New scientific advances in cardiac rehabilitation

Massimo F. Piepoli, Italy

No conflict of interest
Section Cardiac Rehabilitation, EACPR

promoting cardiac rehabilitation in Europe

www.escardio.org/EACPR
EuroCaReD: The European Cardiac Rehabilitation Database

• Web-database
• To collect information on service provision and outcomes in CR in European Centres
• 1,236 patients from 8 countries (October and November 2010)
273/360 patients (70%) completed the CR programme
• 30% drop outs
## EuroCaReD
### 1st snapshot: drop-outs before end of program

<table>
<thead>
<tr>
<th>CRP completed [%]</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR not completed [%]</td>
<td>30</td>
</tr>
<tr>
<td>- Recurrent event</td>
<td>6.3</td>
</tr>
<tr>
<td>- Patient non compliance</td>
<td>25.3</td>
</tr>
<tr>
<td>- Others</td>
<td>68.4</td>
</tr>
</tbody>
</table>
There is need to reduce drop-outs, particularly in most fragile patients.

PCI should not be plausible reason.

The majority of unknown causes needs further investigation.
HeartQoL Project

An international project in 22 countries

European Association for Cardiovascular Prevention and Rehabilitation

European Society of Cardiology

European Health Psychology Society

Primary objective:
To develop a core HRQoL questionnaire for patients with ischaemic heart disease (in Europe)
HeartQoL Project: second objective

An international comparison of in patients with ischaemic heart disease

21 countries
15 languages
n = 6,3096

English-speaking: Australia, Canada, USA; n = 1,452
UK, Ireland

Scandinavia: Denmark, Norway, Sweden; n = 1,004

WE: Austria, Belgium, France, Netherlands, Germany, Switzerland; n = 1,439

Mediterranean: Portugal, Spain [Cuba]; n = 901

EE: Hungary, Poland, Russia, Ukraine; n = 1,300

Italy
HeartQoL

Higher score, higher HRQL

Lower score, poorer HRQL

Reliable
Valid
Responsive

Thank you for addressing these questions that will give us an understanding of how your heart problem has affected you.

We would like to know how your heart problem has bothered you and how you have been feeling **DURING THE LAST 4 WEEKS**.

Please circle one number

<table>
<thead>
<tr>
<th>First, in the last 4 weeks, have you been bothered by having to:</th>
<th>No</th>
<th>A little</th>
<th>Some</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Walk indoors on level ground?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. Garden, vacuum, or carry groceries?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. Climb a hill or a flight of stairs without stopping?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. Walk more than 100 yards at a brisk pace?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. Lift or move heavy objects?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Now, in the last 4 weeks, have you been bothered by:</th>
<th>No</th>
<th>A little</th>
<th>Some</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Feeling short of breath?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. Being physically restricted?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. Feeling tired, fatigued, low on energy?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. Not feeling relaxed and free of tension?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10. Feeling depressed?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>11. Being frustrated?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>12. Being worried?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>13. Being limited in doing sports or exercise?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>14. Working around the house or yard?</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Thank you
HeartQoL Global score by diagnosis

- **Total**: n=6,096, Mean=2.2
- **MI**: n=2,232, Mean=2.4, p<0.001 (HF & AP < MI)
- **AP**: n=2,000, Mean=2.2
- **HF**: n=1,864, Mean=2.1 (MID ≥ 0.3, HF vs. MI)

HeartQoL score

[Bar chart showing distribution of HeartQoL scores across different diagnoses with statistical details provided]
International HeartQoL Global score between-country differences

2.4: Italy, Belgium, Canada
≥ MID higher HRQL than
Australia, 2.1; UK/Ireland, 2.1; Ukraine, 2.1; Portugal, 2.0; Russia, 2.0

2.3: Austria, Denmark, France, Germany, Netherlands, Poland, Spain, Switzerland, USA,
≥ MID higher HRQL than
Russia, 2.0

2.2: Hungary, Norway, Sweden
EUROASPIRE III: Use and Effects of Cardiac Rehabilitation in Patients with CHD

