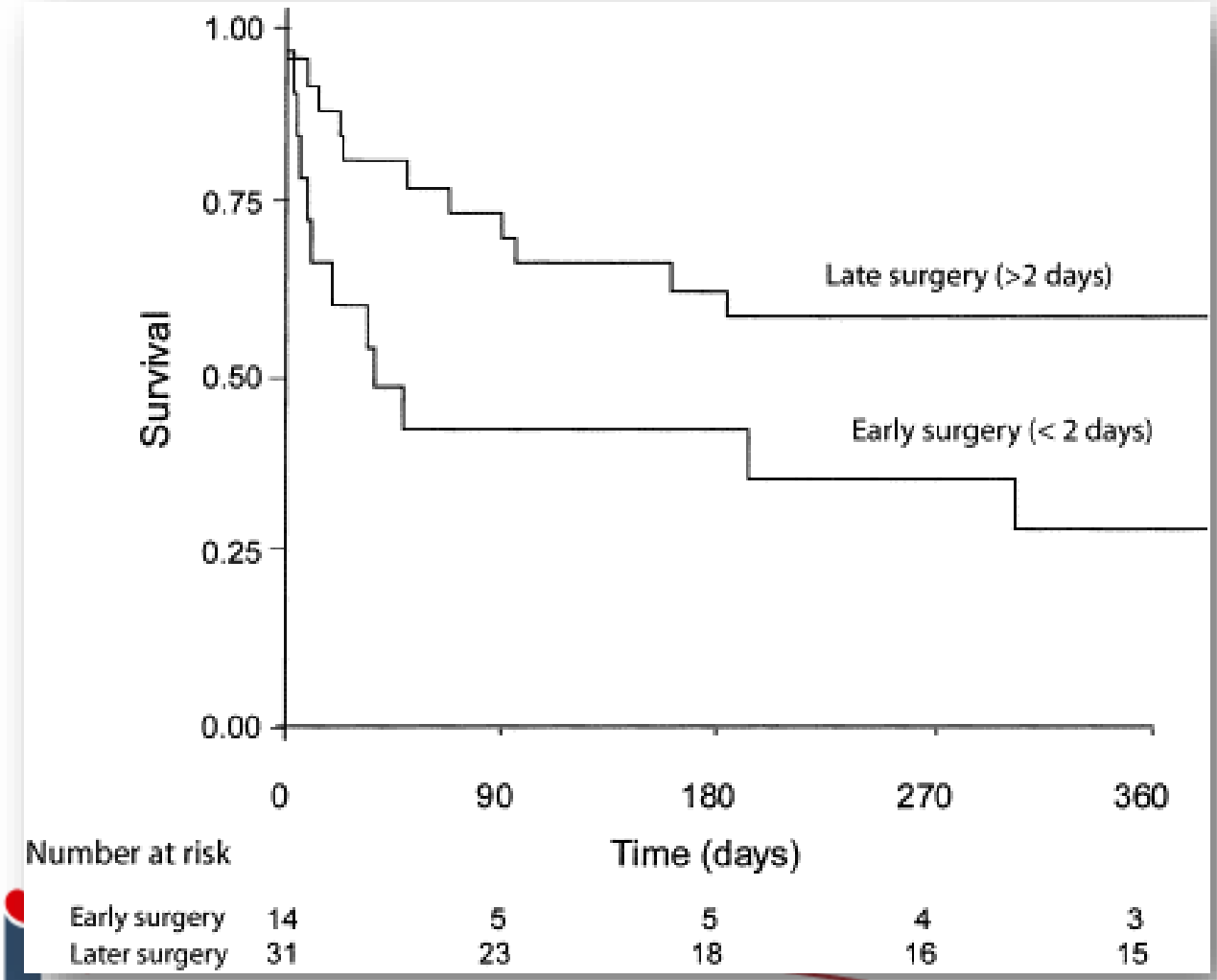
Deville *et al. Multimedia Manual of Cardiothoracic Surgery 2005*

Delay Surgery?



Poulsen *et al. Ann Thorac Surg* 2008 85, 1591

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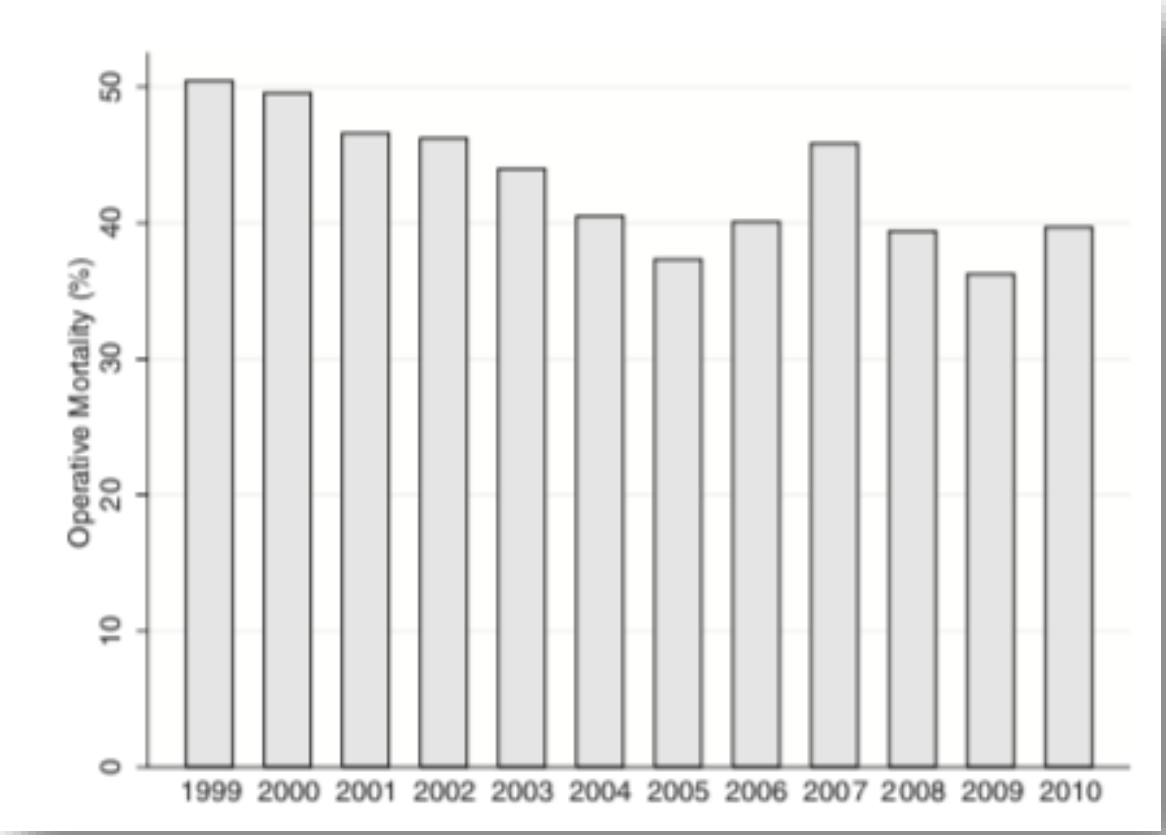
Outcomes from the STS Database

