

# **Redo Coronary Artery Bypass Surgery**

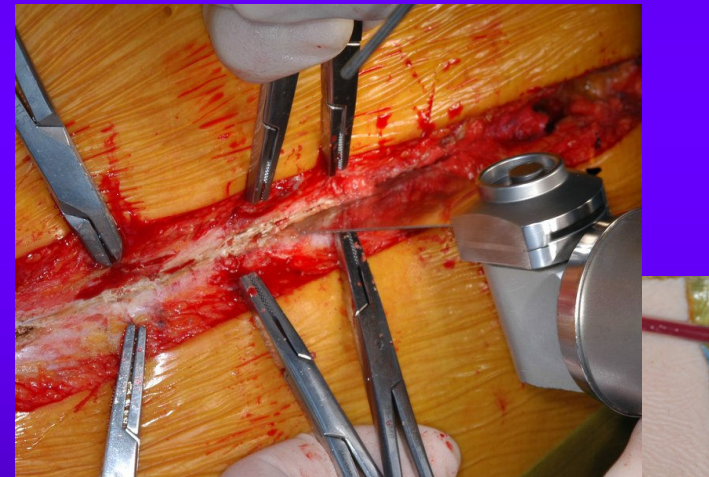
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Sunkyunkwan University School of  
Medicine**

# Introduction

## Incidence

**25 %**, USA and EU

**1 %** (25/2,325), *SMC*



# **Introduction**

## **Choice of conduit**

**ITA, RA, GEA, IEA, SV**

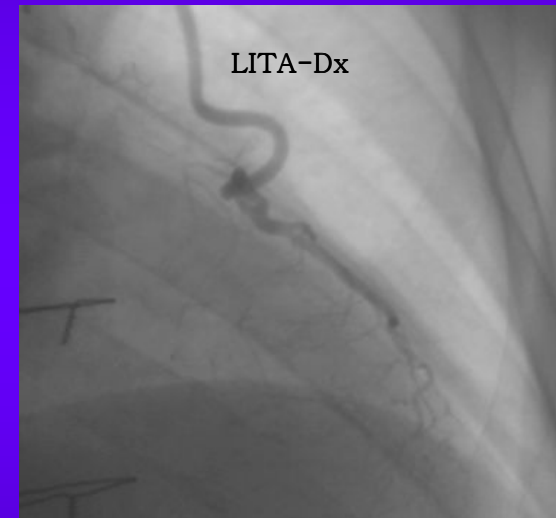
## **Grafting strategy**

**replacement of SV**

**reuse of functioning ITA**

## **Myocardial protection**

## **Off-pump technique**



# Indications

## *AHA/ACC recommendations*

### *Class I*

1. Coronary bypass should be performed in patients with prior CABG for ***disabling angina despite optimal nonsurgical therapy***. (If the angina is not typical, then objective evidence of ischemia should be obtained.) *(Level of Evidence: B)*
2. Coronary bypass should be performed in patients with prior CABG without patent bypass grafts but with Class I indications for surgery for native-vessel coronary artery disease (***significant left main coronary stenosis, left main equivalent, 3-vessel disease***). *(Level of Evidence: B)*

### *Class IIa*

1. Coronary bypass is reasonable in patients with prior CABG and ***bypassable distal vessel(s) with a large area of threatened myocardium by noninvasive studies***. *(Level of Evidence: B)*
2. Coronary bypass is reasonable in patients with prior CABG if ***atherosclerotic vein grafts with stenoses greater than 50%*** supplying the LAD coronary artery or large areas of myocardium are present. *(Level of Evidence: B)*

# **Indications**

## ***Anatomic***

- 1. atherosclerotic (late) stenoses in vein grafts that supply the LAD**
- 2. multiple stenotic vein grafts that supply large areas of myocardium**
- 3. multi-vessel disease with a proximal LAD lesion**
- 4. abnormal LV function related to native vessel lesion or stenotic vein grafts.**

## ***Functional***

- 1. Recurrent angina**
- 2. CHF**
- 3. LMD and 3 VD with LV dysfx.**

# **Redo CABG/PTCA**

## **Redo CABG**

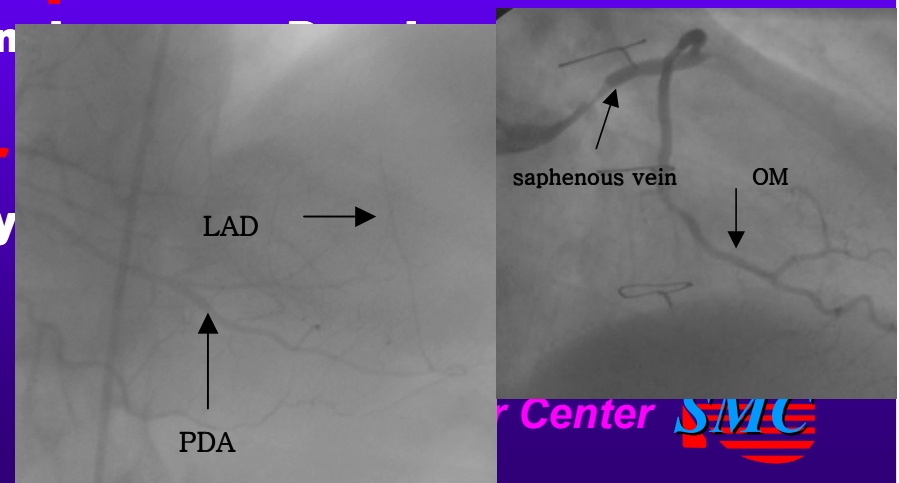
- 1. late( $\geq 5$  years) stenoses**
- 2. multiple stenotic vein grafts**
- 3. diffusely atherosclerotic vein grafts**
- 4. stenotic LAD graft**
- 5. no patent ITA graft**
- 6. abnormal LV function**

## **PTCA**

- 1. Early (<5years) stenoses**
- 2. single stenotic vein graft**
- 3. other patent vein graft**
- 4. focal graft lesions**
- 5. patent ITA-LAD graft**

