Coronary artery surgery results 2005, in Japan

The President of Japanese Association for Coronary Artery Surgery (JACAS)

Yukiyasu Sezai
Coronary artery bypass grafting (CABG), 2005

<table>
<thead>
<tr>
<th>Total cases</th>
<th>12,207</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated CABG</td>
<td>9,827</td>
</tr>
<tr>
<td>Concomitant CABG</td>
<td>2,380</td>
</tr>
</tbody>
</table>

Isolated CABG

<table>
<thead>
<tr>
<th>Initial elective</th>
<th>8,089</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off–pump</td>
<td>4,936</td>
</tr>
<tr>
<td>820</td>
<td></td>
</tr>
<tr>
<td>On–pump</td>
<td>3,153</td>
</tr>
<tr>
<td>918</td>
<td></td>
</tr>
</tbody>
</table>

(Off–pump rate : 61%)
Changes in OPCAB frequency rate of initial elective CABG
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cases of initial elective</td>
<td>8,089</td>
<td>100%</td>
</tr>
<tr>
<td>On-pump (cardiac arrest)</td>
<td>2,725</td>
<td>33.7%</td>
</tr>
<tr>
<td>On-pump (cardiac beating)</td>
<td>428</td>
<td>5.4%</td>
</tr>
<tr>
<td>Off-pump (total cases)</td>
<td>4,936</td>
<td>61.0%</td>
</tr>
<tr>
<td>Off-pump (complete)</td>
<td>4,815</td>
<td></td>
</tr>
<tr>
<td>On-pump (convert)</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>OPCAB complete rate</td>
<td>97.5%</td>
<td></td>
</tr>
<tr>
<td>Off to on-pump convert rate</td>
<td>2.5%</td>
<td></td>
</tr>
<tr>
<td>(previous year: 3.8%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mortality of isolated CABG: **1.91%**  
(previous year: 1.95%)

Mortality of initial elective CABG: **0.89%**  
(previous year: 1.04%)

- On-pump (cardiac arrest): **1.17%**
- On-pump (cardiac beating): **1.40%**
- Off-pump (total cases): **0.68%**
- Off-pump (complete): **0.60%**  
  (previous year: 0.88%)
- On to on-pump (convert): **4.13%**  
  (previous year: 3.38%)
Changes in mortality of CABG

<table>
<thead>
<tr>
<th>Mortality (%)</th>
<th>Total cases</th>
<th>Initial elective cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.91%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.89%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Year:
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
Surgical results according to diseased vessels

(Initial elective cases: 8,089, mortality: 0.89%)
Surgical results according to diseased vessels

(Initial elective off–pump (complete): 4,815, mortality: 0.60%)
Surgical results according to diseased vessels
(Initial elective on-pump (arrest): 2,725, mortality: 1.17%)

- 1VD (1.92%)
- 2VD (1.52%)
- 3VD (0.90%)
- LMT (0%)
- LMT + 1VD (1.12%)
- LMT + 2VD (1.83%)
- LMT + 3VD (1.36%)
Surgical results according to diseased vessels

(Initial elective off to on-pump (conversion): 121, mortality: 4.13%)

Mortality (%)

1VD (0%)
2VD (0%)

3VD (5.36%)

LMT + 1VD
LMT + 2VD
LMT + 3VD (8.0%)
Surgical results according to diseased vessels

(Initial elective on-pump (beating): 428, mortality: 1.40%)
Surgical results according to diseased vessels

(Extra initial elective cases: 1,738, mortality: 6.67%

Mortality (%)

1VD (8.51%)
2VD (3.92%)
3VD (6.88%)
LMT (8.15%)
LMT + 1VD (1.16%)
LMT + 2VD (4.31%)
LMT + 3VD (9.09%)
Surgical results according to procedures

(Except initial elective cases: 1,738, mortality: 6.67%)

Mortality (%)

Off pump (total) 5.40%

On pump (beating) 11.74%

On pump (arrest) 6.21%
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cases</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4≤</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cases</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4≤</td>
</tr>
<tr>
<td>On-pump (arrest)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4≤</td>
</tr>
<tr>
<td>On-pump (beating)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4≤</td>
</tr>
<tr>
<td>Off to on (conversion)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4≤</td>
</tr>
<tr>
<td>Off-pump (complete)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4≤</td>
</tr>
</tbody>
</table>

