POST-INTENSIVE CARE UNIT SYNDROME: AN OVERVIEW

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ICU Mortality

![Graph showing ICU Mortality over years with decreasing trend]
Surviving Critical Illness: baby boomers

Between 1999 and 2008 the number of new 3 year ICU survivors had more than doubled

Between 1999 and 2008 the number of new 5 year ICU survivors had nearly doubled

Large numbers of survivors are discharged from the ICU annually

We have gotten better at saving lives, but what comes next?

Survival is not the end point for patient and families

Return to normal function and highest quality of life possible is important
Post-Intensive Care Unit Syndrome

- **Goals**
  - Understand the types of PICS
  - Understand what makes up PICS
  - Understand the “burden of survivorship”
  - Understand some novel interventions for treatment of PICS
Definition of post-intensive care unit syndrome (PICS) and post-intensive care unit syndrome-family (PICS-F)

Post Intensive Care Syndrome (PICS)

Family (PICS-F)
- Mental Health: Anxiety/ASD, PTSD, Depression, Complicated Grief
- Cognitive Impairments: Executive Function, Memory, Attention, Visuo-spatial, Mental Processing Speed

Survivor (PICS)
- Physical Impairments: Pulmonary, Neuromuscular, Physical Function

Post Intensive Care Unit Syndrome Family

- Common
  - Up to 33% of families for PTSD alone
- Can last for years
- Risk factors include:
  - female gender
  - younger relative and patient age
  - critically ill spouse
  - lower educational level
  - being an unmarried parent of a critically ill child
  - low social support
  - lack of communication with nurses
  - lack of empathy for care team
Post Intensive Care Unit Syndrome

Family

- **Prevention**
  - ICU staff should receive education related to assessing and meeting family needs
  - Communication
  - Understand preferred level of involvement
  - Facilitated Sense Making
  - “VALUE”
    - Value Family contributions to discussions
    - Acknowledge family emotions
    - Listen
    - Understand the patient as a human
    - Elicit questions from the family

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Risk Assessment: Distance from the hospital, female gender, adequate support, preference for inclusion in decision-making, decision-making style, needs, comprehension, pre-existing anxiety, depression, or PTSD

- Anxiety, depression, PTSD, return to work, quality of life, complicated grief
- Complicated Grief
- Quality of Death and Dying
- Comprehension, satisfaction, anxiety, ASD, depression, risk of PTSD
Physical Impairment

ICU-Acquired Weakness

- Critical Illness Polyneuropathy (CIP)
- Critical Illness Myopathy (CIM)
- Critical Illness neuromyopathy (CINM)
Physical Dysfunction

ICU Acquired Weakness

- CIP and/or Critical Illness myopathy have been reported in 50% of ICU patients with sepsis, MOF or prolonged mechanical ventilation.
- 84-95% of ICU survivors with CIP continue to have neuromuscular abnormalities nearly 5 years after discharge. This include muscle atrophy, weakness, entrapment neuropathies, painful sensations.

Physical Function

EDEN Trial Follow-Up

Physical Function 6MWT
- Mean percent predicted 64%– 6 Mo
- Mean percent predicted 66% -12 mo
- Physical performance of survivors was lower than predicted values at 6 and 12 months
- Some improvement over time ( P< 0.011)
- Rehab
Mental Health
**Post Traumatic Stress Disorder**

- **DSM IV-R American Psychiatric Association**
  - **Exposure** to a traumatic event in which the individual experiences, witnesses or is confronted with an event involving actual or threatened death or serious injury or threat to the physical integrity of self or others AND responded with intense fear, helplessness or horror.
  - **3 symptom groups**
    - Intrusion (nightmares, flashbacks)
    - Avoidance (avoiding reminders)
    - Hyper-arousal (not sleeping)
  - **Symptoms** are experienced for **more than one month**
  - Clinically significant **distress or impairment in social, occupational or other areas of functioning**