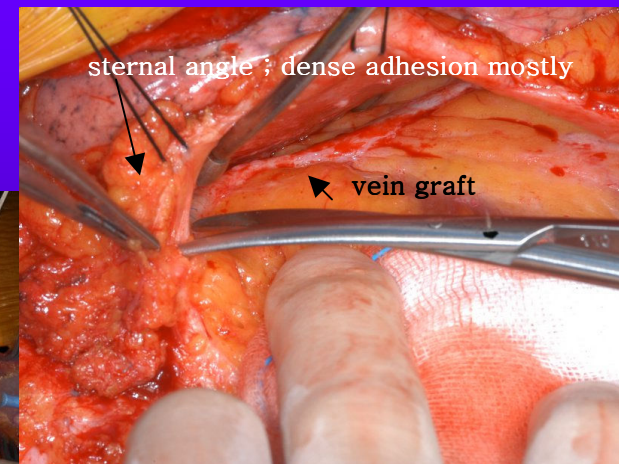
# Preoperative Assessment

1. **complete study** of the native coronary and bypassed graft anatomy, additional cardiac defect (mitral insufficiency, aortic insufficiency, LV thrombi, pulmonary hypertension, atrial septal defect)
2. **viable myocardium** supplied by graftable coronary artery
3. evaluation of **bypass conduit planned** (ITAs, RA, GEA, SV, IEA with anastomosis)
4. evaluation of **other vascular** (renal, carotid, peripheral artery)



# **Intraoperative Factors**

- 1. application of defibrillator pads and background lidocaine**
- 2. exposure of femoral artery and vein before sternotomy**
- 3. repeat sternotomy**
- 4. remaining dissection under cardioplegia**
- 5. single-clamp technique in all cases**





# **Intraoperative Factors**

## **High risk situations**

**RV, or aortic enlargement**

**patent vein graft to RCA**

**in situ RITA to LCA**

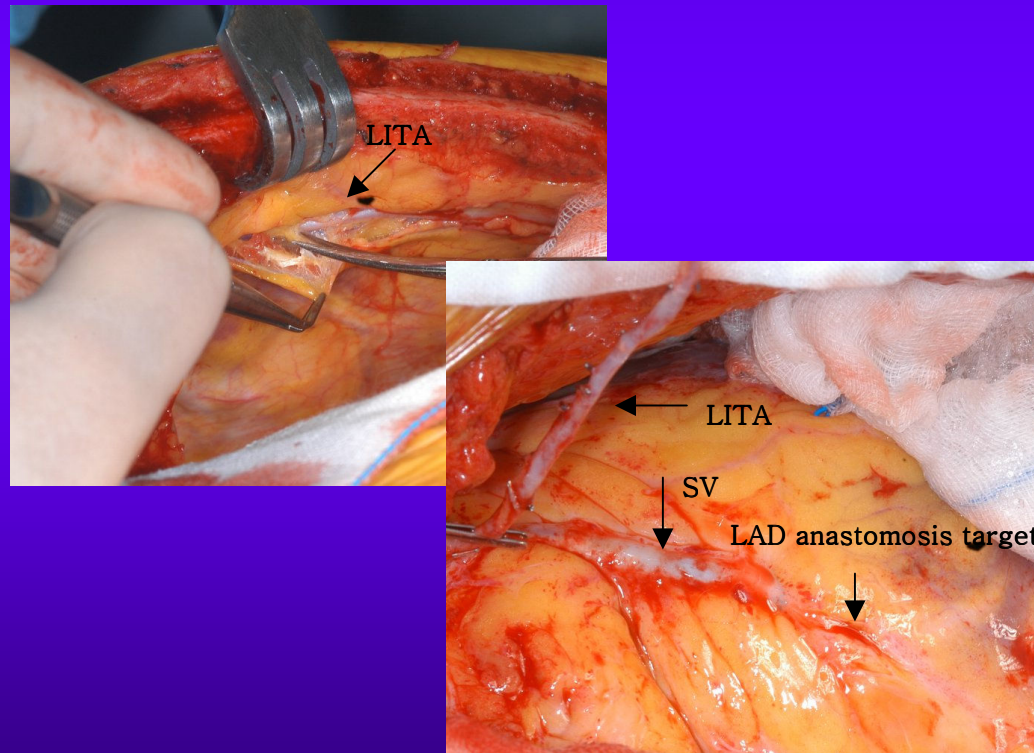
**in situ LITA curled medially**

**multiple reoperations**

***epicardial thickening, scar—difficulty in CA identification***

# Intraoperative Factors

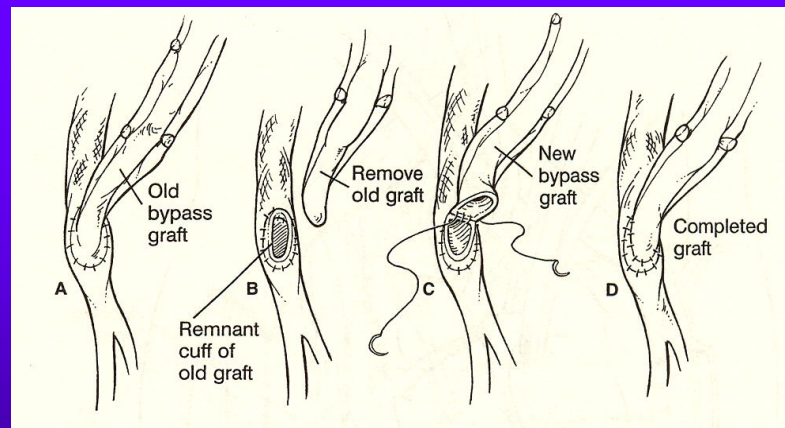
## ITA harvesting



# Intraoperative Factors

## Grafting techniques

### vein graft replacement

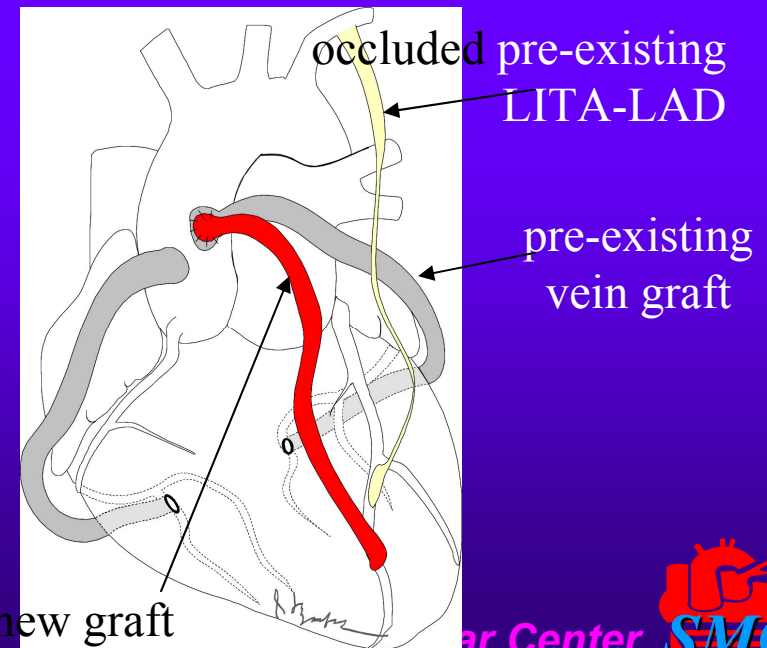
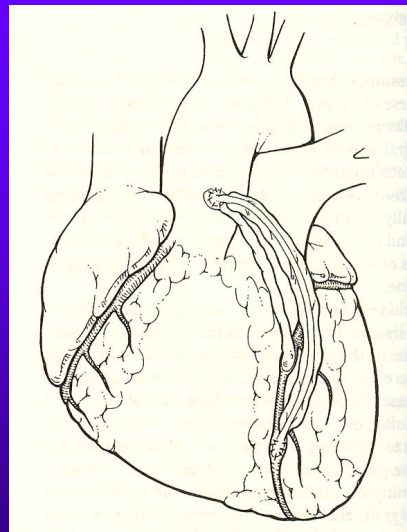