Operative Mortality (Reflects Confusion)



Non-linear trend in mortality

Overall mortality 42.9% (highest of STS database)

Aranaoutakis *et al. Ann Thorac Surg* 20012; 94(2):436

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Outcomes from the STS Database

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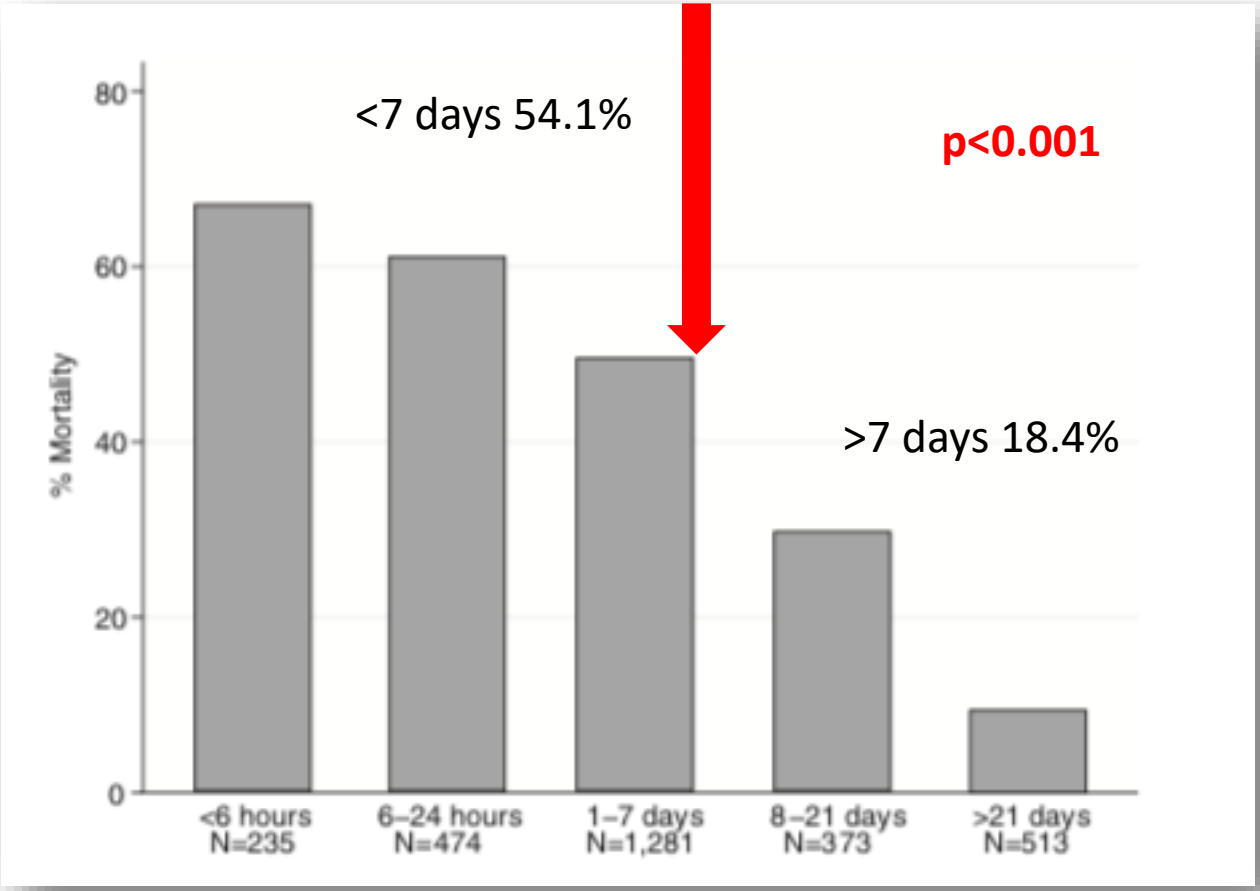

Aranaoutakis *et al. Ann Thorac Surg* 20012; 94(2):436

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Immediate *vs.* Delayed Surgery

- Patients with multiple risk factors may benefit from delaying surgery for several weeks (Arnaoutakis *et al.*)

- BEWARE! Mortalilty in stable patients that decompensate while waiting for surgery is 100% (Poulsen *et al.*)

IABP in *All* Patients?

- Placement of IABP leads to immediate reduction in left-to-right shunt
- Improves systemic cardiac output
- Hemodynamic stabilization may allow delayed operation

Testuz *et al.* Catheter Cardiovasc Interv 2013; 81(4):727

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Percutaneous Closure?

- Based on congenital muscular VSD
- Poor tissue quality=poor success rate
- May be offered to patients at excessive risk for surgery:
  - ✓ Shock
  - ✓ VSD location
  - ✓ MOF
  - ✓ Profound biventricular dysfunction

