The Elderly ICU Patient

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What are you?

a. Anaesthetist
b. Geriatrician
c. Intensivist
d. Other

Results
Once upon a time
>65 years = NO ICU admission
Goals of the Talk
(1) Understand the complexities surrounding the Elderly ICU admission.

(2) Give you some tools in discussing complex cases with surgeons and ICU.
Take home messages
Severity of illness
Frailty
Co-morbidity
Elective surgery...

...predicts ICU outcome
Elderly + MOF + Emergency Surgery
Elderly + MOF + Emergency Surgery + Poor Outcomes
Elderly + MOF + Emergency Surgery

(2)

Poor Outcomes

Should we operate?
Loss of function and independence is important to some of our elderly patients.
Decision making surround admission is complex.
Structure of Talk
Who

What

How

Decision making

Therapies
Who are the elderly ICU patients?

What

How

Decision making

Therapies
Who
Age related definitions are varied in the Critical Care Literature

**Elderly**
- > 65 years
- > 85 years

**Very Elderly**
- > 80 years
- > 90 years in some studies
US retrospective cohort study

1996 to 2010

> 65 years

28 million patients

Medicare beneficiaries admitted to ICU or CCU

Demographics, co-morbid illness and outcomes

Average age from 76 ➔ 77yrs

Proportion aged from 85-94, 14 ➔ 20%

Proportion aged from 95 or older, 1 ➔ 1.7%

Proportion of cohort is getting older

At Discharge

Home: 68% ➞ 56%

Into care: 18.2% ➞ 34%

Hospice care: 0.1% to 4.6%

More survivors who are dependent
What about ANZ?
ANZICS Database Analysis

2000-2005, 57 ICU’s

> 80 years (very old)

15,640 patients (13% of admissions)

Demographics, co-morbid illness and outcomes

Increased proportion of Very Elderly in ICU
(5.6%/year)
Increased ICU and Hospital mortality compared to younger cohorts

Factors associated with **LOWER** survival:

- Admission from a rest home
- **Number** and **Severity** of Co-morbid Illness
- **Non-surgical admission**
- Mechanical Ventilation
- Longer ICU Stay
But, what about age as a predictor?
Contentious issue!
Age cannot be used in isolation in predicting ICU outcome.

In elderly patients ➔ less so

In very elderly patients ➔ more so
Who are the elderly ICU patients?

What pathology do they present with?

How

Decision making

Therapies
What
Elective Surgery

High Risk Surgeries

Sepsis

Circulatory Failure
Elective Surgery
Elective Surgery

Elective surgery

> Emergency surgery and a Medical diagnosis

Even when taking into account chronic co-morbidity*

Long-term survival and quality of life after Intensive Care for patients 80 years of age or older – Andersen, FH et al, Annals of Intensive Care, 2015:5-13*
### Summary of factors associated with hospital survival for patients aged ≥ 80 years

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds ratio (95% confidence interval)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission from chronic care facility</td>
<td>1.35 (1.09 to 1.67)</td>
<td>0.005</td>
</tr>
<tr>
<td>Co-morbid disease (present)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 1</td>
<td>1.0^a</td>
<td></td>
</tr>
<tr>
<td>≥ 2</td>
<td>1.31 (1.12 to 1.52)</td>
<td>0.001</td>
</tr>
<tr>
<td>Admission type (present)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective surgical</td>
<td>1.0^a</td>
<td></td>
</tr>
<tr>
<td>Emergency surgical</td>
<td>1.83 (1.58 to 2.13)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Medical</td>
<td>2.58 (2.22 to 3.00)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Admission diagnosis (present)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsis</td>
<td>1.24 (1.10 to 1.40)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Trauma</td>
<td>1.28 (1.05 to 1.57)</td>
<td>0.016</td>
</tr>
<tr>
<td>Hepatic</td>
<td>1.21 (1.02 to 1.44)</td>
<td>0.025</td>
</tr>
<tr>
<td>Gastrointestinal (nonbleeding)</td>
<td>1.72 (1.48 to 1.99)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cardiac</td>
<td>1.54 (1.34 to 1.77)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neurologic</td>
<td>1.92 (1.59 to 2.33)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Respiratory</td>
<td>1.29 (1.11 to 1.49)</td>
<td>0.01</td>
</tr>
<tr>
<td>Metabolic</td>
<td>0.53 (0.36 to 0.76)</td>
<td>0.01</td>
</tr>
<tr>
<td>Nonage-related APACHE II score (per point)</td>
<td>1.11 (1.10 to 1.11)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mechanical ventilation (present)</td>
<td>1.18 (1.07 to 1.30)</td>
<td>0.001</td>
</tr>
<tr>
<td>Acute kidney injury (present)</td>
<td>1.38 (1.25 to 1.51)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ICU length of stay (log-transformed) (per day)</td>
<td>1.17 (1.11 to 1.24)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Model also included adjustment for hospital site. Goodness of fit, P = 1.0; area under the receiver operator characteristic curve = 0.79. APACHE, Acute Physiology and Chronic Health Evaluation; ICU, intensive care unit. *Reference variable.
Norwegian Study (2000-2012)