**Timing**  
**≥ 5 years**

# Intraoperative Factors

## Grafting techniques

### proximal arterial graft on vein graft

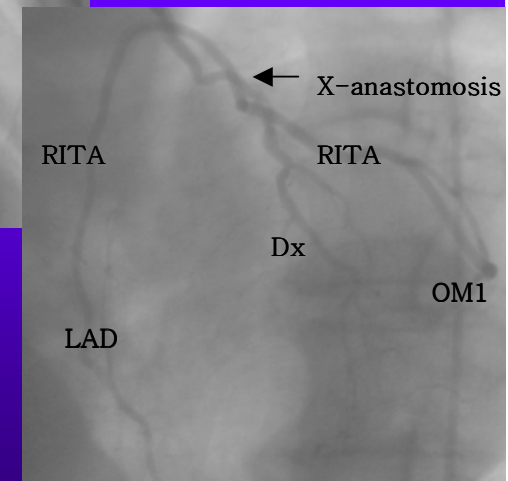
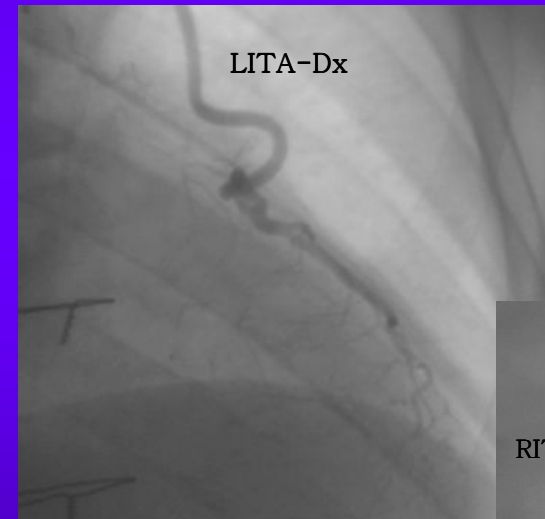
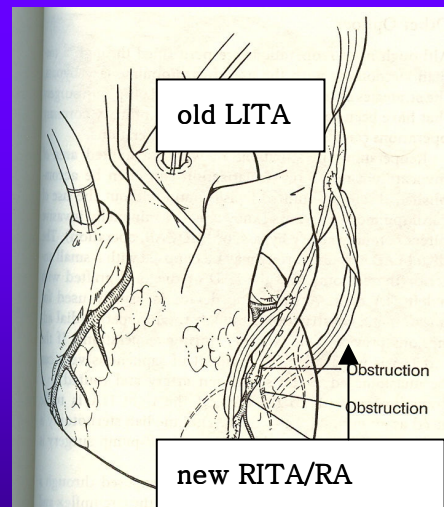


new graft  
to LAD

# Intraoperative Factors

## Grafting techniques

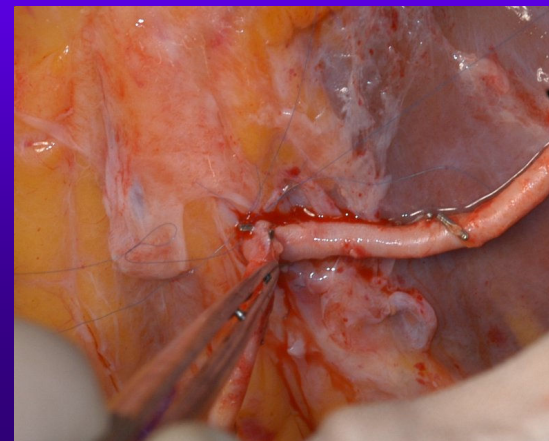
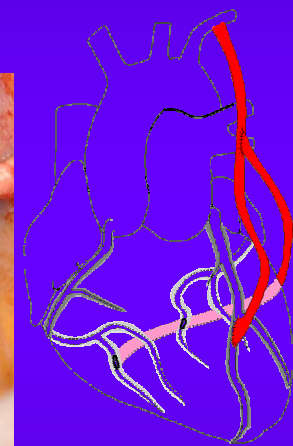
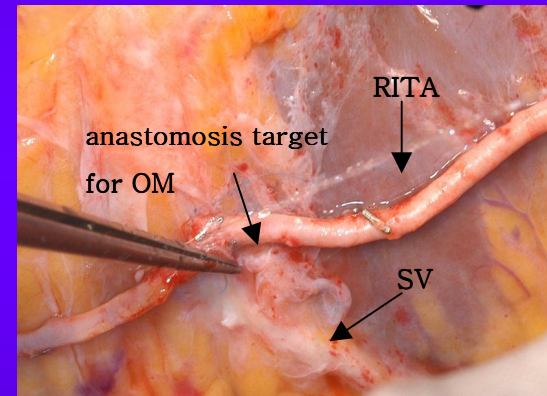
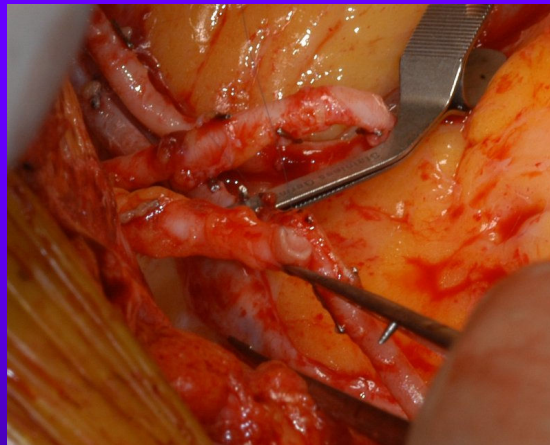
*reuse functioning ITA*



# Intraoperative Factors

## Grafting techniques

**composite graft**



# Redo CABG

2001-2007,7 SMC

## Profiles

Numbers : 25 cases (2001-2007.7.)