Objectives

To describe

• The current status of cardiac rehabilitation in Europe

• Whether participation in CRP results in healthier lifestyle and risk factor control, and in more appropriate use of prophylactic drug therapies in patients with established CHD.

www.escardio.org/EACPR
**EUROASPIRE III**

*Distribution by age, gender and diagnostic category*

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>8845</td>
</tr>
<tr>
<td>females</td>
<td>25%</td>
</tr>
<tr>
<td>≥ 60 years</td>
<td>64%</td>
</tr>
</tbody>
</table>

**Diagnostic category**

- CABG: 20%
- PCI: 42%
- AMI: 19%
- Ischaemia: 19%

[www.escardio.org/EACPR](http://www.escardio.org/EACPR)
Advise to follow a CRP programme* by country

- All patients: 45%
  - Men 46%
  - Women 42%

* Within 3 months of discharge following the index event or procedure
Prevalence of CVD risk factors according to participation in a CRP

- Smoking: CRP 15%, No CRP 19%, p < 0.0001
- Smoking*: CRP 47%, No CRP 54%, p = 0.0008
- Obesity: CRP 35%, No CRP 35%, p = 0.83
- Raised BP: CRP 57%, No CRP 56%, p = 0.14
- Elevated TC: CRP 49%, No CRP 53%, p = 0.004

*Among patients smoking prior to the index vent
**BP ≥ 140/90 mmHg, (≥ 130/80 mmHg in patients with diabetes); *** TC ≥ 4.5 mmol/L
THE EHO 3 DEVICE
FOR HOME TELE-REHABILITATION

- 4 electrodes
- Ecg recorded from three precordial leads out of V1-V6
- The exercise cycle is set by a physician. Patients follow the exercise program led by signals from a blinking color diode.
The aim of the study

To compare the safety and effectiveness of two models of cardiac rehabilitation in chronic heart failure patients in the early phase after discharge

**Model 1 (n=56)**
Ambulatory rehabilitation based on interval training on cyclo ergometer

**Model 2 (n=75)**
Home telerehabilitation based on walking training
RESULTS
AMBULATORY VS HOME TELE-REHABILITATION EFFECTIVENESS peak oxygen consumption

pVO2 (ml/kg/min)

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Group 1: Before CR
Group 2: After CR

p=0.0001
p=0.0021
p=NS
p=NS
RESULTS
AMBULATORY VS HOME TELE-REHABILITATION
DROP OUT

AMBULATORY REHABILITATION: 20%
HOME TELEREHABILITATION: 0%

Drop-out
Safety and efficacy of exercise training in moderately symptomatic hypertrophic cardiomyopathy patients
R Robert Klempfner\textsuperscript{1}, M Arad\textsuperscript{2}, T Kamerman\textsuperscript{1}, A Nahshon\textsuperscript{1}, I Hay\textsuperscript{1}, I Goldenberg\textsuperscript{1}
\textsuperscript{1}Chaim Sheba Medical Center, Cardiac Rehabilitation Institute, Tel Hashomer, Israel, \textsuperscript{2}Chaim Sheba Medical Center, Lavev Heart Center, Tel Hashomer, Israel

Conclusions: The present study is the first to show that moderately symptomatic patients with hypertrophic cardiomyopathy can safely exercise in a cardiac rehabilitation program. Our findings suggest that symptomatic and functional gains are attainable in this high risk population. Further evaluation through a larger randomized study is necessary.
Intensity of cardio training in modification of erectile dysfunction and physical fitness in male patients treated invasively due to ischaemic heart disease

D Kalka¹, ZA Domagala², J Wojcieszczyk³, L Rusiecki⁴, P Koleda⁵, A Janocha⁵, M Pilot⁶, M Poreba⁴, M Rusiecka⁷, W Pilecki⁴

¹Wrocław Medical University and Creator Centre of Cardiac Rehabilitation and Prevention, Wrocław, Poland, ²Ostrobramska Medical Center, Magodent, Department of Cardiology, Warsaw, Poland, ³Warsaw Medical University, Department of Physiotherapy, Warsaw, Poland, ⁴Ostrobramska Medical Center, Magodent, Department of Cardiology, Warsaw, Poland, ⁵Wrocław Medical University, Department of Cardiology, Wrocław, Poland, ⁶County Center of Cardiac Rehabilitation in Tarnów, Wrocław, Poland, ⁷County Center of Cardiac Rehabilitation in Tarnów, Wrocław, Poland.