Poulsen *et al. Ann Thorac Surg* 2008 85, 1591

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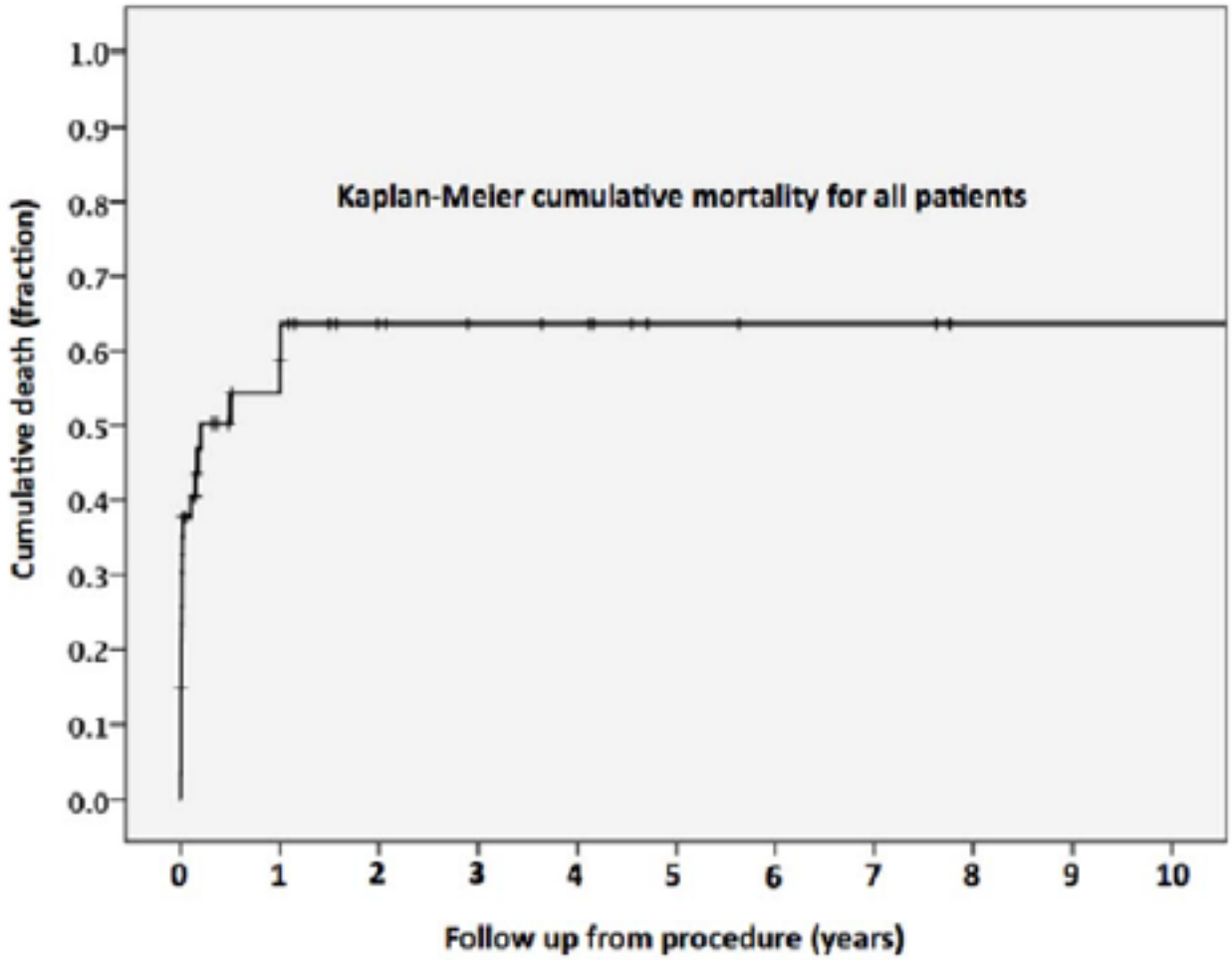
Percutaneous Closure

Overall Mortality



Calvert *et al.* Circulation 2014;129:2395

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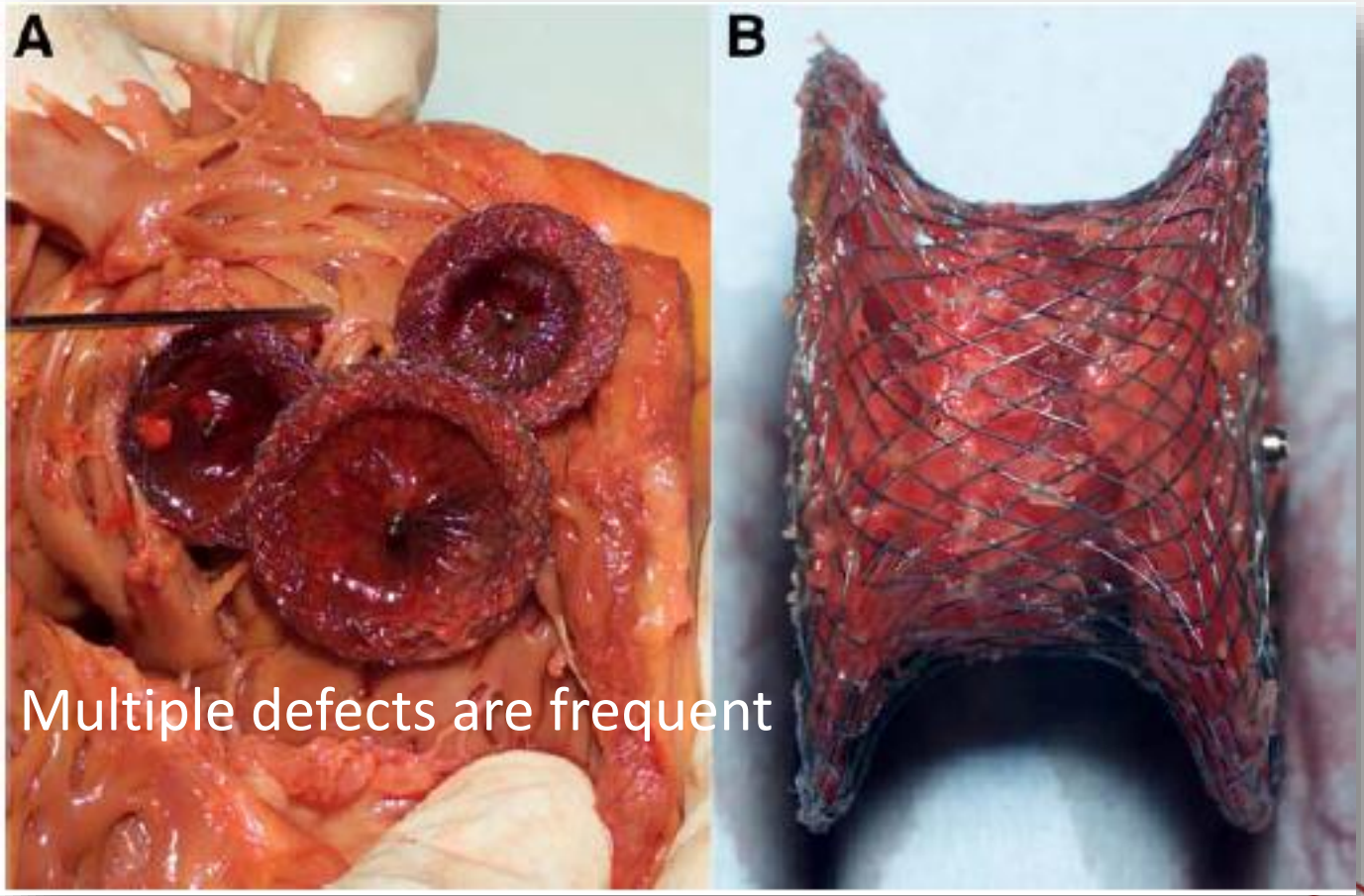
Percutaneous Closure