M:F= 19; 6

Age :  $61.9 \pm 9.7$  (41~75)

Interval(months);  $103.0 \pm 64.6$  (2-264)

EF(%);  $50.0 \pm 13.2$  (26-78)

### Risk factors

IABP (2)

CRF (7)

EF < 35% (4)

# Redo CABG

2001-2007,7 SMC

## Targets

### New targets

LAD	18
Dx	12
OM	19
RCA	2
PDA	3
PL	4

### Graft failure

LAD	12
OM	11
RCA	12

LITA 6  
SV others

### New lesions

LAD	2
OM	1
RCA	1



# Redo CABG

2001-2007,7 SMC

## Operations

### *Grafts*

RITA	20
LITA	6
RA	10
GEA	10
SV	1
TDA	1

*No of distal anastomosis ; 2.8 ± 0.9 (1-5)*

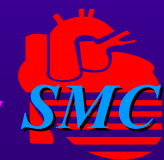
### *Op techniques*

Conventional CABG	15
On pump beating	6
MIDCAB	2
OPCAB	2

**ASD 1**

**MAP 1**

**MVR 1**



# **Redo CABG**

**2001-2007,7 SMC**

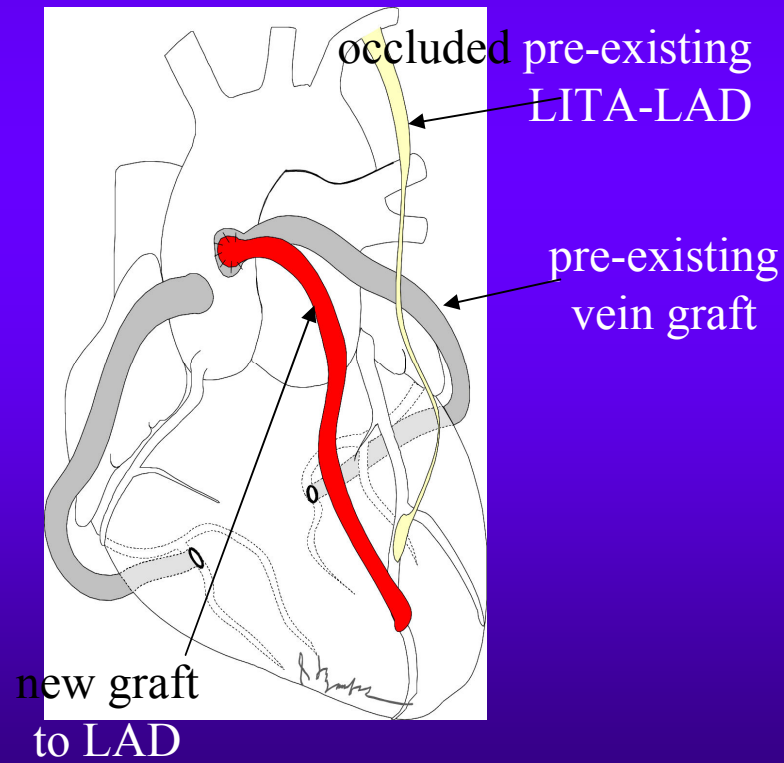
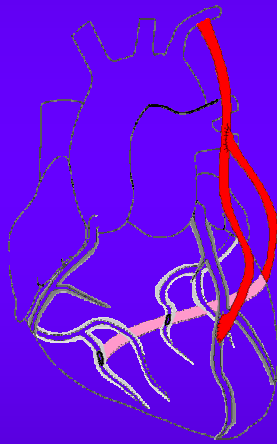
## **Results**

<b>Operative mortality</b>	<b>0</b>
<b>Late mortality</b>	<b>1</b>
<b>Postop IABP</b>	<b>0</b>
<b>Postop LCOS</b>	<b>4</b>
<b>Af</b>	<b>4</b>
<b>Neurologic</b>	<b>2</b>
<b>Reintervention</b>	<b>2</b>

# Redo CABG

2001-2007,7 SMC

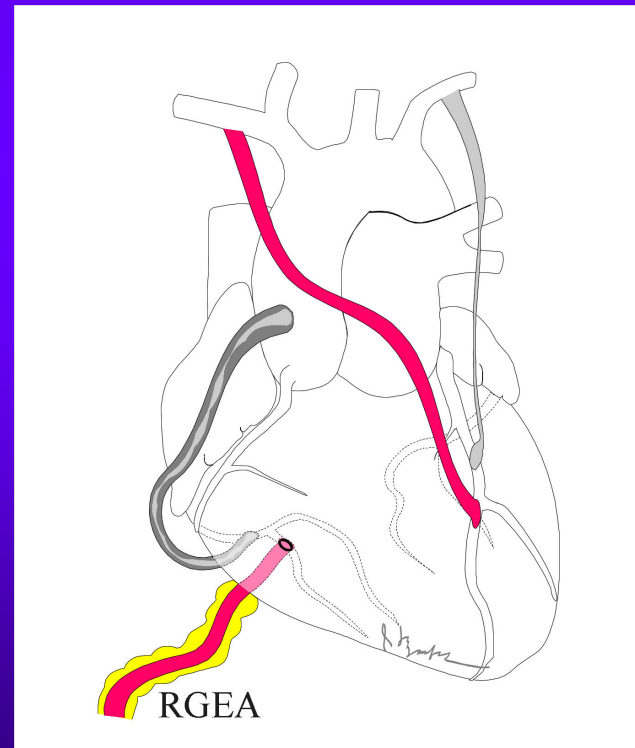
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