• 151 males patients with ED (IIEF-5 test <21 points) enrolled in a randomised control trial
• 6/12 Ex Training: 45’ sessions of general exercise (2d), cycle bicycle (5 days),
• ↑ MET in Ex T group (+2.2±1 vs 0.5±1, P<.01)
• ↑ IIEF-5 in Ex T group (+1.9±1 vs 0.2±5, P<.01)
• Positive correlation between exercise fitness and ED improvement
Safety and outcome of residential cardiac rehabilitation (RCR) in transcatheter aortic valve implantation (TAVI) patients compared to biological aortic valve replacement (AVR) for aortic stenosis

F Franco Tarro Genta\textsuperscript{1}, Z Bouslenko\textsuperscript{1}, M Tidu\textsuperscript{1}, F Bertolin\textsuperscript{1}, C Taglieri\textsuperscript{1}, P Giannuzzi\textsuperscript{2}

\textsuperscript{1}Salvatore Maugeri Foundation, IRCCS - Institute of Turin, Turin, Italy, \textsuperscript{2}Salvatore Maugeri Foundation, IRCCS, Division of Cardiology Rehabilitation, Veruno, Italy

- 24 consecutive TAVI (89% females, 82 yr)
- 24 consecutive AVR (55% females, 78 yr)

<table>
<thead>
<tr>
<th>Metric</th>
<th>TAVIp (M ± DS)</th>
<th>AVRp (M ± DS)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE (M ± DS)</td>
<td>24 ± 9</td>
<td>8 ± 4</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>CIRS-CI (M ± DS)</td>
<td>5.1 ± 1</td>
<td>5.6 ± 1</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>TAVI admission (M ± DS)</td>
<td>62 ± 29</td>
<td>64 ± 15</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>LVＲ (M ± DS)</td>
<td>120 ± 53</td>
<td>190 ± 80</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>6MWT admission m (M ± DS)</td>
<td>220 ± 77</td>
<td>320 ± 35</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Differences 6WT</td>
<td>123 ± 85</td>
<td>139 ± 73</td>
<td>NS</td>
</tr>
<tr>
<td>LVEE, % (M ± DS)</td>
<td>55 ± 9</td>
<td>62 ± 5</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

\textsuperscript{CIR} TAVI: cumulative illness rate. \textsuperscript{CI} CIRS-CI: cumulative illness rate. \textsuperscript{AVR} AVR: aortic valve replacement. \textsuperscript{AVR} RCR: aortic valve replacement rehabilitation.

- **TAVI patients show higher risk profile**
- **RCR is similarly safe and effective in TAVI and AVR**
Cross-over study: continued exercise (CON) at 60% VO$_{2peak}$, vs. aerobic intensive interval training (AIT) at >80% VO$_{2peak}$ in HTX

11 HTX, randomised 12 weeks of either CON or AIT

VO$_{2peak}$ CON +3.2 vs AIT +5.5 ml/kg/min (p .001)

FMD CON +0.16 vs AIT +0.30 (p NS)

Intensive Ex Training seems superior in improving aerobic capacity, but not in endothelial function
• **HF complication** after acute cardiac event is associated with worse prognosis. Little is known in patients after Myocardial Revascularisation (MR) during Cardiac Rehabilitative (CR) phase

• **ICAROS**: prospective multicentre Italian registry involving 1,262 patients after MR from 62 CR Centres

• HF occurred in 96 (7.6%) patients: 90% in the acute wards, 23% during CR, 9% in both settings

• Long history of CHD, CHF, age>75yo, COPD, CRF were predictors of HF complications

• Mortality (8.3 vs 1.6%, p<0.001), MACEs (21.9 vs 8.1 %) occurred more frequently in HF

• HF independently predicted adverse outcome in post MR patients (OR 2.45, CI 1.4-4.2) also for episodes occurring during CR