How to prevent early & unplanned hospital readmission?

- after subacute care –

K. Singler
21th September 2017
CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report.

K. Singler
The way....

- Acute illness
- A&E/ICU
- Acute care
The way....

- Acute illness
- A&E/ICU
- Acute care
The way....
Hospital readmission after post-acute rehabilitation – a quality indicator?

2013: The Centers for Medicare and Medicaid Services (CMS) identified 30-days readmission as national quality indicator for inpatient rehabilitation facilities.

Risk of readmission after post-acute rehabilitation

<table>
<thead>
<tr>
<th>Impairment category</th>
<th>Readmission rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower extremity joint replacement</td>
<td>5.8 %</td>
</tr>
<tr>
<td>Lower extremity fracture</td>
<td>9.4 %</td>
</tr>
<tr>
<td>Stroke</td>
<td>12.7 %</td>
</tr>
<tr>
<td>Debility</td>
<td>18.8 %</td>
</tr>
<tr>
<td>Neurological disorders</td>
<td>17.4 %</td>
</tr>
<tr>
<td>Brain Dysfunktion</td>
<td>16.4 %</td>
</tr>
</tbody>
</table>

- 736,536 patients
- Mean age 78.0 (SD=7.3) years
- Female 62.5%
- Living with someone prior to hosp. 65.7%
- ≥ one rehab.comorbidity 27.9%
- Mean LOS 12.4 (SD=5.3) days

30- days readmission rate 11.8% (95%CI, 11.7%, 11.8%) after discharge
23 % of PAC episodes within 30- days of hospital discharge

Mor V, Intrator O, Feng Z et al. Health Aff 2010;29:57-64.
## Reasons for readmission after post-acute rehabilitation

<table>
<thead>
<tr>
<th>Reasons for readmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
</tr>
<tr>
<td>Urinary tract infection</td>
</tr>
<tr>
<td>Pneumonia</td>
</tr>
<tr>
<td>(Septicemia)</td>
</tr>
<tr>
<td>Nutritional and metabolic disorders</td>
</tr>
<tr>
<td>Esophygitis, gastroenteritis &amp; digestive disorders</td>
</tr>
</tbody>
</table>

### Site of rehabilitation:
- rural vs. urban
- hospital based vs. freestanding

### Motor and cognitive functioning

### Early assessment of functional status

Predictors for 30-days rehospitalization

Unplanned rehospitalization rate only 4%

Factors associated with early readmission (≤ 7 days)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS (index stay) &gt;8 days</td>
<td>0.60 (0.56, 0.64)</td>
</tr>
<tr>
<td>Discharge diagnosis:</td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>1.54 (1.35, 1.75)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1.14 (1.03, 1.23)</td>
</tr>
<tr>
<td>Number of chronic conditions &gt;6</td>
<td>0.85 (0.76, 0.91)</td>
</tr>
<tr>
<td>Prior hospitalization within 1 year</td>
<td>1.10 (1.09, 1.11)</td>
</tr>
<tr>
<td>Private insurance</td>
<td>1.43 (1.32, 1.59)</td>
</tr>
<tr>
<td>Rural area</td>
<td>1.47 (1.33, 1.61)</td>
</tr>
<tr>
<td>Size of hospital</td>
<td>0.78 (0.71, 0.86)</td>
</tr>
<tr>
<td>Teaching status of hospital</td>
<td>0.88 (0.81, 0.96)</td>
</tr>
</tbody>
</table>

+1 day in hospital stay risk of early readmission decreased by 2% (OR 0.98 [CI 0.97–0.98])
Comorbidity indices vs. function

**Impairment group**
- Stroke
- Joint replacement
- Lower extremity fracture

**Comorbidity Index**
- Charlson CI
- Tier comorbidity
- Functional CI
- Elixhauser CI
- Hierarchical Condition Category

Functional status as predictor of readmission

The way....

Acute illness → A&E/ICU → Acute care → Transitional care → Subacute care/rehabilitation → discharge

Geriatric assessment
Functional status (FS) and hospitalization

- Acute illness and hospitalization are crucial events
- 30% do not recover their premorbid FS
  - Increased risk of death
  - Prolonged short- and long-term disability
  - Institutionalization

Risk factors for short-term functional recovery

- Older age
- Physical and cognitive frailty
- Severity of medical illness
- Prehospitalization FS
- Functional dynamics

Risk factors for short-term functional recovery

- Older age
- Physical and cognitive frailty
- Severity of medical illness

Functional status?

- Functional changes around acute illness and hospitalization!