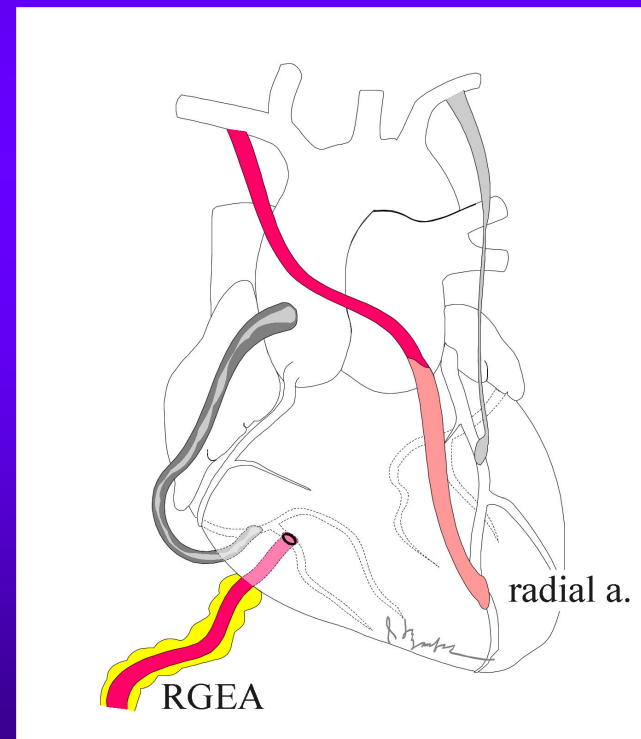
## Variable grafting techniques



# Redo CABG

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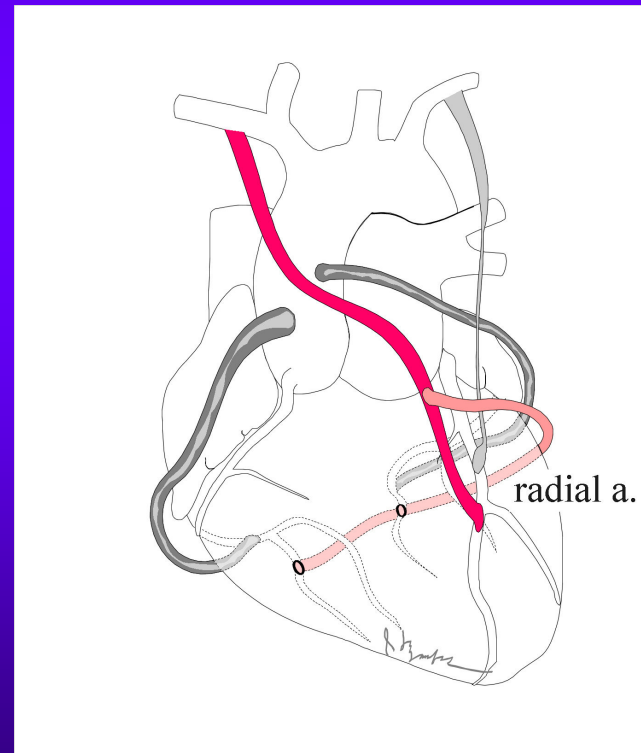
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

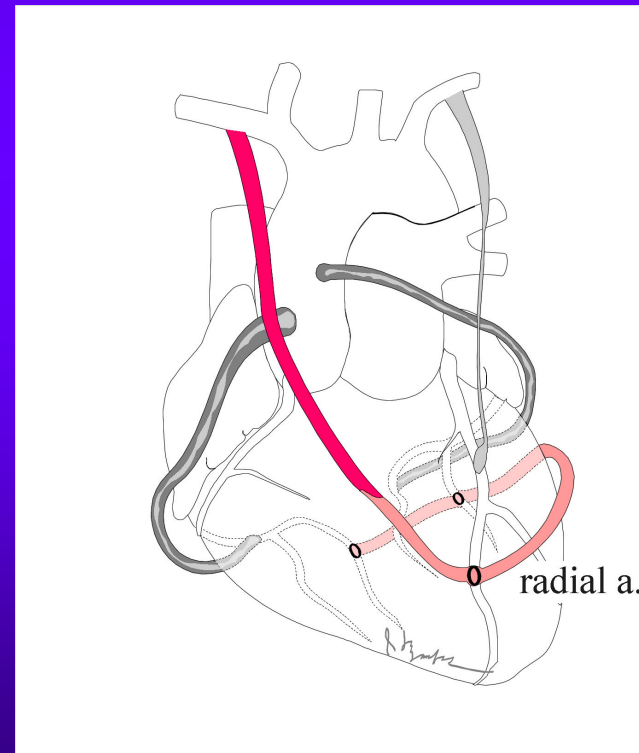
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

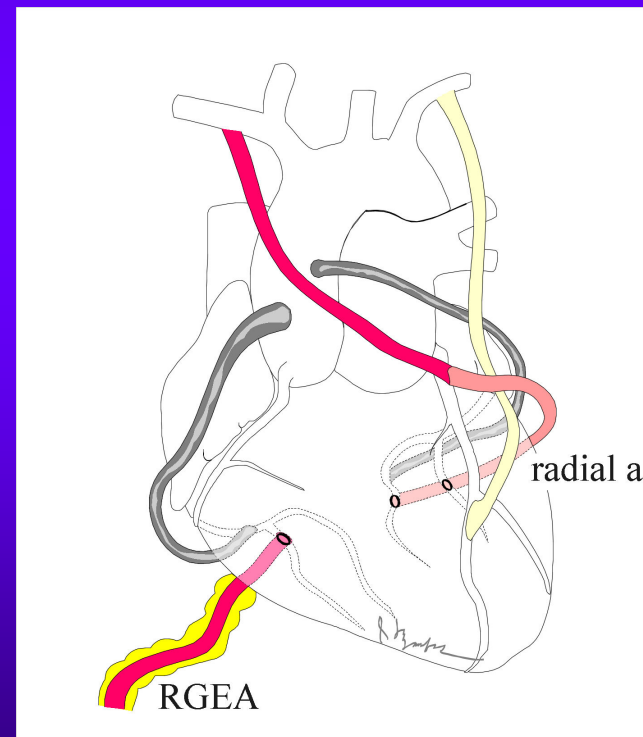
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