Overall Mortality



Calvert *et al.* Circulation 2014;129:2395

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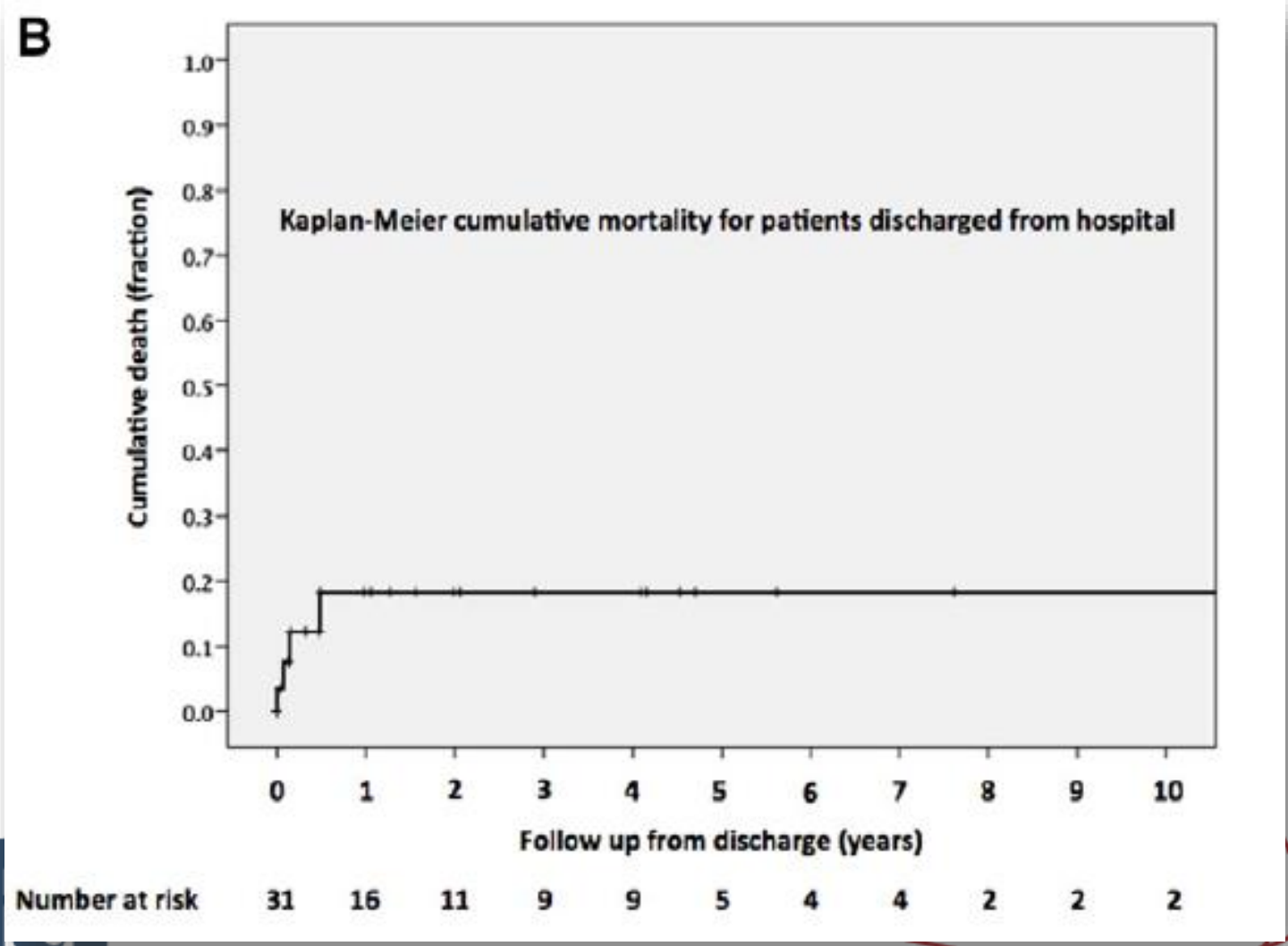
Percutaneous Closure

Post-Discharge Mortality



Calvert *et al.* Circulation 2014;129:2395

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So…Percutaneous Closure?

- Ideal Candidates:
  - ✓ VSD diameter < 2,5 cm
  - ✓ Adequate septal margins
  - ✓ Central rather that apical position
  - ✓ No proximity to aortic valve

- Perhaps not quite ready for *Primetime*

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Gregoric et al., ASAIO J. 2014 Sep-Oct;60(5):529-32.

Peripheral VAD

Tandem Heart

- 11 patients; 8 preop & 3 postop
- Hemodynamics improved immediately after placement
- pVAD support for 7±3 days prior to VSD repair +/- CABG
- All patients with pVAD preop survived
- Currently *routine* staged approach

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Gregoric et al., ASAIO J. 2014 Sep-Oct;60(5):529-32.

Extracorporeal Life Support

- Pros:
  - ✓ Easily implantable to allow stabilization and transport from remote facilities
  - ✓ Widespread use

- Cons:
  - ✓ Does not always allow unloading of LV
  - ✓ Coagulopathy

Methods

- Historical cohort from January of 2004 to October 2018, of patients underwent post-infarction Ventricular septal repair.
- Patients were identified through an institutional cardiac surgery database.
- Prospective harvest from July 2008

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Preoperative Characteristics

	N=18
Male sex	14(77,8)
Age years, mean ±SD	66 ±8,9
Diabetes	5(27,8)
Dyslipidemia	3(16,7)
Dyalisis	1(5,6)
Hypertension	8(44,4)
COPD	2(11,1)
creatinina, median IQR	1,06(0,9-1,3)
Tobacco use	
current smoker	2(11,1)
Former smoker	4(22,2)
Previous cardiac operation	1(5,6)
NYHA functional class	
II	11(61,1)
III	4(22,2)
IV	3(16,7)
Previous arrhythmia	3(16,7)
LVEF, median IQR	39,6(30-52)

LVEF= left ventricular ejection fraction. Categoric data are expresed as number (%) IQR= Interquartil range SD=Standar deviation

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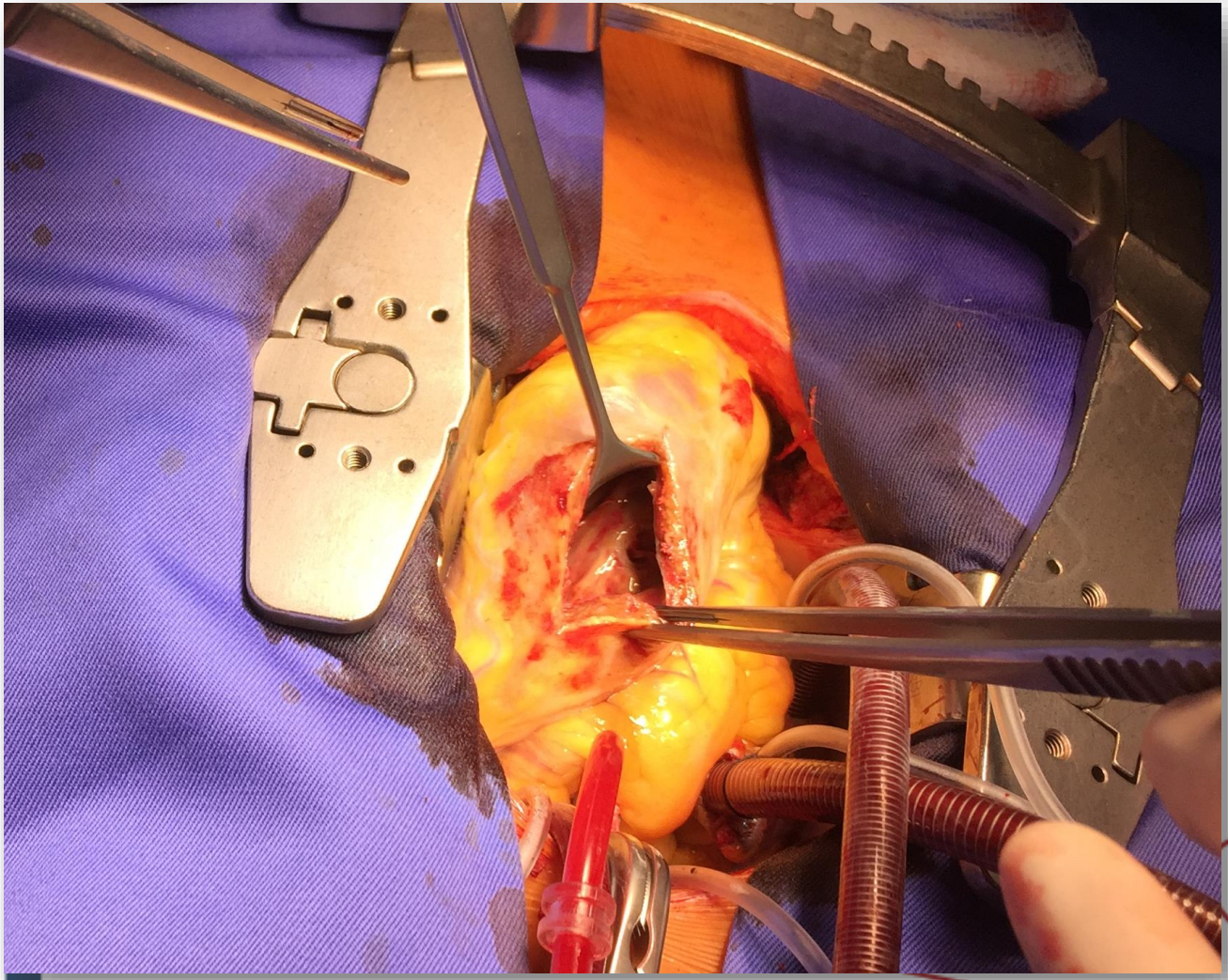
PMI VSD– Patch Exclusion