Retrospective analysis of ICU Survivors

> 80 years (very old)

n = 395

Demographics, co-morbid illness, outcomes and QOL

Long-term survival and quality of life after Intensive Care for patients 80 years of age or older – Andersen, FH et al, Annals of Intensive Care, 2015:5-13
Long-term survival and quality of life after Intensive Care for patients 80 years of age or older – Andersen, FH et al, Annals of Intensive Care, 2015:5-13
Elective Surgery is very different to an Emergency Surgical and Medical Admission

Long-term survival and quality of life after Intensive Care for patients 80 years of age or older – Andersen, FH et al, Annals of Intensive Care, 2015:5-13
Fig. 2  Survival from Intensive care unit (ICU) admission. Kaplan-Meier survival curve: patients after medical admission *(blue)*, planned surgery *(green)* and unplanned surgery *(gray)*. Groups were compared via Log-rank test *(p < 0.01)*
Age has limited bearing on Elective Surgical outcomes and ICU admission.
High risk surgery
Post-op ventilation for High Risk Operations

US retrospective cohort study

Medicare fee for service tracked

> 66 yrs

227 high risk operations – in patient mortality of at least 1%

n = 106,322
Post-op ventilation for High Risk Operations

Neurosurgery  
Thymus excision  
Laryngectomy  
Bronchial surgery  
Thoracoplasty  
Decortication  
Bronchopleural fistula repair  
Mediastinal surgery  
Valve surgery  
CABG  
Pericardial surgery  
Intra-cardiac open surgery  
Insertion of artificial heart/assist device  
Aortic surgery  
Peripheral vascular bypass surgery  
Neurovascular surgery  
Embolectomy and endarterectomy  
Central vascular surgery  
Splenic surgery  

Gastric surgery  
Small bowel procedure  
Open Colorectal surgery  
Pericostomy Hernia repair  
Abdominal and Diaphragmatic Hernia Repair  
Thoracic Diaphragmatic Repair  
Oesophageal surgery  
Abdominal proctopexy  
Major biliary (not Lap Chole)  
Pancreatic procedures  
Hepatic lobe and hepatectomy  
Nephrectomy  
Kidney transplant  
Major urology  
Pelvic evisceration  
Colonic vaginal fistula repair  
Vaginoenteric fistula repair  
Amputation of lower extremity  
Transplant – heart, lung, liver
Post-op ventilation for High Risk Operations

Prolonged ventilation = > 96 hrs

Only **4%** received prolonged ventilation

Risk factors – emergency surgery, increased comorbidity

47% mortality within 30 days

64% mortality at 1 year

Most of survivors require RH placement or HLNC

Post-op ventilation for High Risk Operations

Prolonged ventilation = > 96 hrs

Only 4% received prolonged ventilation

Risk factors – emergency surgery, increased comorbidity

47% mortality within 30 days
64% mortality at 1 year

Most of survivors require RH placement or HLNC

Conclusion in paper = we should not prolong life support in these elderly patients.

In some patients, perhaps we should pull out early

? COPD
? OHCA

⇒ It’s all about Case Selection ⇐

Sepsis
Sepsis

Increasing in prevalence amongst elderly

Contributes to a significant proportion of cognitive and functional decline

Goal = determine impact of severe sepsis on cognitive impairment and physical functioning.