## Variable grafting techniques

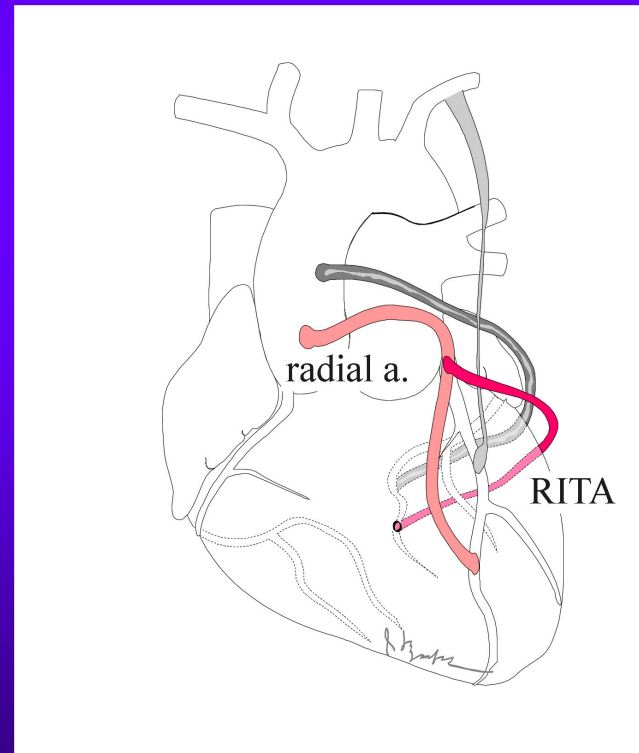




# Redo CABG

2001-2007,7 SMC

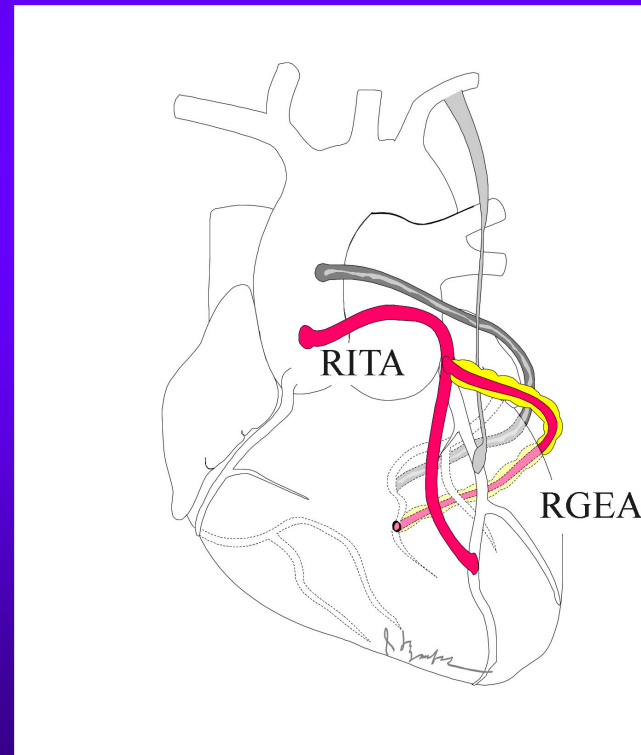
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

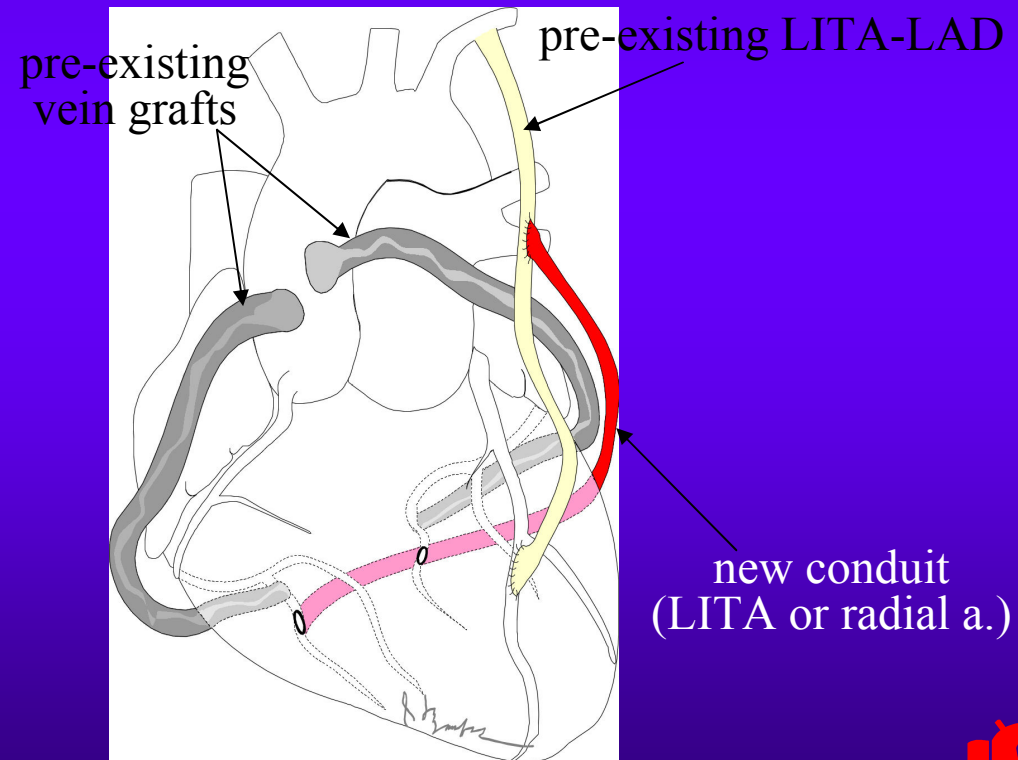
## Variable grafting techniques



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2001-2007,7 SMC

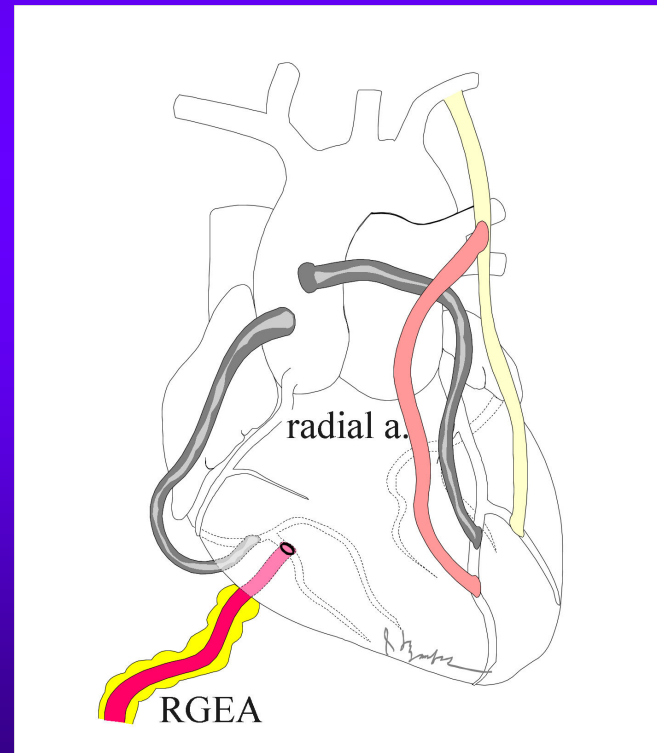
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