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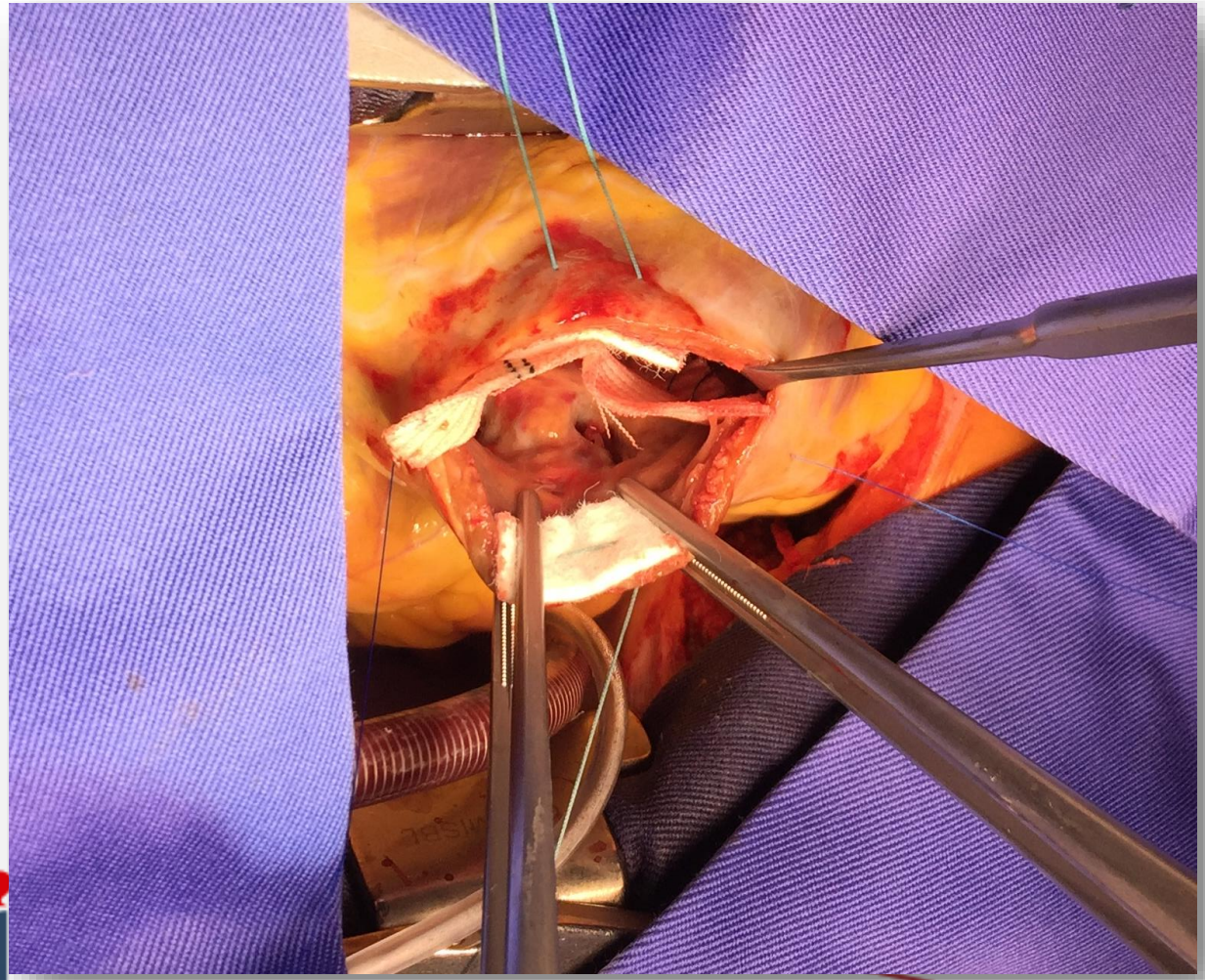

