E-CPR
at
Accident & Emergency Department
nursing perspectives

F P5.36

16 May 2017
HT Wong
Veno-arterial ECMO

• Use venoarterial ECMO to help the arrested heart to maintain circulation and oxygen delivery to vital organs

Source: www.smh.com.au

ECMO + CPR (E-CPR): Model simulation
Flow of E-CPR

Cardiac Arrest + Age ≤ 60

Potential reversible cause

Yes
A&E alert AICU
Activate “E-CPR”

AICU physicians + nurses assess patient in A&E

Suit ECMO

No
A&E Cont’d resuscitation

Yes
AICU: Cannulation via USG
Start ECMO

A&E: Cont’d ACLS

Admit AICU
To make it happen . . . .

First meeting was held on 25.4.2015

**Mangers Meeting**
- Feasibility
- Workflow
- Logistics
- Equipment

**Training**
- 23 teaching sessions by NC AICU

**Setup**
- ECMO corner

**Checklist**
- Debriefing + Site visit

**Meeting**
- Identify gaps
- Identify designated lift for transfer
To make it happen . . . .

Mangers Meeting
- Feasibility
- Flow
- Logistics
- Equipment

Training
- 23 sessions from NC AICU

Drill
- 7 May 2015

First meeting was held on 25.4.2015
Interdepartmental Drill

ACLS by A&E team
Interdepartmental Drill

Percutaneous sheath insertion with USG guided performed by AICU doctors

1st drill – 7.5.2015
AICU nurses primed + manage ECMO
A&E + AICU nurses:
Maintain ACLS, ECMO
Transfer
Documentation
Interdepartmental Drill

Transferal: by AICU + A&E nurses, AICU doctors, supporting staff
Interdepartmental Drill

Transfer to AICU + handover
To make it happen . . . . .

Mangers Meeting
- Feasibility
- Flow
- Logistics
- Equipment

Debriefing + Site visit
- Meeting
- Identify gaps
- Identify designated lift for transfer
To make it happen . . . . .

- ECMO corner
1st case on 28.4.2015
Team Work
Outcome

Result: Patients from 28.4.2015 to 31.12.2016 with E-CPR started in our A&E and data were analyzed. Mean Age = 45.5 (SD=15.1); range 20-73#.

<table>
<thead>
<tr>
<th>Year</th>
<th>E-CPR in A&amp;E QMH</th>
<th>Gender</th>
<th>Dead</th>
<th>Alive</th>
<th>Survival Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>28/4 To 31/12/2015</td>
<td>9</td>
<td>M</td>
<td>6</td>
<td>1</td>
<td>22.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>8</td>
<td>M</td>
<td>4</td>
<td>2</td>
<td>37.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

# First patient recruited to this E-CPR program, with unknown identity during resuscitation
It works finally because...
Acknowledgement

- All AED / Cardiology / ICU doctor, nurses and supporting staff
- Hospital Authority for extra resources
  - ECMO hardware: oxygenator, cannula

Dr Wallace C W NGAI
Dr Simon W C SIN
Mr Peter Lai

Dr TC Tsang
Mr WK Chan
Ms KY Lo
THANK YOU
Configurations for ECMO

- **Veno-Venous** (Respiratory ECMO)
- **Veno-Arterial** (Cardiac and Respiratory ECMO)
<table>
<thead>
<tr>
<th></th>
<th><strong>VA ECMO</strong></th>
<th><strong>VV ECMO</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cannulation site</strong></td>
<td>Vein:</td>
<td>Single cannulation</td>
</tr>
<tr>
<td></td>
<td>- Internal jugular</td>
<td>- Internal jugular</td>
</tr>
<tr>
<td></td>
<td>- Femoral</td>
<td>- Right atrium</td>
</tr>
<tr>
<td><strong>Artery:</strong></td>
<td>Right common carotid</td>
<td>Double cannulation</td>
</tr>
<tr>
<td></td>
<td>Axillary</td>
<td>- Jugular-femoral</td>
</tr>
<tr>
<td></td>
<td>Femoral</td>
<td>- Femoro-femoral</td>
</tr>
<tr>
<td></td>
<td>Aorta</td>
<td>- Sapheno-saphenous</td>
</tr>
<tr>
<td><strong>Arterial PaO_2</strong></td>
<td>60–150 mmHg</td>
<td>45–80 mmHg</td>
</tr>
<tr>
<td><strong>Indicators of O_2 sufficiency</strong></td>
<td>Mixed venous oxygen saturation (mSvO_2)</td>
<td>- SaO_2 and PaO_2</td>
</tr>
<tr>
<td></td>
<td>PaO_2</td>
<td>- Cerebral venous saturation</td>
</tr>
<tr>
<td></td>
<td>Calculated oxygen consumption</td>
<td>- Pre-membrane saturation trend</td>
</tr>
<tr>
<td><strong>Cardiac effects</strong></td>
<td>Preload: decreased</td>
<td>May reduce RV afterload</td>
</tr>
<tr>
<td></td>
<td>Afterload: increased</td>
<td>Rest unaffected</td>
</tr>
<tr>
<td></td>
<td>Pulse pressure: lower</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CVP: varies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coronary O_2: varies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LV blood desaturated,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Cardiac Stun syndrome</td>
<td></td>
</tr>
<tr>
<td><strong>O_2 delivery capacity</strong></td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Circulatory support</strong></td>
<td>Partial to complete</td>
<td>No direct support, increased O_2 delivery to coronary and pulmonary circuit → improving cardiac output</td>
</tr>
</tbody>
</table>