Controlled for Pre-sepsis functioning

US prospective cohort study

n = 1194 with sepsis, 5574 without sepsis

1998-2006

Interviewed prior to sepsis

Severe sepsis = infection +/- 1 organ dysfunction

516 survived (50%) to 12 months

Re-interviewed at 2 years

- Functional status = level of independence

- Cognitive function = 35 point scale or relative interview

Results

Mean age: 77 years

Prevalence of moderate-severe cognitive dysfunction increased 11% (OR 3.34) after an episode of sepsis.
Results

Those with no to moderate limitation prior to an episode of severe sepsis had the most to lose.

Severe sepsis contributes to a significant decline in cognitive and functional state.

This lasts at least 8 years.
Circulatory Failure
Circulatory Failure

Analysis of RCT comparing Dopamine vs Norad

n = 1651

Very old @ 6 months
– 92% had died

Very old @ 12 months
– 97% died

Fig. 1  Twenty-eight day mortality as a function of age

## Circulatory Failure

### Mortality in studies of elderly and circulatory failure

<table>
<thead>
<tr>
<th>References</th>
<th>Age (years)</th>
<th>Follow-up</th>
<th>Mortality (%)</th>
<th>Patient characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasa (2011)</td>
<td>&gt;80</td>
<td>ICU</td>
<td>79</td>
<td>Severe sepsis/septic shock</td>
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<tr>
<td>Tomassini (2011)</td>
<td>&gt;75</td>
<td>In-hospital</td>
<td>55</td>
<td>Cardiogenic shock</td>
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<tr>
<td>Vosylius (2005)</td>
<td>&gt;75</td>
<td>In-hospital</td>
<td>62</td>
<td>Shock</td>
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<td>Bision [1]</td>
<td>75–84</td>
<td>1 year</td>
<td>84</td>
<td>Circulatory failure</td>
</tr>
<tr>
<td>Lim (2009)</td>
<td>&gt;85</td>
<td>1 year</td>
<td>97</td>
<td>Circulatory failure</td>
</tr>
<tr>
<td>Tabah (2010)</td>
<td>&gt;75</td>
<td>1 year</td>
<td>52</td>
<td>Cardiogenic shock</td>
</tr>
<tr>
<td>Chelluri (1993)</td>
<td>≥75</td>
<td>1 year</td>
<td>76</td>
<td>Septic shock and multiple organ failure</td>
</tr>
</tbody>
</table>

Very Elderly on Inotropes in ICU

Very poor prognosis

(palliative situation?)
Elective Surgery ✓

High Risk Surgeries (if require prolonged MV) ×/ ✓

Sepsis ×

Circulatory Failure ×
Who are the elderly ICU patients?

What pathology do they present with?

How do they do prognostically?

Decision

Therapies and Models of Care
How
Frailty and Function

Home vs Care

QOL

Experience of ICU
Frailty and Function
Frailty indexes are being applied and validated in Elderly ICU Patients

Simple ➔ Complex

Clinical Frailty Scale

1. Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.

5. Mildly Frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. Moderately Frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7. Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8. Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. Terminally Ill – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In severe dementia, they cannot do personal care without help.


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### Frailty Index

<table>
<thead>
<tr>
<th>HISTORY</th>
<th>EXAMINATION</th>
<th>LAB</th>
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</thead>
<tbody>
<tr>
<td>Workload of accompanying people</td>
<td>Consciousness</td>
<td>MCV</td>
</tr>
<tr>
<td>Desire for survival</td>
<td>Hearing</td>
<td>BSL</td>
</tr>
<tr>
<td>ADL</td>
<td>Eyesight</td>
<td>Ur/Cr ratio</td>
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<tr>
<td>IADL</td>
<td>Urine volume</td>
<td>PF ratio</td>
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<tr>
<td>Functional Assessment Staging</td>
<td>SBP</td>
<td>Procalcitonin</td>
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<tr>
<td>NHYA</td>
<td>DBP</td>
<td>Platelets</td>
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<tr>
<td>Emotion</td>
<td>CVP</td>
<td>WCC</td>
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<td>Sleeping</td>
<td>Cardiac rhythm</td>
<td>Hb</td>
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<td>Daytime sleepiness</td>
<td>T</td>
<td>Na+</td>
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<tr>
<td>Urinary disease</td>
<td>HR</td>
<td>K+</td>
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<tr>
<td>Respiratory disease</td>
<td>RR</td>
<td>Bilirubin</td>
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<td>GI disease</td>
<td>MAP</td>
<td>INR</td>
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<tr>
<td>CVS disease</td>
<td>Balance</td>
<td>Alb</td>
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<tr>
<td>Endocrine disease</td>
<td></td>
<td>Lactate</td>
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<td>Bowel function</td>
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<td>Ur &amp; Cr</td>
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<td>N+V</td>
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<td>PaO2</td>
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<td>HCO3-</td>
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<td></td>
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<td>pH</td>
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<td>HCT</td>
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</tbody>
</table>

