Surgical Treatment of Post-Infarction Ventricular Septal Rupture

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Surgical Repair of Ventricular Septal Defect after Myocardial Infarction: Outcomes from the Society of Thoracic Surgeons National Database

G. J. Arnaoutakis et al.

Presented at the STS meeting in Fort Lauderdale, FL January 30, 2012

Richard E. Clark Paper

Annals of Thoracic Surgery – in press
Arnaoutakis et al. – STS Database
Operative Outcomes of Post-MI VSD

1999-2010
2,876 patients: 56% ♂; 44% ♀
Preop IABB: 65%
Emergent: 50%

OPERATIVE MORTALITY: Overall = 43%
54% AMI ≤ 7 days
18% AMI > 7 days
Arnaoutakis et al. – STS Database
Operative Outcomes of Post-MI VSD

1999-2010

2,876 patients: 666 centers

0.09 to 3.7 patients/year/center

0.9 pt/yr in 75% of centers
Toronto General Hospital - 1991-2010
Number of Cases/Surgeon and Deaths

21%  20%  33%  78%  50%  66%  66%  100% Operative Mortality

Overall Mortality 39%

Surgeon

A  B  C  D  F  H  I  J

# Patients

Deaths
Surgery for Post-Infarction VSD
Willard M. Daggett, Jr. – Boston, MA

- Myocardial revascularization
- Infarctectomy
- Reconstruction of the septum and ventricular wall with Dacron
Repair of Apical Postinfarction VSD
Daggett’s technique
Surgical Repair of Anterior Postinfarction VSD
Daggett’s Technique
Repair of Posterior Postinfarction VSD
Daggett’s Infarctectomy & Patches
Postinfarction VSD
Operative Outcomes - Daggett’s Technique

Common conclusions of various studies:
1. Shorter the time interval between AMI and VSD = worse the outcome
2. Cardiogenic shock = high operative mortality
3. Posterior VSD has higher operative mortality than anterior VSD
4. Poor RV function is a predictable of operative mortality
Size of Infarction and VSD Autopsy Findings

- Infarct size by planimetry:
  - LV = 27.2%
  - RV = 19.8%

- Anterior VSD:
  - LV = 32.3%
  - RV = 9.9%

- Posterior VSD:
  - LV = 21.3%
  - RV = 31.4%

Cummings et al. Circulation 1988;77:33
Autopsy Findings on Postinfarction VSD

- Septal rupture is associated with extensive transmural myocardial infarction
- The RV is always infarcted
- The RV is more extensively infarcted than the LV in posterior septal rupture
- The LV is more extensively infarcted than the RV in anterior septal rupture
- Posterior VSD occurs at proximal third of the septum and anterior VSD at the distal third

Cummings et al. Circulation 1988;77:33
Repair of Anterior Postinfarction VSD
Infarct Exclusion Technique
Repair of Postinfarction Anterior VSD
Infarct Exclusion Technique
Repair of Posterior Postinfarction VSD
Infarct Exclusion Technique
Current Approach to Postinfarction VSD

• Hemodynamically stable patients:
  Coronary angiography
  URGENT SURGERY

• Patients in cardiogenic shock:
  Resuscitation
  Coronary angiography
  EMERGENT SURGERY
Postinfarction Posterior Ventricular Septal Rupture Repair by Infarct Exclusion Technique

APEX

BASE

Posterior Descending Artery
Posterior Wall

Base of heart

Apex

Ruptured Interventricular Septum
Case Study:

A 78 year-old man developed acute cardiogenic shock 2 days after a posterior wall infarction. Echocardiography showed a VSD.

An IABP was inserted and coronary angiography obtained. The RCA was totally occluded at its mid-portion, the LAD had 80% stenosis and the circumflex had no flow-limiting disease.

He was taken to the OR. The LAD was bypassed and ...
Postinfarction VSD Repair
Infarct Exclusion Technique

Operative mortality: 11/52 (21%)

Cardiogenic shock: 10/35 (29%)
No cardiogenic shock: 1/16 (6%) p = 0.005

Anterior VSD: 5/25 (20%)
Posterior VSD: 6/27 (22%) p = 0.9

Preop renal failure: 6/15 (40%)
No renal failure: 5/37 (14%) p = 0.03

David et al. JTCVS 1995;110:1315-22
Postinfarction VSD Repair
Infarct Exclusion Technique

Causes of death:  
6 – heart failure
4 – multi-organ failure
1 – postop stroke

Postoperative complications:
  Renal failure (dialysis) 12 pts
  Respiratory failure (>2 days) 18 pts
  Recurrent VSD 2 pts

ICU stay: 10 days (1 to 112)
Hospital stay: 22 days (1 to 131)
Long-term Survival After Repair by Infarct Exclusion Technique

% Alive

Patients at risk

0  0.1  1  2  3  4  5  6  7  8

Years

52  41  40  38  36  32  25  20  17  15

50 %
Postinfarction VSD

Inferences

• Its incidence is probably declining
• The mortality remains very high
• The natural history is very poor
• The infarct exclusion technique reduced the operative mortality for posterior VSD
• Operative survivors have good long-term survival
Thank you