### Studies - ICU psychological recovery

<table>
<thead>
<tr>
<th>Study</th>
<th>Subgroup</th>
<th>N</th>
<th>Anxiety</th>
<th>Depression</th>
<th>PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones et al Brit J Inten Care 1994;2:46-53</td>
<td>-</td>
<td>28</td>
<td>55.5%</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Koshy et al Intens Care Med 1997;23(S1):516</td>
<td>-</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>15%</td>
</tr>
<tr>
<td>Schelling et al Crit Care Med 1998;26;651-659</td>
<td>ARDS</td>
<td>80</td>
<td>-</td>
<td>-</td>
<td>27.5%</td>
</tr>
<tr>
<td>Nelson et al Crit Care Med 2000;28(11):3626-3630</td>
<td>ARDS</td>
<td>24</td>
<td>43.5%</td>
<td>-</td>
<td>25%</td>
</tr>
<tr>
<td>Schmieder et al Am J Psych 2001;158:594-599</td>
<td>Trauma</td>
<td>106</td>
<td>-</td>
<td>-</td>
<td>14%</td>
</tr>
<tr>
<td>Scragg et al Anaesth 2001;56:9-14</td>
<td>-</td>
<td>80</td>
<td>47%</td>
<td>47%</td>
<td>15%</td>
</tr>
<tr>
<td>Jones et al Crit Care Med 2001;29(3):573-580</td>
<td>-</td>
<td>126</td>
<td>34%</td>
<td>25%</td>
<td>51%</td>
</tr>
<tr>
<td>Cuthbertson et al Intens Care Med 2004;30:2004-2008</td>
<td>-</td>
<td>78</td>
<td>-</td>
<td>-</td>
<td>5-15%</td>
</tr>
<tr>
<td>Jones et al Intens Care Med 2007 DOI 10.1007/s00334-007-0600-8</td>
<td>-</td>
<td>231</td>
<td>-</td>
<td>-</td>
<td>3-15%*</td>
</tr>
<tr>
<td>Girard et al Critical Care 2007 11:R28</td>
<td>-</td>
<td>43</td>
<td>-</td>
<td>-</td>
<td>14%</td>
</tr>
</tbody>
</table>
The ICU Experience

- **In the ICU**
  - 61% reported sleep deprivation.
  - 94% said that analgesics requested did not yield the expected pain relief
  - 63% recalled being thirsty.
  - 13% had been hungry.
  - 37% and 28% had been uncomfortably hot and cold respectively.
  - 62% patients had been afraid or anxious.
  - 46% had felt lonely or isolated.
  - 33% lacked information about their condition and procedures

- **Post ICU**
  - **Anxiety** 25 - 30% of patients attending ICU outpatient clinic
    - Appears to be related to hallucinations and paranoid delusions.
  - **Panic attacks, agoraphobia**
    - panic on going out alone, crowded places e.g. shops.
    - don’t want to be alone in case they are taken ill again
  - **Post traumatic stress disorder (PTSD)**
    - 15 - 30% of patients

Mental Health

False ICU Dreams and Memories
Mental Health
Delusional Memories

- An ICU patient thought they were sexual assaulted
  - Patients may fear telling anyone about the rape or assault they recall
- An ICU patient imagined he had nightly to visit a sushi bar where he had to swim through a pool of man-eating fish before he could dine.
- An ICU patient had flashbacks of hospital walls covered in blood.
- An ICU had visions of big spiders riding bicycles in her room.
- An ICU patient thought that his penis had been cut off and that doctors would not sew it back on unless he paid $8,000
- The most common delusion is that "a nurse is trying to kill you." It turns out that is even more upsetting than almost dying.
- An ICU patient thought he was on a conveyor belt feeding into an oven. (He had gotten an MRI.)

Mental Health
Delusional vs. Factual Memories

Critical Care Medicine Issue: Volume 29(3), March 2001, pp 573-580
ICU Diaries
http://www.icu-diary.org/

- Idea originated in Scandinavia
- Written for ICU patients during their time of sedation and ventilation.
  - Daily account of ICU stay in every day language
  - It is written by relatives, nurses and others in plain language
- Photograph of patient taken at start and points of change
- The patient can read his or her diary afterwards and is more able to understand what has happened.
- Aim to fill in memory gaps and help patients understand their illness
- With staff support to go through the diary and photos
- UK National Institute for Health and Clinical Excellence recommend cognitive behavioural therapy (CBT for PTSD). Changing how clients think about their traumatic experience is one of the aims of CBT
ICU Diaries

- The diary is proved to reduce the incidence of:
  - Depression & anxiety (Knowles & Tarrier 2010)
  - PTSD for patients (Jones et al. 2010)
  - Depression, anxiety and PTSD for Families (Jones et al. 2012) & (Bergbom et al 1999) and (Garrouste-Oregas et al 2012)
    - In families the impact was greater than in patients
    - This may be because diaries counteract perceptions that staff do not listen, do not care or did not give patient attention.

Rachel II Study

Critical Care 2010, 14:R168

- Retrospectively collected diary of a patient’s (ICU) stay.
- 352 Patients whose ICU stay was > than 72 hours
- Randomized controlled trial examining the effect of a diary outlining the details of the patients ICU stay on the development of acute PTSD.
- Diary was reviewed 1-3 month post- ICU discharge
**Table 2**

Results at three months by study group

<table>
<thead>
<tr>
<th>Variables (number, percentage)</th>
<th>Control (n = 160)</th>
<th>Intervention (n = 162)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>New-onset PTSD</td>
<td>21 (13.1%)</td>
<td>8 (5%)</td>
<td>0.02*</td>
</tr>
<tr>
<td>ICU seen as traumatic (PDS)</td>
<td>76 (47.5%)</td>
<td>70 (43.2%)</td>
<td>0.36</td>
</tr>
</tbody>
</table>

*Chi-squared test. PDS, PTSD Diagnostic Scale; PTSD, post-traumatic stress disorder.


