Resident Training in Minimally Invasive Cardiac Surgery

THE POTENTIAL AND THE PROBLEMS

S P Collison, Yugal Mishra
J Brickwedel, H Reichenspurner
Why is it difficult to get training in OPCAB?

- Graft patency
- Incomplete revascularisation
- Learning curve

We are standing on the shoulders of giants - Isaac Newton, 1676
What is the magnitude of the problem?
Use of Off Pump Techniques in Coronary Bypass Surgery
Final Results

Years in Practice - Adult Cardiac

<table>
<thead>
<tr>
<th>Years</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>29.3%</td>
</tr>
<tr>
<td>5-10</td>
<td>19.9%</td>
</tr>
<tr>
<td>10-15</td>
<td>18.5%</td>
</tr>
<tr>
<td>&gt; 15</td>
<td>32.3%</td>
</tr>
</tbody>
</table>

% of Respondents

- Academic: 53.9%
- Medical Center: 16.1%
- Community - For Profit: 20.7%
- Community - Not for Profit: 0.0%

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## Responses

<table>
<thead>
<tr>
<th>Top 6 Responses</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did not feel the patients were good candidates for off pump surgery</td>
<td>287</td>
<td>53.0%</td>
</tr>
<tr>
<td>I am happy with current on pump techniques, and do not feel the need to use off pump procedures</td>
<td>155</td>
<td>28.6%</td>
</tr>
<tr>
<td>The literature does not support that off pump is better</td>
<td>124</td>
<td>22.9%</td>
</tr>
<tr>
<td>I have not had enough training to be comfortable with off pump</td>
<td>84</td>
<td>15.5%</td>
</tr>
<tr>
<td>I do not believe there is any benefit to doing cases off pump</td>
<td>74</td>
<td>13.7%</td>
</tr>
<tr>
<td>Our anesthesiologist(s) is not comfortable doing off pump cases</td>
<td>58</td>
<td>10.7%</td>
</tr>
</tbody>
</table>
What would make you do more cases?

<table>
<thead>
<tr>
<th>Top 6 Responses</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More data showing the benefit</td>
<td>245</td>
<td>45.2%</td>
</tr>
<tr>
<td>Better tools to do off pump surgery</td>
<td>188</td>
<td>34.7%</td>
</tr>
<tr>
<td>More training for surgeon in off pump surgery</td>
<td>142</td>
<td>26.2%</td>
</tr>
<tr>
<td>More training for anesthesiologist in off pump surgery</td>
<td>116</td>
<td>21.4%</td>
</tr>
<tr>
<td>Anesthesiologist willing to do off pump cases</td>
<td>53</td>
<td>9.8%</td>
</tr>
<tr>
<td>Nothing, I do not want to do more off pump cases</td>
<td>47</td>
<td>8.7%</td>
</tr>
</tbody>
</table>

In 2004 out of 19,806 isolated CABG, only 16% were OPCAB

Use of off-pump coronary bypass in Canada

Is incomplete revascularization more common in OPCAB?

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In the next 5 years, will off-pump surgery utilization increase, decrease, or stay the same?
Status in Japan

Historical Background and Current Problems of OPCAB in Japan


The proportion of CABG performed off pump increased from 22% in 2000 to 62% in 2005

The situation in the UK

In a survey of cardiothoracic trainees in the UK, 96% felt that training in OPCAB was essential

Only 51% of UK trainees had gained experience of OPCAB in their training programme.

JOURNAL OF THE ROYAL SOCIETY OF MEDICINE July 2004
In 2001, total number of CABG was 23,000

In 2008 it was 53,034.

31,414 of them were on-pump

21,620 were off-pump.

60-40 situation

Dr. Vivek Jawali (Presidential Address IACTVS 2009)

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**FIGURE 1.** Growth of OPCAB use from 1990 to 2004.
FIGURE 2. Conversion to CPB from 1990 to 2004.

This is what has become of Human Evolution

Is IMA and veins on pump and with the heart arrested all that we can offer?
WHAT DRIVES CHANGE: EVIDENCE OR POPULAR DEMAND?

Rethinking Heart Surgery

BYPASS SURGERY
In common procedures known as bypass operations, surgeons improve blood flow by attaching new blood vessels to the heart, routing around clogged arteries.

ANGIoplasty
With angioplasty, surgeons use a balloon on a catheter to open narrowed arteries, then insert mesh metal tubes—stents—to hold the vessels open.

