Mobility in Hospitalized Patients

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Bio

• Exercise Science at Gonzaga
• MS at Creighton University
• Med school at the University of Vermont
• Residency at Providence St. Vincent, Internal Medicine
• Runner / cyclist / skier
• Bothered by sitting
Outline

• Defining the problem
• Pathophysiology of bedrest
• Delirium
• Solutions: Early mobility
• QI project
• Work being done here
Defining the problem

• Montana is 6th oldest state, ~ 20% of population is age > 65
• Nursing homes are closing
• Patients spend 80% of time in bed, and just 3% of time ambulating (1)
• Patients age > 75 in the hospital take an average of just 589 steps / day. The longer the stay the less ambulation they have (2)

RESULTS: Forty-five male patients (mean age 74.2) with a mean length of stay of 5.1 days generated 2,592 one-hour periods of data. A baseline functional assessment indicated that 35 (77.8%) study patients were willing and able to walk a short distance independently. No patient remained in bed the entire measured hospital stay, but on average, 83% of the measured hospital stay was spent lying in bed. The average amount of time that any one individual spent standing or walking ranged from a low of 0.2% to a high of 21%, with a median of 3%, or 43 minutes per day.

Defining the problem

• Disposition can be predicted based on patient mobility scores in the first 48 hours of admission

Compared with patients discharged to home, patients discharged to a postacute facility were older (median, 64 vs 56 years old) and had lower mobility scores at hospital admission (median, 32 vs 41). The final decision tree accurately classified the discharge location for 73% (95% CI, 67%-78%) of patients.
Defining the problem

• Low mobility in the hospital predicts functional outcome differences at follow up (1):

1. https://doi.org/10.1111/j.1532-5415.2010.03276.x
Hospitals are set up for promoting weakness

• Patients are given a bed, a chair, and a small room to sit in, and usually told they can't get up without help.

• Hallway is not designed to promote mobility

• Uncomfortable clothing

• Bed alarms (hospital response to CMS fall penalty)

• Time: Busy nurses / CNAs

• Purewick, liberty catheter, bedside commodes

• Catheters, IVs (non-restraint restraints)

• High consequence for a fall, no consequence for iatrogenic deconditioning
Case:

• Susie is an 89 yo F w/ a history of CAD, mild diastolic CHF, left hip fx s/p ORIF 18 months ago who is admitted w/ fever, tachycardia, cough, mild hypoxia to 86% w/ a RLL infiltrate c/w pneumonia. Requires 2 liters oxygen. IV abx ordered.

• Is she going to be allowed out of bed?
• How long will she be admitted?
• How much mobility will she get here?
Susie

- Susie is an 89 yo F w/ a history of CAD, diastolic CHF, left hip fx s/p ORIF 18 months ago who is admitted w/ fever, tachycardia, cough, mild hypoxia to 86% w/ a RLL infiltrate c/w pneumonia. **Sick for 5 days PTA. Lives independently. Widowed 2 months ago. Daughter lives out of state.** Requires 2 liters oxygen. IV abx ordered. Feels tired and wants to rest.

- Is she going to be allowed out of bed?
- How long will she be admitted?
- How much mobility will she get here?
Pathophys of bed rest:

• Studied by NASA to simulate microgravity
• Some changes happen as soon as 24-36 hours
• Reduced hydrostatic gradient in the cardiovascular system leads to:
  • Reduced circulating plasma volume
  • Reduced RBC mass / production
  • Decreased VO2 max via decline in stroke volume, cardiac output, muscle capillary density
  • Myocardial wall thinning
  • Increased resting heart rate via reduction in vagal tone

Pathophys of bed rest

• Reduced forces on skeletal muscles & bones
  • Decreased skeletal muscle mass (sarcopenia), strength, blood flow, myofibril type switching (slow -> fast)
• Reduced energy expenditure
• Increased insulin resistance
• Orthostasis
• Increased inflammatory markers, (IL1, IL6, cortisol)
• Increased VTE risk
• Worsened cognitive state / emotional state

Consequences of bed rest

• Patients gradually lose their ability to perform ADLS, the loss starts pre-hospital

• If Susie is discharged on HD 3, she has now had 7 or 8 days of decreased mobility

• At the time of d/c 35% of age > 65 patients will perform worse on ADLS. 50% of those age > 85 will perform worse (1)

1. https://doi.org/10.1046/j.1532-5415.2003.51152.x
Consequences of bed rest

• An invisible epidemic

• An iatrogenic harm

• Difficult to prevent

• Contributes to delirium
Delirium

- **Delirium**: an acute, waxing and waning change in cognition and level of consciousness, characterized by inattention, agitation, confusion, disorientation and perceptual disturbances.