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**ICU Diaries**  
**Starting a Diary Program**

- **Key requirements for starting**
  - Legal Team / Guardian approval
  - Diary notebooks
  - Polaroid camera or digital camera with printer - Memory card wiped after printing
  - Diary register
  - Enable tracking of which patients have a diary and where the diary currently is located
  - Secure, lockable storage
  - Storage of diaries between patient discharge and follow-up
  - Diary guidelines at every bed space
  - Diary champions
Clinical Psychologist provide emotional support, educational interventions, & stress management coping strategies to trauma patients & families

Available 24 hours

Observational study of those with and without a clinical psychologist

A trend towards less depression and anxiety

A statistically significant decrease in PTSD (21.1% vs. 57.%)
Intensive Care Unit Clinics

ICU Clinics
Post Traumatic Stress Disorder

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Control Events</th>
<th>Total</th>
<th>Weight</th>
<th>M-H, Fixed, 95% CI</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1 PTSD New onset</td>
<td>4 27 4 31</td>
<td>15.0%</td>
<td>1.19 [0.32, 4.18]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holmes 2007</td>
<td>8 182 24 186</td>
<td>85.0%</td>
<td>0.38 [0.17, 0.82]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jones 2010</td>
<td>189</td>
<td>191 140.0%</td>
<td>9.46 [4.26, 9.98]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal (99% CI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total events</td>
<td>12</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Chi² = 2.12, df = 1 (P = 0.15; I² = 53%)
Test for overall effect: z = 2.13 (P = 0.03)

Test for subgroup differences: Not applicable

0.1 0.2 0.5
Favours [experimental]
1 2 3 4 5 10
Favours [control]
ICU Clinics
Anxiety and Depression

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>1.1.1 Anxiety at 2-3 months</td>
<td>Holmes 2007</td>
<td>4.7</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Knowles 2009</td>
<td>4.72</td>
<td>2.99</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Subtotal (95% CI)</td>
<td>46</td>
<td>49</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Heterogeneity: Chi² = 2.01, df = 1 (p = 0.15)</td>
<td>I² = 50%</td>
<td>I² = 50%</td>
<td>I² = 50%</td>
</tr>
<tr>
<td></td>
<td>Test for overall effect: Z = 0.63 (p = 0.53)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 1.1.2 Anxiety at 6 months | Cutberson 2009 | 6 | 6.5 | 105 | 7 | 4.6 | 115 | 83.3% | -1.00 | [-2.20, 0.20] | -1.00 | [-2.20, 0.20] |
|                       | Holmes 2007 | 6.9 | 5.2 | 27 | 6.9 | 5.2 | 31 | 16.7% | 0.90 | [-2.08, 2.86] | 0.90 | [-2.08, 2.86] |
|                       | Subtotal (95% CI) | 132 | 146 | 100.0% | -0.83 | [-1.85, 0.27] | -0.83 | [-1.85, 0.27] |
|                       | Heterogeneity: Chi² = 0.44, df = 1 (p = 0.51), I² = 0% |  |  |  |  |  |  |  |  |  |  |
|                       | Test for overall effect: Z = 1.45 (p = 0.14) |  |  |  |  |  |  |  |  |  |  |

| 1.1.3 Depression at 6 months | Cutberson 2009 | 5.3 | 4.3 | 105 | 5.3 | 4 | 115 | 90.0% | 0.80 | [-1.19, 2.79] | 0.80 | [-1.19, 2.79] |
|                             | Holmes 2007 | 8.0 | 6.8 | 27 | 8.2 | 6.4 | 31 | 9.4% | 0.70 | [-2.71, 4.11] | 0.70 | [-2.71, 4.11] |
|                             | Subtotal (95% CI) | 132 | 146 | 100.0% | 0.87 | [-0.99, 2.73] | 0.87 | [-0.99, 2.73] |
|                             | Heterogeneity: Chi² = 0.15, df = 1 (p = 0.70), I² = 0% |  |  |  |  |  |  |  |  |  |  |
|                             | Test for overall effect: Z = 0.12 (p = 0.90) |  |  |  |  |  |  |  |  |  |  |

ICU Clinics
Depression

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>1.2.1 Depression at 2-3 months</td>
<td>Holmes 2007</td>
<td>5.6</td>
<td>6.1</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Knowles 2009</td>
<td>4.17</td>
<td>2.90</td>
<td>16</td>
</tr>
</tbody>
</table>

Favours [experimental] Favours [control]
References