Physical Restraints & Falls in Older Hospitalized Adults: Where Do We Go from Here?

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Agenda

• Understand the issue of physical restraint and falls in US hospital settings
• Multi-level approach to fall prevention & restraint reduction
• Determining future directions
“American nurses have strange practices…. they tether their patients”

“We have to ask ourselves…. Are we a house of comfort or a house of corrections?”

J. Dermot Frengley, MD, FRCP
Ongoing observation during medical rounds with physician residents, 1980s
What are ‘physical restraints’?

- Any manual method or physical or mechanical device, material, or equipment attached or adjacent to the [person’s] body that the individual cannot remove easily which restricts freedom of movement or normal access to one’s body.

US Centers for Medicare & Medicaid Services, 42 CFR 483.13(a)
Examples of physical restraint

• Chest/vest restraints
• Limb restraints (wrist or ankle)
• Elbow splints
• Belt restraints
• Secured trays
• Bedside rails*
• Linen
How often are physical restraints used?

• Varies by hospital: Overall 50/1000 pt-days
• Varies by type of unit
  – Critical care >> non-critical care
  – Neuro & Psychiatric > surgical
• Varies within units of similar patient populations
# Rates of Use in Hospitals

<table>
<thead>
<tr>
<th>Type of Unit</th>
<th>Mean # restraint-days/1000 patient-days</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-ICU, Academic (n = 815)</td>
<td>0 – 3.69</td>
<td>0</td>
</tr>
<tr>
<td>Non-ICU, All Hospitals (n = 3,022)</td>
<td>0 – 3.66</td>
<td>0</td>
</tr>
<tr>
<td>ICU, Academic (n = 515)</td>
<td>0 – 43.46</td>
<td>16.68</td>
</tr>
<tr>
<td>ICU, All Hospitals (n = 2,100)</td>
<td>0 – 40.82</td>
<td>12.85</td>
</tr>
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2010-2011 NDNQI data
Bedrest ---- Immobility

- Antithesis of
  - rehab principles
- Impacts every
  - body system
- Involuntary
- Immobilization:
  - Used in animal studies to study effects of stress

Creditor, Ann Intern Med, 1993
Negative Outcomes of Physical Restraint

• Immobility related:
  – Increased pressure ulcer development
  – Joint contractures
  – New onset urinary incontinence
  – Muscle weakness
  – Longer hospital stays
  – Higher mortality rates

Negative Outcomes of Physical Restraint

• Psychological/Cognitive
  – Depression/demoralization
  – New or increased agitation (ICU & non-ICUs)
  – New delirium (ICU & non-ICUs)
  – Associated with ICU PTSD
Negative Outcomes of Physical Restraint

• Brachial nerve injuries
• Wrist fractures
• Hematomas
• Anoxic encephalopathy
Death from Restraint: Positional asphyxia

Types of restraints
- Roll belts
- Chest/Vest
- Bed side rails
- Wrist restraints

Locations
- EDs
- ICUs
- Non-ICUs

S. Miles, 1992
**Figure 2.** Rail and in-bed entrapment.

**Figure 3.** Rail and off-bed entrapment.
Why are physical restraints used in hospitals?

Perceived benefits

• Prevent falls
• Stop the patient from self-extubation, pulling out various medical devices
• Control violent behavior
"I really got his hands tied down tight now. No way those tubes are coming out this time!"
Hospital Falls

• Common hospital adverse event
• ~ 1 million hospital fall events each year
• 250,000 injuries
• 11,000 deaths
• Costly
  – Increased length of stay
  – CMS penalties started in 2008
  – Litigation
Fall Prevention Strategies

• Myriad of strategies that experts claim reduce falls – some quite costly
• Little evidence supporting use of any single or bundled set of interventions

“We speculate that, at times, even the most basic standards of care are inevitably compromised by the sheer volume of initiatives pertaining to falls implemented at any given time.” (Goldsack et al., Nursing 2014)
Little change in rates leading up to 2008 deadline. Fall rates varied by patient, unit and hospital characteristics. Prevention in hospitals may will likely require system level approaches.