Frailty

Frailty index highly predictive of survival

Clinical Frailty Scale not so predictive of survival
(length of stay)

Frailty + ICU = Poor Outcome
<table>
<thead>
<tr>
<th>PPS Level (%)</th>
<th>Ambulation</th>
<th>Activity and Evidence of Disease</th>
<th>Self-Care</th>
<th>Intake</th>
<th>Conscious Level</th>
<th>Cumulative Frequency of 12 mo PPS* (%)</th>
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</thead>
<tbody>
<tr>
<td>100</td>
<td>Full</td>
<td>Normal activity and work</td>
<td>Full</td>
<td>Normal</td>
<td>Full</td>
<td>100</td>
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<td>Evidence of disease</td>
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<td>80</td>
<td>Full</td>
<td>Normal activity with effort</td>
<td>Full</td>
<td>Normal or reduced</td>
<td>Full</td>
<td>94</td>
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<td>Some evidence of disease</td>
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<td>70</td>
<td>Reduced</td>
<td>Unable normal job/work</td>
<td>Full</td>
<td>Normal or reduced</td>
<td>Full</td>
<td>90</td>
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<td></td>
<td>Significant disease</td>
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<td>60</td>
<td>Reduced</td>
<td>Unable hobby/house work</td>
<td>Occasional assistance necessary</td>
<td>Normal or reduced</td>
<td>Full or confusion</td>
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<td>Significant disease</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>50</td>
<td>Mainly sit/lie</td>
<td>Unable to do any work</td>
<td>Considerable assistance required</td>
<td>Normal or reduced</td>
<td>Full or confusion</td>
<td>71</td>
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<td>Extensive disease</td>
<td></td>
<td></td>
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<tr>
<td>40</td>
<td>Mainly in bed</td>
<td>Unable to do any work</td>
<td>Mainly assistance</td>
<td>Normal or reduced</td>
<td>Full or drowsy ± confusion</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extensive disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Totally bed bound</td>
<td>Unable to do any work</td>
<td>Total care</td>
<td>Normal or reduced</td>
<td>Full or drowsy ± confusion</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extensive disease</td>
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<tr>
<td>20</td>
<td>Totally bed bound</td>
<td>Unable to do any work</td>
<td>Total care</td>
<td>Minimal to sips</td>
<td>Full or drowsy ± confusion</td>
<td>55</td>
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<tr>
<td></td>
<td></td>
<td>Extensive disease</td>
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<td></td>
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<tr>
<td>10</td>
<td>Totally bed bound</td>
<td>Unable to do any work</td>
<td>Total care</td>
<td>Mouth care only</td>
<td>Drowsy or coma ± confusion</td>
<td>55</td>
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<tr>
<td></td>
<td></td>
<td>Extensive disease</td>
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<td></td>
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<td>0</td>
<td>Death</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>54</td>
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</tbody>
</table>
Function

50% mortality at 12 months

25% of those alive got to a PPS of > 60 (functional)

25% of those alive were dependent

**Good Prognosis**
- Married
- Emergency CABG or valve
- Initial PPS > 60

**Bad Prognosis**
- Male
- Stroke
- High APACHE II score
- +++ Comorbidity
- Frailty

Predicting Performance Status 1 Year After Critical Illness in Patients 80 Years or Older: Development of a Multivariable Clinical Prediction Model – Heyland, D et al (2016) – Critical Care Medicine, Vol 44, Issue 9, page 1719-1728
Home vs Care
n = 34,696 US ICU survivor study

> 65 yrs

Medicare data linking retrospective study

90% not mechanically ventilated (?HDU study)
Home vs Care

45% got home

> 14 days in ICU, 10% got home

> 21 days in ICU, 7% got home

However, only 45% were alive at 1 year!