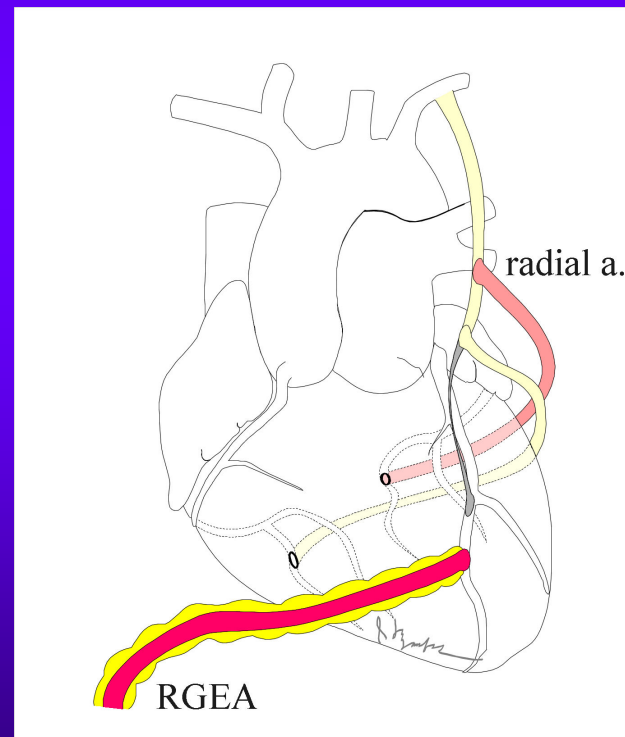
## Variable grafting techniques



# Redo CABG

2001-2007,7 SMC

## Variable grafting techniques

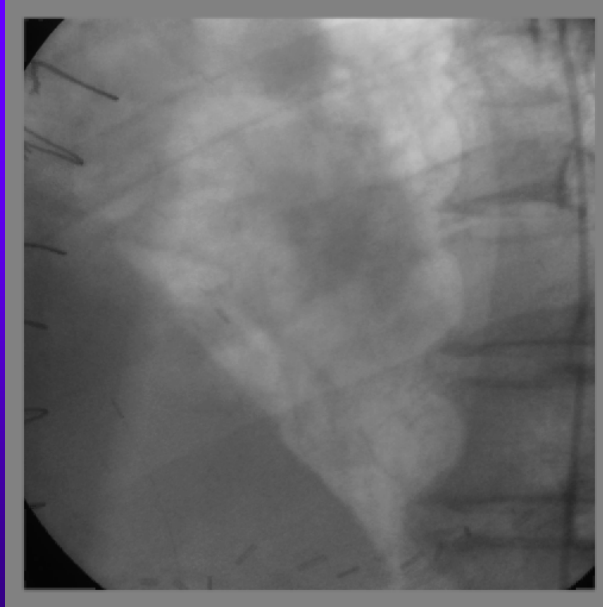
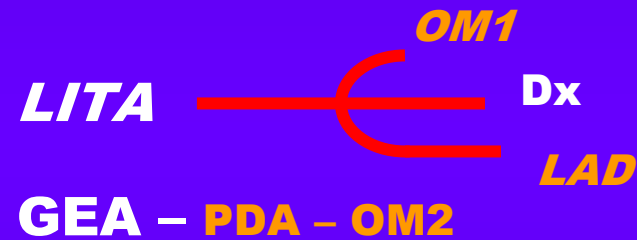


