International experience with RRS, Scandinavia

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The Scandinavian Survey (1)

- Norway
  - Eldar Soreide, professor, PhD, Department of Critical Care, Stavanger University Hospital
  - No MET/RRT yet
  - Discussions among critical care specialists
  - MET/RRT might be the subject of next national critical care meeting

The Scandinavian Survey (2)

- Denmark
  - Ebbe Rønholm, MD, Department of Anaesthesiology, Fredericia and Kolding Hospital
  - No MET/RRT yet
  - Discussions among critical care specialists

The Scandinavian Survey (3)

- Finland
  - Jouni Nousmi, MD, PhD, Department of Critical Care, Helsinki University Hospital
  - Three centers are currently using MET/RRT
  - No studies have been published

- Iceland and the Faroe Islands
  - Halla Haldorsdottir, MD, Department of Anesthesiology and Intensive Care, Karolinska University Hospital
  - No MET/RRT yet
The Scandinavian Survey (4)

- **Sweden**
  - Seven centers have implemented a MET/RRT
    - Falun Hospital
    - Danderyd Hospital, Stockholm
    - Karolinska University Hospital, Stockholm
    - Linköping University Hospital
    - Lund University Hospital
    - St Göran Hospital, Stockholm
    - Örebro University Hospital
  - Seven other hospitals are currently planning to start rapid response teams
    - Karolhamn Hospital
    - Malmö University Hospital
    - Nyköping Hospital
    - Sahlgrenska University Hospital, Gothenburg
    - Södersjukhuset Hospital, Stockholm
    - Västerås Hospital
    - Östersund Hospital

The Karolinska Experience

- **Development**
  - Critical care meeting in Stavanger 2002; METs were discussed
  - Our critical care department invited Dr. Gillian Bishop from Sydney Hospital, Australia to a staff meeting in 2002
  - A Swedish MET/RRT meeting was held in 2003
  - Representatives from the Karolinska ICU (three nurses, three doctors) formed a group; planning the MET

- **Education**
  - Implementation

The Karolinska Experience, Prevalence Study (1)

- Bell M et al., Prevalence and sensitivity of MET-criteria in a Scandinavian University Hospital
  - Resuscitation 2006;70:66-73
  - The study took place at two separate occasions, December 10th 2003 and March 24th 2004
  - With the help of 50 nursing students from the Red Cross Nursing School, we set out to record prevalent physiological data on all adult patients treated in the hospital, excluding the intensive care- and psychiatric wards
  - 1097 patients were treated at the wards during the two study periods
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  - 81.6% were included
  - 40 patients (4.5%) fulfilled the study criteria
  - 42 patients had a DNAR

The Karolinska Experience, Prevalence Study (2)

- The MET criteria
  - Acute change in respiratory rate to <8 or >30 breaths/min
  - Acute change in pulse oximetry saturation to <90%, despite oxygen administration
  - Acute change in heart rate to <40 or >130/min beats/min
  - Acute change in systolic blood pressure to <90 mm Hg
  - Acute change in conscious state as measured by a fall of GCS >2
  - Staff member is worried about the patient

The Karolinska Experience, Prevalence Study (3)

- Flow diagram describing the distribution of the cohort. 30-day mortality rates and CI in italics

Study cohort

<table>
<thead>
<tr>
<th>Essential patient</th>
<th>n = 1097</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study criteria</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>989 (90.4%)</td>
</tr>
<tr>
<td>Negative</td>
<td>104 (9.6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Not essential patient</th>
<th>n = 202 (18.4%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study criteria</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>55 (27.2%)</td>
</tr>
<tr>
<td>Negative</td>
<td>147 (72.8%)</td>
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</table>

<table>
<thead>
<tr>
<th>No patients</th>
<th>n = 106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study criteria</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>38 (35.8%)</td>
</tr>
<tr>
<td>Negative</td>
<td>68 (63.8%)</td>
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</table>

<table>
<thead>
<tr>
<th>No cases</th>
<th>n = 50</th>
</tr>
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<tbody>
<tr>
<td>Study criteria</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>9 (18%)</td>
</tr>
<tr>
<td>Negative</td>
<td>41 (82%)</td>
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</tbody>
</table>
The Karolinska Experience, Prevalence Study (4)

**The extended criteria**
- Respiratory rate of \(< 10 \text{ or } > 28\) breaths/min
- Heart rate of \(< 50 \text{ or } > 120\) beats/min
- Systolic blood pressure of \(< 100 \text{ mm Hg}\)

**The restricted criteria**
- Respiratory rate of \(< 6 \text{ or } > 32\) breaths/min
- Heart rate of \(< 35 \text{ or } > 140\) beats/min
- Systolic blood pressure of \(< 80 \text{ mm Hg}\)

The Karolinska Experience, Education (1)

- Education: an ongoing effort
- Every single ward
  - Nursing staff
  - Doctors
- All wards have one MET contact: administration, education of new staff members and feedback
- Big hospital meetings
- The Karolinska University Hospital Homepage

The Karolinska Experience, Implementation (1)

- March 2005 - March 2006
- 346 calls (315 unique patients)
- Median age: 65.3 years
- Females: 178, Males: 168
- Time spent on ward 34.5 min
The Karolinska Experience, Implementation (3)

- 92 patients to central ICU 26.5%
- 18 patients to medical emergency ward 5.2%
- 11 patients to other ICU/HDU 3.2%
- Stayed on unit 65.1%
- 48 patients were post ICU patients 13.9%

The Karolinska Experience, Implementation (4)

- Increasing use of DNAR
  - Up until May 2005, 4%
  - Prevalence study data also showed 4%
  - September 8.8%
  - After a full year: 12.1%

The Karolinska Experience, Implementation (5)

No of MET calls by time period

The Karolinska Experience, Implementation (6)

Time on ward pre MET

The Karolinska Experience, Implementation (7)

30-day mortality (7/3-05 to 6/3-06)

- 309 unique MET calls, 72 patients died, 11 of these had a DNAR
- 30-day mortality 23.3%
- 30-day mortality corrected for DNAR: 19.7% (61/309)
  - 30-day mortality prevalence study: 25%
  - 30-day mortality of "not possible"-patients 31.4%

The Karolinska Experience, Implementation (8)

Cardiac arrest team vs MET

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>MET 3 year</th>
<th>January First 4th</th>
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<tbody>
<tr>
<td>No of calls</td>
<td>146</td>
<td>123</td>
<td></td>
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<tr>
<td>Time to ward</td>
<td>2.8 min</td>
<td>2.8 min</td>
<td></td>
<td></td>
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<tr>
<td>No of cardiac arrests</td>
<td>51 (35%)</td>
<td>50 (35%)</td>
<td>28 (38%)</td>
<td>18</td>
</tr>
<tr>
<td>Non-cardiac cardiac arrests</td>
<td>17 (11%)</td>
<td>18 (13%)</td>
<td>18 (24%)</td>
<td>7 (10%)</td>
</tr>
<tr>
<td>No of respiratory calls</td>
<td>21 (15%)</td>
<td>23 (20%)</td>
<td>19 (26%)</td>
<td>13 (20%)</td>
</tr>
<tr>
<td>Patients to the ICU</td>
<td>51 (35%)</td>
<td>66 (53%)</td>
<td>33 (45%)</td>
<td>18 (28%)</td>
</tr>
</tbody>
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