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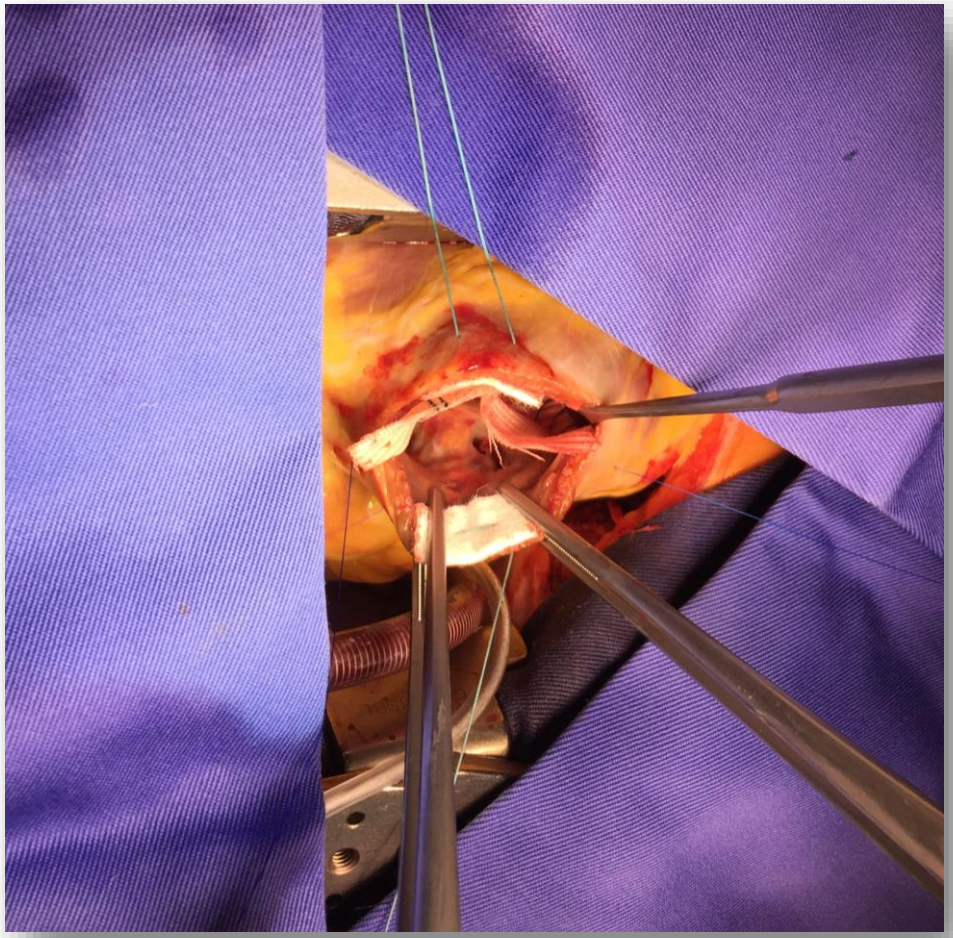

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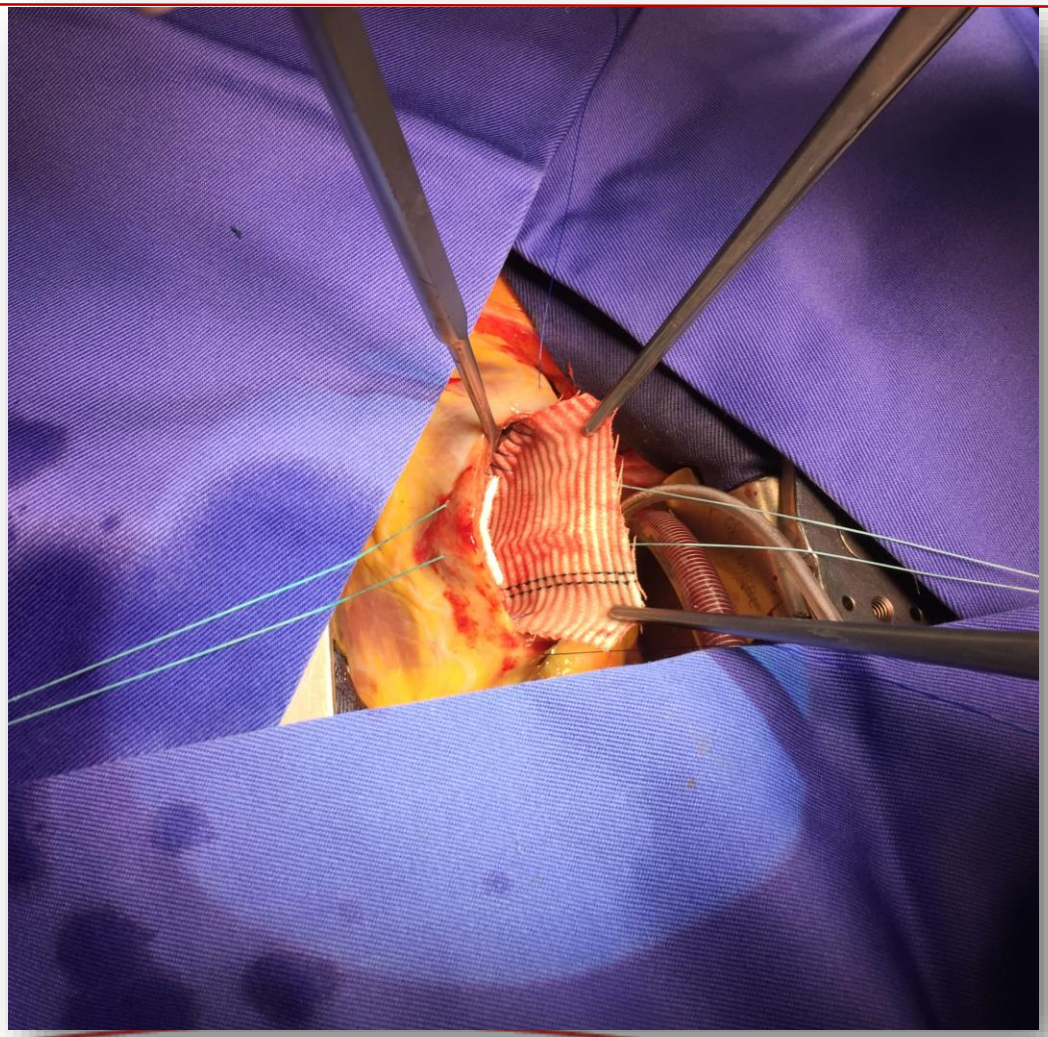

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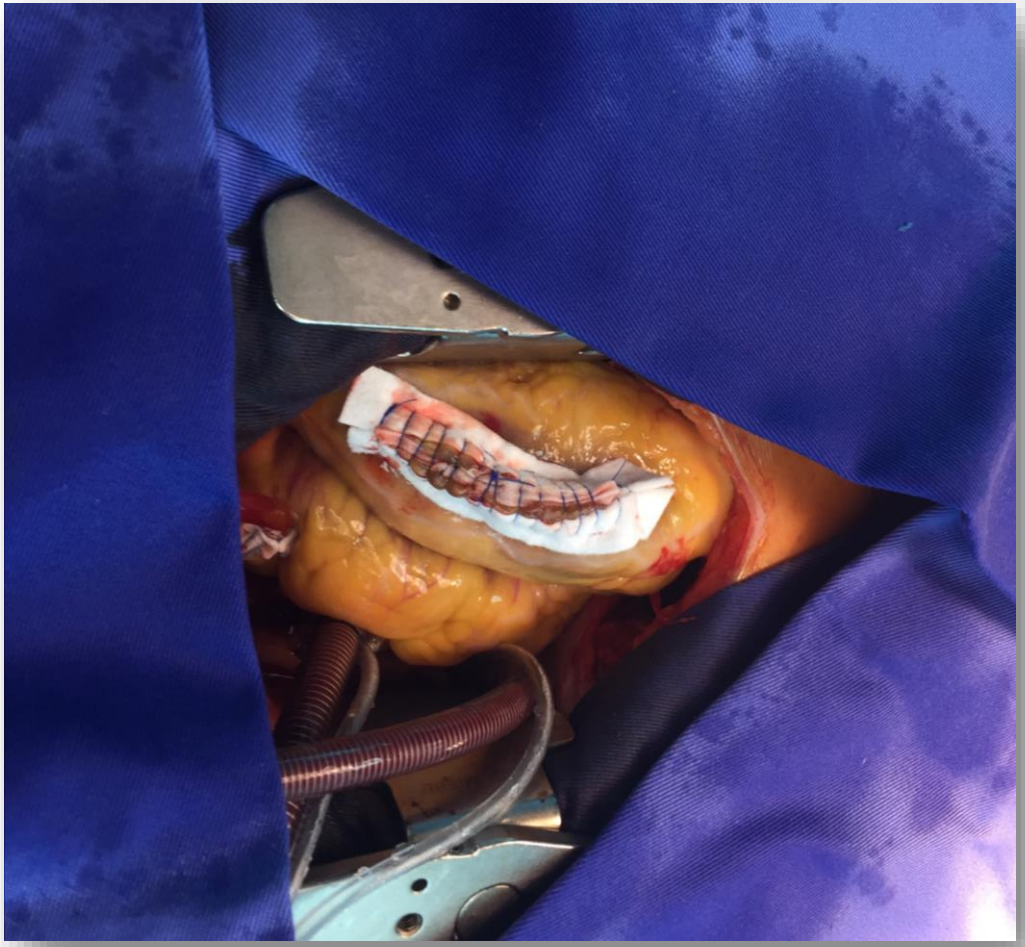