Mean grafts:

- Total cases: 2.83
- On-pump (arrest): 3.09
- On-pump (beating): 2.89
- Off to on (conversion): 2.81
- Off-pump (complete): 2.68
Surgical procedures according to number of grafts

1 graft
- Off-pump
- On-pump (arrest)

2 grafts
- Off-pump
- On-pump (arrest)

3 grafts
- Off-pump
- On-pump (arrest)

4 or more grafts
- Off-pump
- On-pump (arrest)
Surgical procedures according to diseased vessels

1 vessel
- Off-pump
- On-pump (arrest)

2 vessels
- Off-pump
- On-pump (arrest)

3 vessels
- Off-pump
- On-pump (arrest)

LMT
- Off-pump
- On-pump (arrest)

LMT +1
- Off-pump
- On-pump (arrest)

LMT +2
- Off-pump
- On-pump (arrest)

LMT +3
- Off-pump
- On-pump (arrest)
Surgical results of off-pump (complete) vs. on-pump (arrest) according to diseased vessels

Mortality (%)

- Off-pump (complete)
- On-pump (arrest)

1 vessel: 2.0
2 vessels: 1.17
3 vessels: 0.60
LMT: 0
LMT +1: 1.17
LMT +2: 1.17
LMT +3: 1.17
Total: 1.17
### Off to on-pump conversion rate according to diseased vessels (total: 2.5%)

<table>
<thead>
<tr>
<th>Vessels</th>
<th>Conversion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 vessel</td>
<td>0.9%</td>
</tr>
<tr>
<td>2 vessels</td>
<td>0.9%</td>
</tr>
<tr>
<td>3 vessels</td>
<td>2.7%</td>
</tr>
<tr>
<td>LMT</td>
<td>3.5%</td>
</tr>
<tr>
<td>LMT +1</td>
<td>2.0%</td>
</tr>
<tr>
<td>LMT +2</td>
<td>2.9%</td>
</tr>
<tr>
<td>LMT +3</td>
<td>3.8%</td>
</tr>
</tbody>
</table>
On-pump (arrest) vs. off-pump (Initial elective CABG)

- **RCA**
  - On-pump (arrest): 70%
  - Off-pump: 58%

- **LAD**
  - On-pump (arrest): 96%
  - Off-pump: 92%

- **LCX**
  - On-pump (arrest): 82%
  - Off-pump: 67%
### Off-pump vs. off to on-pump conversion (Initial elective CABG)

<table>
<thead>
<tr>
<th>Bypass</th>
<th>No.</th>
<th>Off-pump</th>
<th>Off to on-pump(conversion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCA(+)</td>
<td>2,898</td>
<td></td>
<td>2.8%</td>
</tr>
<tr>
<td>LAD(+)</td>
<td>4,562</td>
<td></td>
<td>2.6%</td>
</tr>
<tr>
<td>LCX(+)</td>
<td>3,308</td>
<td></td>
<td>2.9%</td>
</tr>
<tr>
<td>RCA(−)</td>
<td>2,038</td>
<td></td>
<td>1.9%</td>
</tr>
<tr>
<td>LAD(−)</td>
<td>374</td>
<td></td>
<td>0.8%</td>
</tr>
<tr>
<td>LCX(−)</td>
<td>1,628</td>
<td></td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Previous: 14.8%
Age distribution (Initial elective cases)

- **Male:** 75.8%
- **Female:** 24.2%

- **Mortality:** 0.62% (previous: 1.10%)
- **Mortality:** 1.26% (previous: 1.24%)

**Age distribution:**
- **2250:** Male: 388
- **2232:** Male: 1100
- **2212:** Male: 281
- **2200:** Male: 49

**Female:**
- **253:** Female
- **553:** Female
- **203:** Female
- **40:** Female
Changes in elderly patients (Initial elective cases)

- 70 y.o. ≤ 80 y.o.