CONCERNS
- Patients face a 1% to 2% chance of dying in the operating room.
- Complications such as heart attacks, strokes, and blood clots are not uncommon.
- Some 20% to 40% of patients suffer memory loss that can last a year or more.

CONCERNS
- There is a small risk of patients suffering heart attacks during the procedure.
- Some doctors are worried about complications with the newer drug-coated stents.
- Symptoms can reappear after a few years as the blood vessel begins to clog up again.

Business Week July 18, 2005, p30

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A Significant Reduction in the Use of Medical Therapy Alone Among All Patients

Results from the CRUSADE Quality Improvement Initiative
Trends in Type of Revascularization Strategy for 3-Vessel CAD: PCI vs. CABG

Results from the CRUSADE Quality Improvement Initiative
## SWOT analysis of CABG

<table>
<thead>
<tr>
<th>Strengths:</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect late result</td>
<td>Early risk, related to co-morbidity and human interface</td>
</tr>
<tr>
<td>Repeatable procedure</td>
<td>Late result has reached plateau</td>
</tr>
<tr>
<td>Teachable procedure</td>
<td>Very resource consuming (human and material)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn from military science</td>
<td>The future will be different versus the past, since conditions change.</td>
</tr>
<tr>
<td>Learn from economic science</td>
<td>Patient perception of risk</td>
</tr>
<tr>
<td>Learn from pedagogic science</td>
<td>Older patients have a shorter benefit interval.</td>
</tr>
<tr>
<td>Learn from any science</td>
<td>European Directives</td>
</tr>
<tr>
<td></td>
<td>Natural history of CAD</td>
</tr>
<tr>
<td></td>
<td>Progress and drivers of PCI</td>
</tr>
</tbody>
</table>

The future of cardiac surgery with emphasis on CABG
Paul Sergeant, K.U.Leuven, Belgium
What are the options for training in OPCAB
The Basic Principles

One must not re-invent the wheel

Increased mortality with urgent conversions

High level of anesthetic support is required
Beating heart coronary artery bypass surgery, demands a total re-engineering of the surgical management

Get trained in an institution with a good proportion of OPCAB cases

- Perspectives of a cardiac surgery resident training on off-pump bypass operations
  Karamanoukian, Salerno Ann Thorac Surgery 2000
- Off-pump coronary operations can be safely taught to cardiothoracic trainees.
  Caputo, Angelini Ann Thorac Surg 2001
- Multivessel off-pump coronary bypass grafting can be taught to trainee surgeons.

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Options for OPCAB training

Animal labs or pig heart

Interactive CD-ROMs

Virtual laboratories and training simulators

Brain storming sessions with smaller teams of surgeons and anesthesiologists

Experience sharing center
(1) a didactic portion including interactive compact disks and videos

(2) a laboratory hands-on experience with simulations or animals, or both, and also with cadavers

3) a proctoring process.
   -- a visit by the trainee to the proctor’s hospital to observe procedures there
   -- a visit by the proctor to the trainee’s hospital to observe the trainee’s technique in their own hospital environment.
Escorts Delhi- UKE Hamburg Exchange Programme
The Start is always an Idea

Born in 2006 at 6th ISMICS meeting, created by networking

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What was the idea?

To create a partnership between the 2 institutions so that the strengths of one institution is shared with the other.

Escorts – OPCAB

Hamburg -- minimally invasive valves and percutaneous interventions
How was it organised?

So Jens and I got down to the task of finding out how this could be worked out...it sounded easy at first.
Investments

Money--No grants exist
Can you afford to go to another country to train?
Tickets, visa, living expenses, travel

Family
Have to leave your family while still providing for them

Climatic
Always >100 F in Delhi
Investments

Time
Will you be spared from your institution- continuity of service?

Cultural
Language, Food, Local issues

Licensing issues
@##$.... german bureaucracy and translations
Detractors

Why do you want to do this?
What is the point?
Perhaps it is better if you do something else?
The Final Deal

- Each institution would continue to pay our respective salaries
- Subsidised accommodation of reasonable standard
- Subsidised food at the institutions dining hall
- Whole hearted assistance in obtaining required licensing for a short term stay with privileges to scrub into cases
The Key is to create a “Network”

**Conviction** at the Senior level

**Determination** at the Trainee level

**Supportive** Hospital Administration
Thank you