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Operative Characteristics

	N=18 (%)
ECMO	3(16,6)
IABP	5 (27,8)
CABG	14(77,8)
Cardiopulmonary bypass time minutes, median IQR	118(99-134)
Cross clamp time minutes, median IQR	92(57-113)

Categorical data are expressed as number (%) IQR= Interquartile range SD=Standard deviation

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Postoperative Characteristics

	N=18(%)
Reoperation for bleeding	6(33,3)
Renal impairment	1(5,6)
Hospital stay (IQR)	18,5(12-27)
Mortality (30 day)	3(17)

Categorical data are expressed as number (%)

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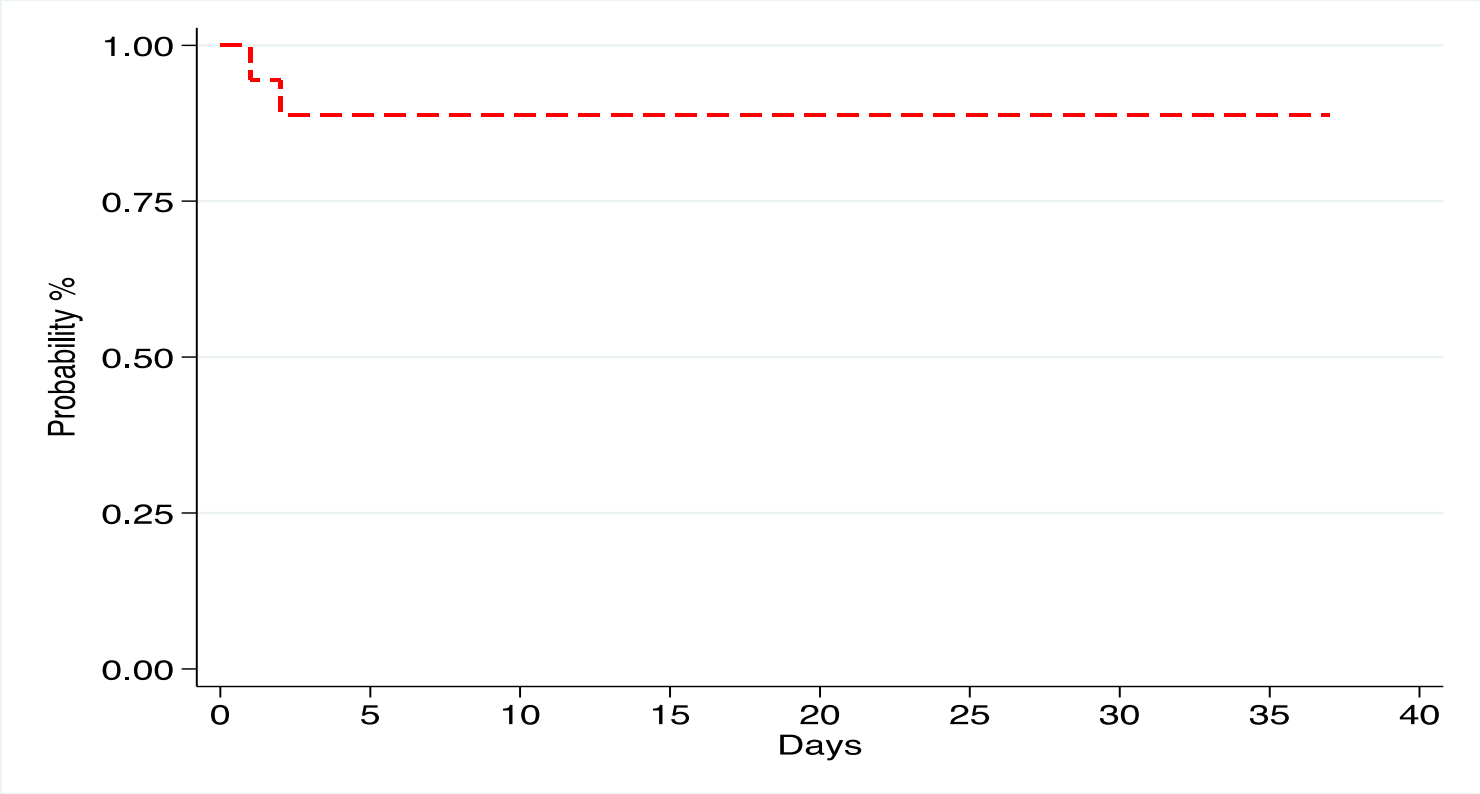
30-Day Survival