= Longer you stay the worse you do

Relationship between ICU Length of Stay and Long-term Mortality for Elderly ICU Survivors. Moitra et al (2016), Critical Care Medicine, 44(4) page 655-662
Home vs Care

In the elderly ICU Admission:

50% survival

25% dependent

25% maintain independence

Relationship between ICU Length of Stay and Long-term Mortality for Elderly ICU Survivors. Moitra et al (2016), Critical Care Medicine, 44(4) page 655-662
QoL
QoL

Data is a little variable
Studies show a decrease in QoL because of ICU complications

*Increased dependence*

*Neuropsychiatric impairments*

- One-year outcome of elderly and young patients admitted to intensive care units – Rockwood, K et al (1993) Critical Care Medicine, Vol 21, No 5
Experiences of the Elderly in ICU
Experience of ICU

Common assumption = that ICU is very unpleasant for the elderly.
Experience of ICU

Only 9% found ICU an unpleasant experience.

Who are the elderly ICU patients?

What pathology do they present with?

How do they do prognostically?

Decision making surrounding admission.

Therapies and Models of Care
Decision
Patient
Experience of ICU

76 M

Independent

Controlled
co-morbidity
Only 13\% of capable patients were asked whether they wanted to go to the ICU.

↑ functionally autonomous

↓ dementia

Older clinicians less likely to ask patients opinions

Are elderly patients’ opinions sought before admission to an ICU? Results of the ICE-CUB study – Le Guen, J et al, Age and Aging 2016, 45:303-309
Patient

We do need to ask

We may be surprised by the answer
Family
Families perspective about the care provided to their elderly loved one

**Most important goal**

=  

“patient to be comfortable and suffer as little as possible.”

**Least important goal**

=  

“the belief that life should be preserved at all costs”
Family

Communication around ICU admission and when to stop is critical

Palliation?
88 F
# NOF for hemi
HLC
CCF
Dementia
Moderate COPD – current LRTI + on N/P O2
Known IHD
Chronic renal impairment
Would you refer to ICU for a postop bed?

(a) Yes
(b) No
Who should do the ARP?

(a) Anaesthetist
(b) Geriatrician
(c) Orthopaedic RMO
(d) Orthopaedic surgeon
(e) ICU
Intensivist
No! – ‘they’re not an ICU candidate’
Intensivist

No! – ‘they’re not an ICU candidate’

HDU admission to ICU (limited care)
No! – ‘they’re not an ICU candidate’

HDU admission to ICU (limited care)

Intensive Care Admission
Intensivist

*Main drivers*

Bed pressure

Resource pressure and...
Intensivist

Main drivers

Bed pressure

Resource pressure and…

…PEER PRESSURE!

91 M
“We are going to try to get you through this operation/illness, however, if you begin to take steps backwards and your organs begin to shut down, we will move to keeping you comfortable”
Who are the elderly ICU patients?

What pathology do they present with?

How do they do prognostically?

Decision making surrounding admission.

Therapies
Therapies
## Landmark ICU trials

<table>
<thead>
<tr>
<th>Trial</th>
<th>Median Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>RENAL</td>
<td>65 years</td>
</tr>
<tr>
<td>SAFE</td>
<td>58 years</td>
</tr>
<tr>
<td>NICE-SUGAR</td>
<td>60 years</td>
</tr>
<tr>
<td>CHEST</td>
<td>63 years</td>
</tr>
<tr>
<td>DECRA</td>
<td>24 years</td>
</tr>
<tr>
<td>TTM</td>
<td>64 years</td>
</tr>
<tr>
<td>TRICC</td>
<td>57 years</td>
</tr>
<tr>
<td>ARDSnet</td>
<td>51 years</td>
</tr>
</tbody>
</table>