# Redo CABG

2001-2007,7 SMC

## Variable grafting techniques

*reuse of functioning LITA, X-graft*



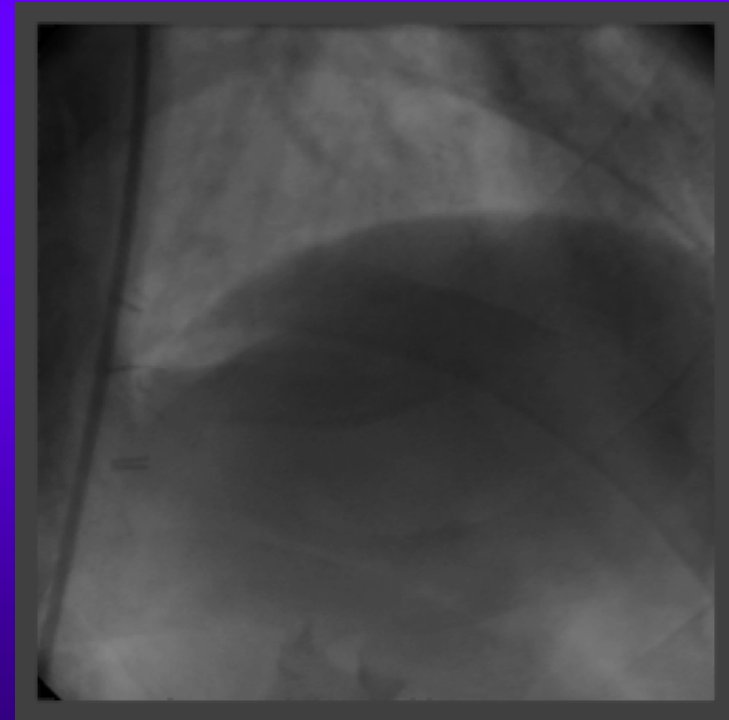
# Redo CABG

2001-2007,7 SMC

## Variable access techniques

***LAST***

**LITA---LAD**



# Redo CABG

2001-2007,7 SMC

**Variable access techniques**

*transabdominal MIDCAB*

*GEA-d-RCA*



Trans Abdominal MID CABG

samsung medical center TS



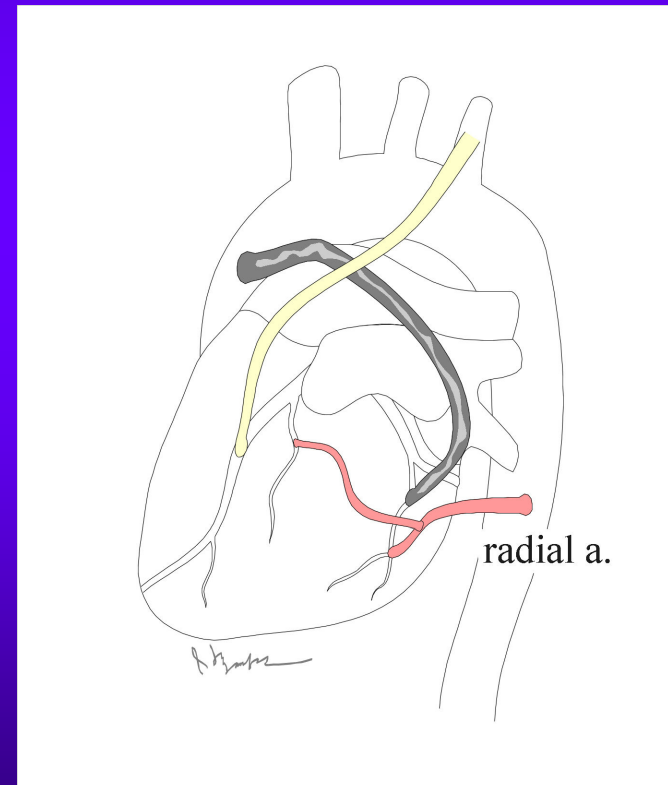
# Redo CABG

2001-2007,7 SMC

## Variable access technique

*Thoracotomy*

*Desc. Ao--SV or RA --- OM*



# Redo CABG

2001-2007,7 SMC

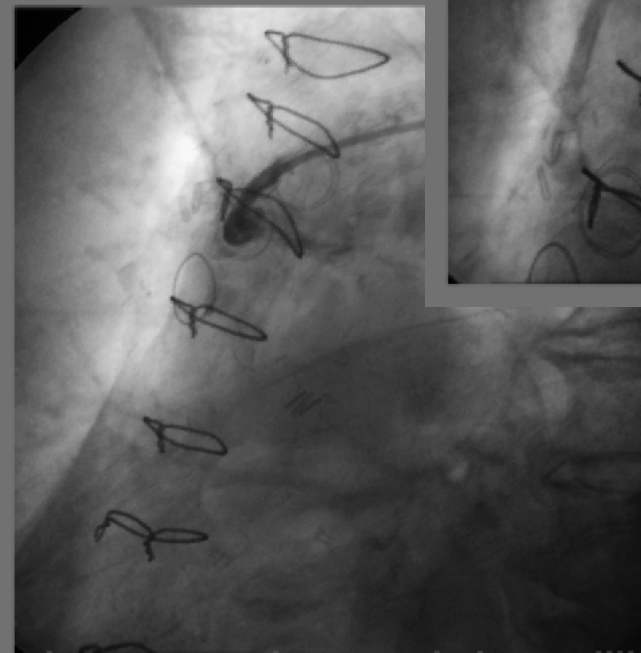
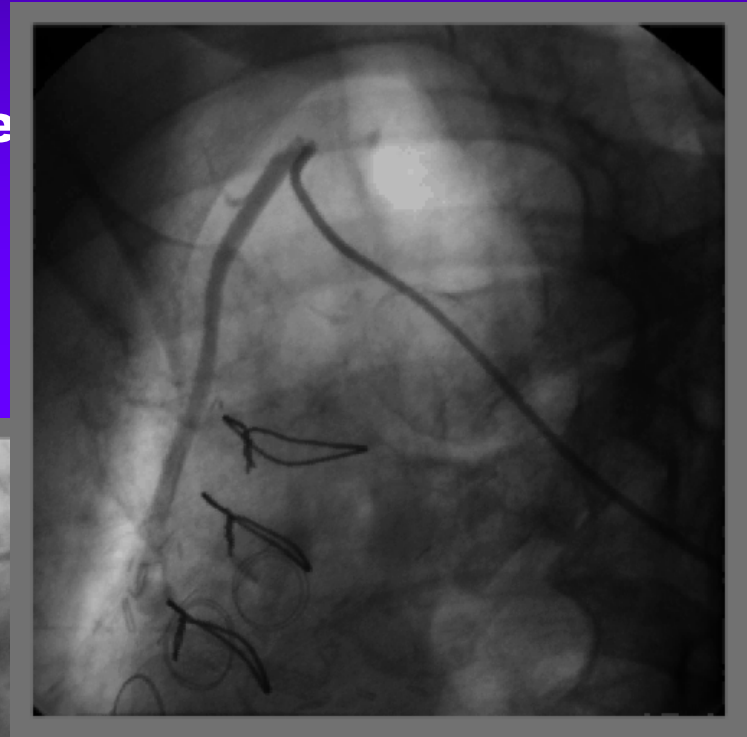
Reintervention on SV patent at re

F/67

redo cabg, on pump beating (7years)

RITA extension RA to  
Patent SV to LAD

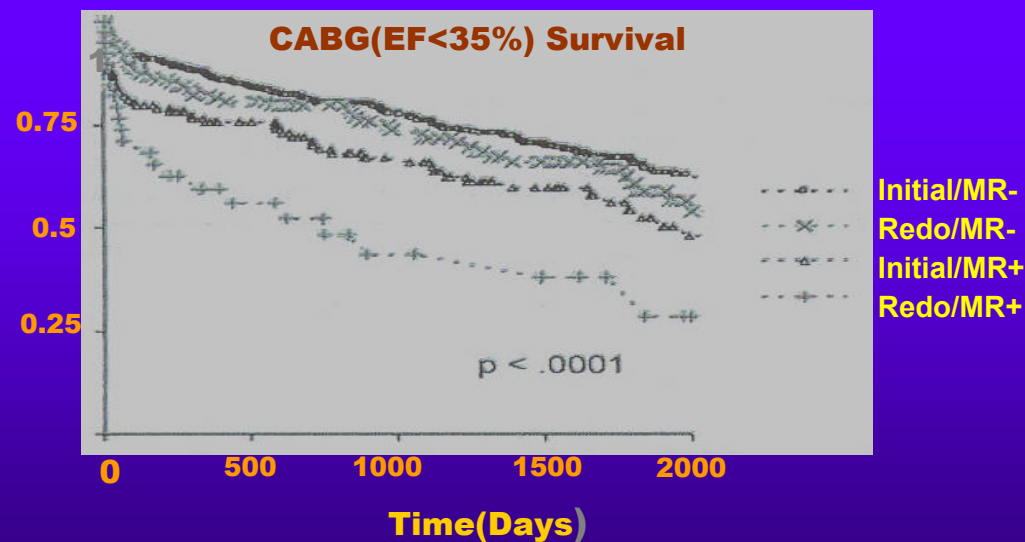
--2 years later PCI in S



# Redo CABG in LV Dysfunction

Impact of mitral insufficiency on reoperative coronary artery surgery in **ischemic cardiomyopathy, EF<35%**

	<b>Redo/MR+</b>	<b>Redo/MR-</b>	<b>Initial/MR+</b>	<b>Initial/MR-</b>
<b>3 year survival(%)</b>	<b>41.7</b>	<b>71.8</b>	<b>68.5</b>	<b>76.2</b>



# Redo CABG in LV Dysfunction

reoperative coronary artery surgery in ischemic cardiomyopathy, EF<35%

**Initial late mortality**

dialysis  
stroke  
no angina  
age>65  
no hypercholesterolemia  
EF<25%

**Redo late mortality**

**CHF  
MR3/4**

*Wang N, Eur J Cardio-thorac Surg 2004;26:1118-28*

Cardiac & Vascular Center



# Summary

In the current era, redo CABG is nearly as safe as the primary operation.

But, redo CABG should not be performed in patients having *severe MR with poor LV function* without evidence of intermittent ischemia and without evidence of significant viable myocardium.