Falls on Medical & Surgical Units

- Little to no change in fall rates in 10 years

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Start 2 Year Pre-CMS</th>
<th>Start 1 Year Pre-CMS</th>
<th>Start Year 1 Post-CMS&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Start Year 4 Post-CMS</th>
<th>Start 7 Years Post-CMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Falls (/1000 patient-days)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.66</td>
<td>3.64</td>
<td>3.80</td>
<td>3.37</td>
<td>3.17</td>
</tr>
<tr>
<td>Injurious Falls (/1000 patient-days)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.09</td>
<td>0.98</td>
<td>0.99</td>
<td>0.76</td>
<td>0.70</td>
</tr>
<tr>
<td>Restraint Prevalence&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.8</td>
<td>1.6</td>
<td>1.4</td>
<td>1.0</td>
<td>0.6</td>
</tr>
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Shorr et al, JAMA (Under Review)
Consistent Differences in Fall Rates on Medical Units

Staggs 2015 JAGS
How to explain this variation in units with similar patient populations?

Donabedian Model

- **Structure**: Physical and organisational characteristics where health care occurs
- **Process**: Focus on the care delivered to patients (e.g. services or treatments)
- **Outcome**: Effect of health care on the status of patients and populations

Implementationcentral.com
Structure

• Staffing (mixed results)
  – Quantity (HPPD)
  – Quality (% RN; %BSN)

• Unit design (AHRQ) (mixed results)
  – Work areas for staff that are not long distances from patient’s bedside
  – “Visibility” of patients from nursing work station
  – Noise reduction: carpeting & ceiling tiles
Structure

• Equipment
  – Monitoring/surveillance
  – Bed/chair alarms

• Furniture
  – Low beds
  – Floor mats
  – Chairs conducive to function
No ‘silver bullet’

1.) Sensor system and proximity sensing mat as used on a bed or stretcher.

2.) Sensor system and proximity sensing mat used on a chair or wheelchair.
Study to Increase Bed Alarms

- 18 non-ICUs
- Increased use of proximity alarms
- 64.41 days/1000 pt-days: Intervention
- 1.79 days/1000 pt-days: Control

Shorr et al., Ann Intern Med 2012
Increased Bed Alarms Had No Effect on Fall Rates
Patient Processes of Care

• Target interventions to specific fall risk factors
  – Mobilization
  – Medication review and alteration
  – Delirium prevention/management
  – Pain management
  – Attention to nutrition & hydration
Processes to Promote/Maintain Function: Simple to Complex

- Time-limited orders for bed rest
- Time-limited orders for indwelling bladder catheters
- Determining maximum NPO time for each test, procedure (many do not require fasting from previous night)
Processes to Promote/Maintain Function

• Restricting drugs on formulary based on adverse drug event profile

• Minimize awakenings at night
  – Up to 40 nocturnal awakenings (measured by actigraphy) in 8-hour shift (Hinds et al, Oncology Nursing Forum, 2007)
  – “routine” vital signs; timing of medications, respiratory treatments, weights, baths, etc

• Hourly rounds by nursing personnel (difficult to sustain)
  – Reduces falls
  – Decreases calls
Processes to Promote Function (Continued)

• Family involvement – can reduce delirium, falls, other adverse events
• Examine processes that promote and encourage family member to stay/visit with older adult
• Furniture in room: e.g., reclining chair, fold out couch, cots, etc
• Family and patient meeting with primary care team to discuss goals, set realistic expectations, determine optimal discharge plan
Can We Determine Reasons for Hospital Variation in Falls

- Current NIH-funded observational study
- 80 hospitals in the US
- Examine hospital-, unit-, and patient-level factors that might account for variation
- Determine mix of hospital-, unit-, and patient-level factors that distinguish units with low fall rates from units with high fall rates
- Use findings to inform multi-level intervention study
Multi-Level Approach Needed

• What are patient-level approaches that might account for variation?
  – Compare units fall practices, e.g.,
    • Physical restraint prevalence
    • “Sitters”
    • Bed/chair alarms
  – Adjust for
    • Fall risk factors (not just fall risk level)
    • Use of psychoactive drugs
Multi-Level Approach Needed

• What are unit-level approaches that might account for variation?
• Compare units on
  – Presence of opinion leader
  – Availability of equipment/resources
  – Education
  – Staffing
  – Teamwork & RN satisfaction
Multi-Level Approach Needed

• What are organizational-level approaches that might account for variation?
• Compare hospitals on
  – Culture (safety)
  – Accessibility & availability of resources & equipment
  – Incentives & disincentives
  – Structure & process of hospital fall prevention committee (e.g., leadership involvement?)
....the very first requirement in a hospital [is] that it should do the sick no harm.

Florence Nightingale