Functional changes across the illness continuum

1-month after hospitalization:

D = Decline
S = Stable
I = Improvement

Functional changes across the illness continuum

<table>
<thead>
<tr>
<th></th>
<th>Odds of Functional Recovery in Total Functioning</th>
<th>Odds of Functional Recovery in Self-care</th>
<th>Odds of Functional Recovery in Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (95% CI)</td>
<td>p Value</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S – S</td>
<td>6.0 (3.3–10.9)</td>
<td>&lt;.001</td>
<td>9.8 (5.0–19.1)</td>
</tr>
<tr>
<td>S – I</td>
<td>3.6 (1.6–8.2)</td>
<td>.002</td>
<td>5.5 (2.3–13.6)</td>
</tr>
<tr>
<td>D – I</td>
<td>2.3 (1.3–4.0)</td>
<td>.002</td>
<td>3.0 (1.6–5.7)</td>
</tr>
<tr>
<td>D – S</td>
<td>1.4 (0.5–4.1)</td>
<td>.517</td>
<td>2.0 (0.7–5.4)</td>
</tr>
<tr>
<td>S – D</td>
<td>1.3 (0.6–2.5)</td>
<td>.534</td>
<td>2.2 (1.0–4.5)</td>
</tr>
</tbody>
</table>

Reference

Magic word: In-hospital improvement?
The way....

Acute illness → A&E/ICU → (Sub) Acute care/Early rehabilitation → discharge

Assessment of functional status
Hospitalization Process Effects on Functional Outcomes and Recovery (HoPE-FOR)

2 weeks prior to admission
- Personal Risk Factors
- Functional status
- Sedative medication consumption
- Nutritional status
- Chronic health condition
- Age & family status
- Place of living

At time of hospitalization
- Hospitalization Care Processes
- Mobility
- Continence care
- Sedative medication consumption
- Nutritional intake
- Hospital environment
- Length of stay

At discharge
- Discharge Outcomes
- Functional status decline

After discharge
- Post-hospitalization factors
- Rehospitalization

1 month after discharge
- Post-Discharge Outcomes
- Functional status decline

Severity of acute illness
- Functional status
- Cognitive status
- Depressive symptoms

HoPE-FOR

<table>
<thead>
<tr>
<th>Variable</th>
<th>FD discharge</th>
<th>FD 1-month follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital mobility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital continence care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital medication sedative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-physical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-human</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FD= Functional decline</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FD= Functional decline

EAMA
European Academy for Medicine of Ageing
In-hospital mobility – functional decline

→ 50% to 70% of people in the hospital do not walk outside their room

→ Current study 48% of participants reporting confinement to their room

**Early mobilization**

**Physical outcomes eg. Delirium, pain etc**

**Psychological outcomes eg. Anxiety, depression**

**Social outcomes**

**Organisational outcomes**


Kalisch BJ, Lee S, Dabney BW. J Clin Nurs 2014;23:1486-1501
“N-active”: a new comanaged, orthogeriatric ward

Acute care

early rehabilitation

The way....

The rehabilitation process begins with Acute illness, followed by A&E/ICU. 

(Sub) Acute care/Early rehabilitation is then assessed, followed by as needed rehabilitation. 

Discharge is the final step, with an Assessment of functional status along the way.

OPS 8-550.x
# Early geriatric rehabilitation

## - Effectiveness and feasibility -

<table>
<thead>
<tr>
<th></th>
<th>Martinez-Velilla et al.</th>
<th>Kosse et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articles included</td>
<td>17</td>
<td>15 (multidiscipl. vs usual care + exercise)</td>
</tr>
<tr>
<td>Functional outcome</td>
<td>significant improvement up to 12 months (4)</td>
<td>Improvement on functional tests</td>
</tr>
<tr>
<td>LOS</td>
<td>--</td>
<td>Reduced by multidisciplinary programs</td>
</tr>
<tr>
<td>Discharge destination</td>
<td>--</td>
<td>Less discharge to nursing home</td>
</tr>
<tr>
<td>Costs</td>
<td>Costeffective</td>
<td></td>
</tr>
<tr>
<td>Feasibility</td>
<td>No adverse side effects</td>
<td>safe</td>
</tr>
<tr>
<td>Adherence rate</td>
<td>--</td>
<td>Variation between studies</td>
</tr>
</tbody>
</table>

Key messages

- Rehospitalization from post acute care is common
- Individual risk factors – hospital processes
- In-hospital mobility, continence care, nutrition play an important role
- Early rehabilitation (led by geriatricians) is a promising solution