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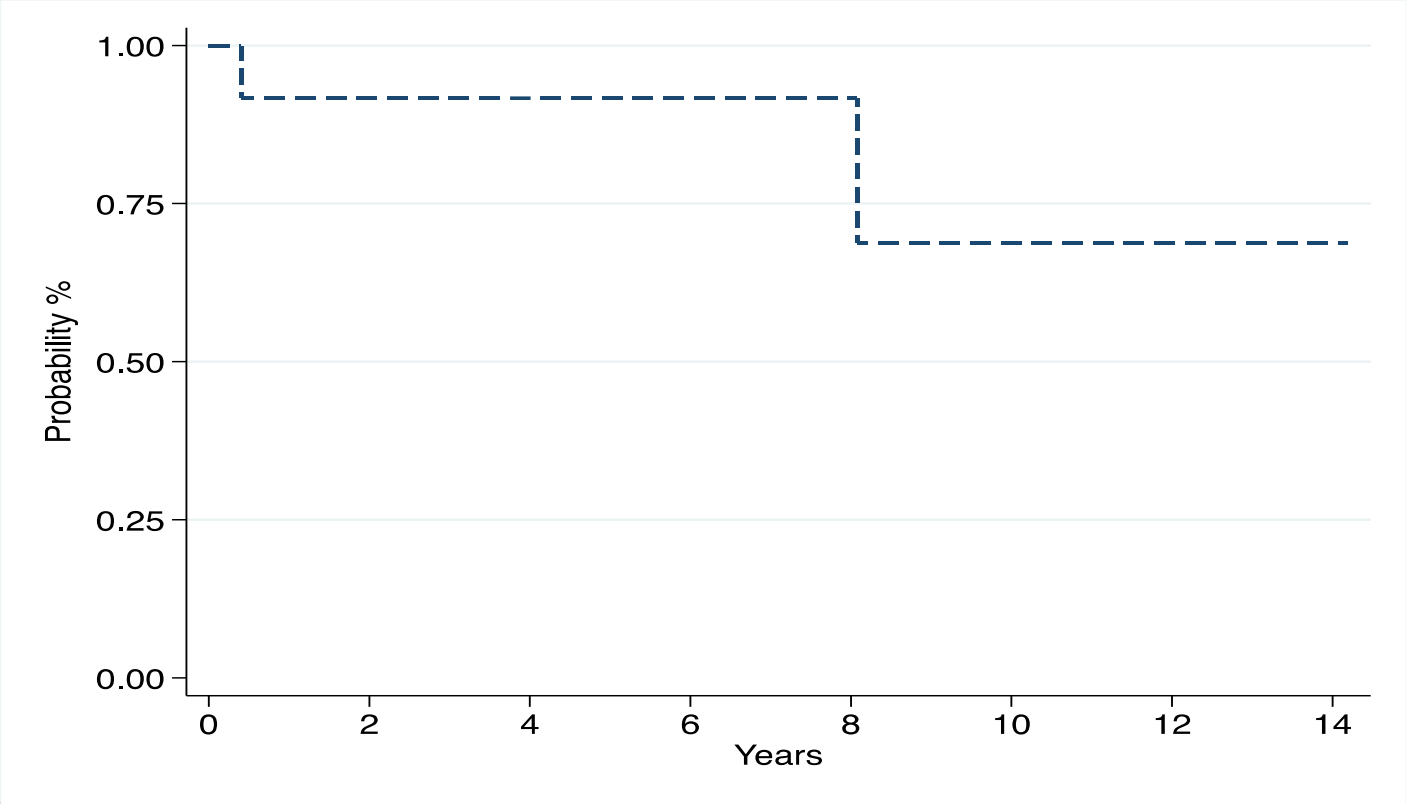
Long-Term Survival



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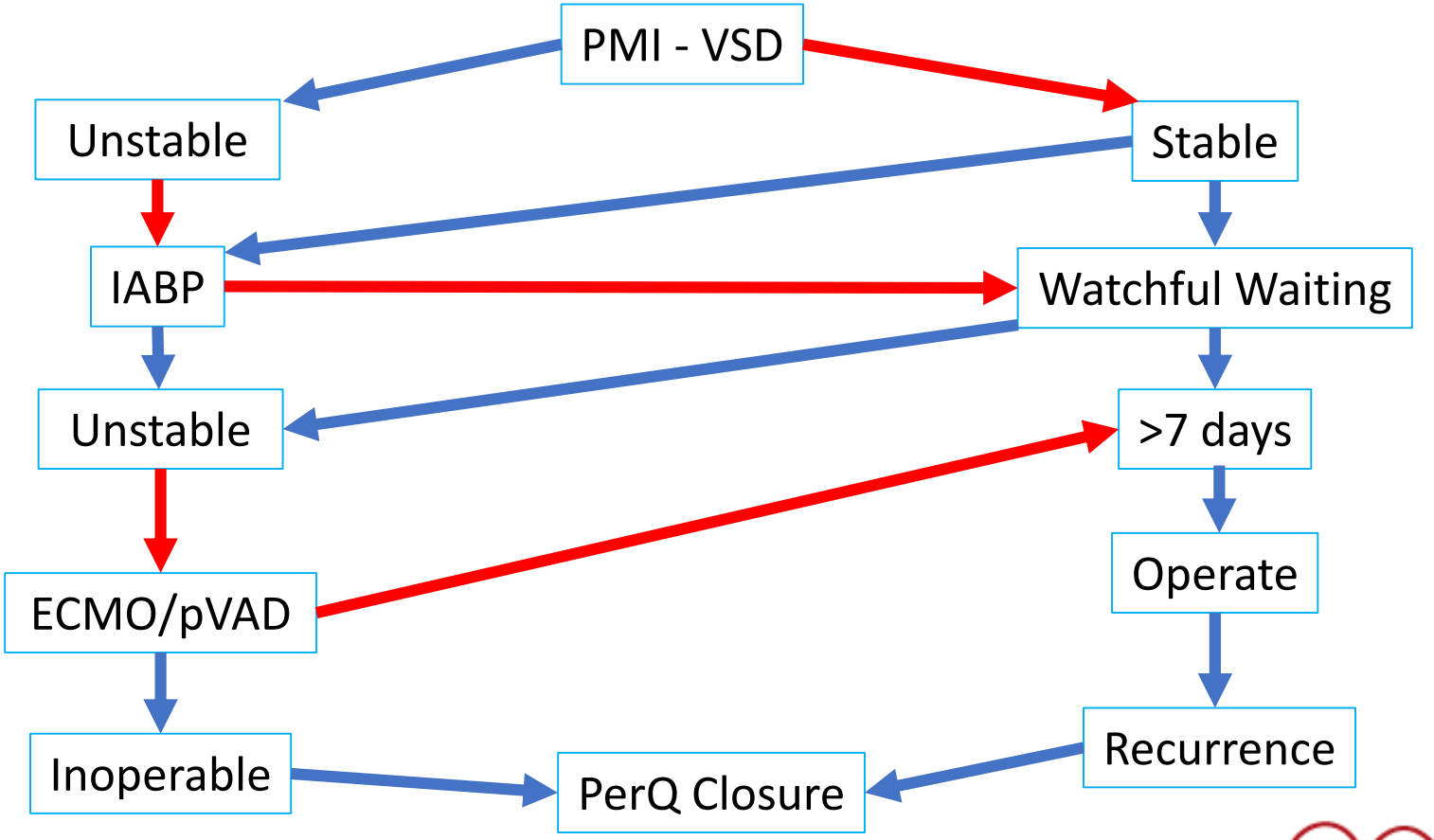
The 2019 Approach (FCI)



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Conclusions

- Despite decreasing incidence, mortality remains exceedingly high
- Early surgical treatment remains the gold standard, but high mortality
- Percutaneous closure only in a very selected few
- IABP in all patients
- pVAD or ECMO may allow delayed intervention (>7days) with better overall results.

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THANK YOU