**Median ages in Trials**
Delirium
<table>
<thead>
<tr>
<th>Table 1</th>
<th>Risk factors for delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unmodifiable/Unpreventable Risk Factors</strong></td>
<td><strong>Potentially Modifiable/Preventable Risk Factors</strong></td>
</tr>
<tr>
<td><strong>Baseline risk factors</strong></td>
<td><strong>Sensory deprivation (i.e., hearing or vision impairment)</strong></td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>APOE-4 genotype</td>
<td></td>
</tr>
<tr>
<td>History of hypertension</td>
<td></td>
</tr>
<tr>
<td>Preexisting cognitive impairment</td>
<td></td>
</tr>
<tr>
<td>History of alcohol use</td>
<td></td>
</tr>
<tr>
<td>History of tobacco use</td>
<td></td>
</tr>
<tr>
<td>History of depression</td>
<td></td>
</tr>
<tr>
<td><strong>Acute illness-related risk factors</strong></td>
<td>Anemia</td>
</tr>
<tr>
<td>High severity of illness</td>
<td>Acidosis</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>Hypotension</td>
</tr>
<tr>
<td>Medical illness (vs surgical)</td>
<td>Infection/sepsis</td>
</tr>
<tr>
<td>Need for mechanical ventilation</td>
<td>Metabolic disturbances (e.g., hypocalcemia, hyponatremia, azotemia, transaminitis, hyperamylasemia, hyperbilirubinemia)</td>
</tr>
<tr>
<td>Number of infusing medications</td>
<td>Fever</td>
</tr>
<tr>
<td>Elevated inflammatory biomarkers</td>
<td></td>
</tr>
<tr>
<td>High LNAA metabolite levels</td>
<td></td>
</tr>
<tr>
<td><strong>Hospital-related risk factors</strong></td>
<td>Lack of visitors</td>
</tr>
<tr>
<td>Lack of daylight</td>
<td>Sedatives/analgesics (e.g., benzodiazepines and opiates)</td>
</tr>
<tr>
<td>Isolation</td>
<td>Immobility</td>
</tr>
<tr>
<td></td>
<td>Bladder catheters</td>
</tr>
<tr>
<td></td>
<td>Vascular catheters</td>
</tr>
<tr>
<td></td>
<td>Gastric tubes</td>
</tr>
<tr>
<td></td>
<td>Sleep deprivation</td>
</tr>
</tbody>
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Delirium

**Sedative use** – holds, avoid BZD, Dexmed

**Analgesia** – pain assessments and opioids

**Immobility** – OT and Physio

**Sleep deprivation** – ear plugs, day-night cycle

**Prophylactic anti-psychotics** – not in ICU

### Delirium

#### ABCDE of Delirium Management in ICU

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awakening and Breathing Coordination</td>
<td>Combine daily spontaneous awakening trials with daily spontaneous breathing trials</td>
</tr>
<tr>
<td>Choice of sedative agents</td>
<td>Avoid benzodiazepines</td>
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<tr>
<td>Delirium Monitoring and Management</td>
<td>Frequently monitor patients for delirium and address modifiable/preventable risk factors and provide nonpharmacologic interventions (reorientation, cognitive stimulation, assess and treat pain, reduce sleep interruption and nonpharmacologic sleep enhancement)</td>
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<td>Early Mobility and Exercise</td>
<td>Mobilize patients out of bed early in the course of their critical illness</td>
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### Delirium

**ABCDE of Delirium Management in ICU**

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But there is a F…


Dexmedetomidine for prevention of delirium in elderly patients after non-cardiac surgery: a randomised, double-blind, placebo-controlled trial

Xian Su, Zhao-Ting Meng, Xin-Hai Wu, Fan Cui, Hong-Liang Li, Dong-Xin Wang, Xi Zhu, Sai-Nan Zhu, Mervyn Maze, Daqing Ma
Criteria for ICU Admission
We DON’T want to know about

LTHC and dependent RH patients

Deteriorating over months

Multiple/end-stage co-morbidity

Disseminated Malignancy (this is controversial)
We DON’T want to know about

Severe Chronic Psychiatric disease

Emergency surgery + MOF preoperatively

Frail (decreased functional capacity)

Those that don’t want to come to ICU!
We **DO** want to know about

Acute, reversible pathology

Those for HDU admission
with clear limitations/ARP

Co-morbidity but good level of functioning
(driving, independence)
Take home messages
Severity of illness
Frailty
Disability
Co-morbidity
Elective surgery

...predicts ICU outcome
(2)

Elderly + MOF + Emergency Surgery
Elderly + MOF + Emergency Surgery = Poor Outcomes

(2)
Should we operate?

Elderly + MOF + Emergency surgery

Outcomes Poor

Elderly (2)
Loss of function and independence is important to some of our elderly patients.
Decision making surround admission is complex.
Questions?
Thank you
Advertise next year’s meeting!