- 7.8% among 80 y.o. and above

- 46.5% among 70 y.o. and above
Changes in mortality according to age (Initial elective cases)

- 49 y.o. 
- 50-59 y.o. 
- 60-69 y.o. 
- 70-79 y.o. 
- 80 y.o. ≤

(year)

(%) 3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
2000 2001 2002 2003 2004 2005

year
Graft selection
(Total number of grafts: 24,7484 grafts)

- LITA: 37.1%
- RITA: 29.8%
- GEA: 11.3%
- RA: 13.9%
- SVG: 7.6%
- Others: 0.2%
Changes in mortality of VSP

2005;
Total cases: 154, death cases: 29 (Mortality: 18.83%)
Results of VSP (1)

Total cases:
- Alive: 125
- Death: 29
- Total cases: 154 (mortality: 18.8%)

Bypass (+):
- Alive: 47
- Death: 10
- Total cases: 57 (mortality: 17.5%)

Bypass (-):
- Alive: 78
- Death: 19
- Total cases: 97 (mortality: 19.6%)

(case)
Results of VSP (2)

Anterior infarction (mortality: 16.0%)
- Dagett: 25 (4 deaths, mortality: 13.8%)
- Komeda: 80 (16 deaths, mortality: 16.7%)

Post-inferior infarction (mortality: 31.0%)
- Dagett: 9 (3 deaths, mortality: 25.0%)
- Komeda: 11 (6 deaths, mortality: 35.3%)
Changes in mortality of papillary muscle rupture of LV

Mortality (%)

year


2005;
Total cases: 29, death cases: 7 (mortality: 24.14%)
Results of papillary muscle rupture

Total cases:
- Alive: 22 (mortality: 24.1%)
- Death: 7

Bypass (+):
- Alive: 11
- Death: 3
- Total: 14 (mortality: 21.4%)

Bypass (-):
- Alive: 11
- Death: 4
- Total: 15 (mortality: 26.7%)
Changes in mortality of cardiac rupture

2005;
Total cases: 82, death cases: 26 (mortality: 31.71%)
Results of cardiac rupture

Total cases: 82 (mortality: 31.7%)
- Bypass (+): 19 (mortality: 21.1%)
- Bypass (-): 63 (mortality: 34.9%)
Changes in mortality of left ventricle aneurysm

2005;
Total cases: 245, death cases 11 (mortality: 4.45%)
Results of left ventricular-plasty (including left ventriculectomy) against LV aneurysm and/or ischemic cardiomyopathy

Total cases: 247 (mortality: 4.45%)
- Bypass (+): 198 (mortality: 4.0%)
  - Alive: 190
  - Death: 8
- Bypass (-): 49 (mortality: 6.1%)
  - Alive: 46
  - Death: 3
Results of left ventriculectomy

- Total cases: 167 (170 alive, 3 deaths, mortality: 1.76%)
- Bypass (+): 136 (139 alive, 3 deaths, mortality: 2.2%)
- Bypass (-): 31 (mortality: 0%)

(case)
Results of mitral valvuloplasty and replacement against ischemic mitral regurgitation

Total cases
- Alive: 187
- Death: 9
- Total: 196 (mortality: 4.59%)

Bypass (+)
- Alive: 173
- Death: 8
- Total: 181 (mortality: 4.4%)

Bypass (-)
- Alive: 1
- Total: 15 (mortality: 6.7%)
Results of LV aneurysm and or ischemic cardiomyopathy concomitant with mitral valve regurgitation

Total cases

- 69 cases
- 9 deaths (mortality: 10.39%)

Bypass (+)

- 54 cases
- 5 deaths (mortality: 8.5%)

Bypass (-)

- 15 cases
- 3 deaths (mortality: 16.7%)
Conclusions (1)

1. The mortality of isolated CABG and initial elective CABG were 1.91%, and 0.89% respectively, indicating better results than that of previous year.

2. Of all initial elective CABG, 61% cases underwent off-pump CABG (OPCAB), showing high frequency rate. The mortality of OPCAB was 0.60%, showing excellent results.

3. The frequency rate of off to on-pump CABG was 4.13%, which was high rate.

4. The mean number of grafts for CABG was 2.83, which increased than that of last years, indicating more bypass performed.
Conclusions (2)

6. Of 4 or more bypass surgery, about 50% cases underwent OPCAB.

7. CABG cases have been getting older; the rate of 70 or more years old was 50%. The surgical results of those cases improved.

6. The frequency use rate of arterial grafts was about 70%, on the other hand, that of vein graft was 30%.

7. As for the results of complications after myocardial infarction, the mortality of those cases has been getting better.