- Present in 10-80% of admissions depending on context

- Associated w/ poor outcomes and increased costs (1)

- Increased prevalence in patients with limited mobility (2)

- Prevention and treatment of delirium involves improved ambulation and exercise in the context of a bundled approach (3, 1)

1. doi:10.1001/archinternmed.2007.4  
2. https://doi.org/10.7326/AITC202010060  
3. https://doi.org/10.1111/ajag.12636
Delirium

One-year health care costs associated with delirium in the elderly population

Results: During the index hospitalization, 109 patients (13.0%) developed delirium while 732 did not. Patients with delirium had significantly higher unadjusted health care costs and survived fewer days. After adjusting for pertinent demographic and clinical characteristics, average costs per day survived among patients with delirium were more than 2(1/2) times the costs among patients without delirium. Total cost estimates attributable to delirium ranged from $16 303 to $64 421 per patient, implying that the national burden of delirium on the health care system ranges from $38 billion to $152 billion each year.

A major component of delirium is loss of mobility, enhanced mobility is part of the treatment.

Increasing healthcare costs by $38-152 billion
Reduced mobility in the hospital

• Contributes to delirium

• Contributes to a loss of strength, endurance, exercise capacity, ADLS and has long lasting consequences out of the hospital
Solutions: Improving mobility

• Starts at admission with an assessment of baseline mobility, and mobility in the past 2-4 weeks
• Educating patients on the dangers of bed rest in the hospital
• "The squeaky wheel gets the grease"
• Continuous nurse and CNA education: mobility is a doctor order
• Setting expectations which are measurable and visible
• Communicating with social work, case management, administration
A program that assesses older patients for risk of delirium, coordinates care within a multi-disciplinary group which includes trained volunteers; and which addresses modifiable risk factors that contribute to delirium:

- mobilization
- orientation
- Sensory adaptation
- social interaction
- nonpharmacologic approach to sleep (no TV late in the evening)
- assistance with meals and hydration

PROGRAM OUTCOMES: To date, 1507 patients have been enrolled during 1716 hospital admissions. The overall intervention adherence rate was 89% for at least partial adherence with all interventions during 37,131 patient-days. Our results indicate that only 8% of admissions involved patients who declined by 2 or more points on MMSE and only 14% involved patients who declined by 2 or more points on ADL score. Comparative results for the control group from the clinical trial were 26% and 33%, and from previous studies 14 to 56% and 34 to 50% for cognitive and functional
Effect of the Hospital Elder Life Program on the Risk of 30-day Readmissions

Fred H. Rubin, MD, AGSF\textsuperscript{1}, Johanna Bellon, PhD\textsuperscript{2}, Andrew Bilderback, MS\textsuperscript{2}, Kevin Urda, MPH\textsuperscript{1}, and Sharon K. Inouye, MD, MPH, AGSF\textsuperscript{3,4}

Program looked at 8 medical units w/ help, 10 units without, for 1 year (July 1, 2013 to June 30, 2014), 7,628 patients (4794 HELP vs. 2834 control)

17.2% relative reduction in readmission rate

Absolute difference of 2% (was not statistically significant, but was an absolute number of 100 readmissions different)
Early mobility project: mobility aides

- Providence St. Vincents
- Grant funding from the medical foundation
- 2 year program intended to provide full time 7 day / week coverage of CNAs with specialized training from OT (in delirium management) and PT (in safe mobility) on a 28 bed general medicine unit
- Delirium prevention protocol including mobility TID, exercise in bed, or passive range of motion for all patients age > 65
Early mobility project at St. Vincents

• More patient's discharged to home vs. SNF
• Long length of stay patients (>7 days) had a significant reduction in delirium
• Daily walking allowed for cognitive engagement, benchmark of progress, motivating, happier patients
• Low cost intervention (CNA) compared with highly trained / skilled physical and occupational therapy
• Nurses reported that the daily engagement with our mobility aide CNA saved them an average of 50 min / day
Early Mobility Project at St. Vincents

![Graph showing delirium burden based on days in ACU (excluding no-CAM days)]

Table 1. Medical A showed lower rate of increase in length of stay compared to Medical B (comparator unit).

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical A</th>
<th>mean (sd)</th>
<th>median (IQR)</th>
<th>Medical B</th>
<th>mean (sd)</th>
<th>median (IQR)</th>
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<tbody>
<tr>
<td>2017</td>
<td>5.4 (5.9)</td>
<td>3.8 (2.3-6.1)</td>
<td>5.4 (5.4)</td>
<td>3.9 (2.4-6)</td>
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<tr>
<td>2018</td>
<td>5.5 (5.5)</td>
<td>3.9 (2.6-6.3)</td>
<td>6.1 (8.3)</td>
<td>4.1 (2.7-6.8)</td>
<td></td>
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</tr>
<tr>
<td>2019</td>
<td>5.8 (5.9)</td>
<td>4 (2.4-6.9)</td>
<td>6.5 (7.6)</td>
<td>4.5 (2.8-7.1)</td>
<td></td>
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</tr>
</tbody>
</table>
Early mobility project at St. Vincents

Providing a humanistic impact to
the hospital stay, not measurable in
the data.
Mobility in the hospital, St. Pats

- Spring 2022 through now the chair of PT / OT / social services has coordinated a plan to implement a mobility aide program here
- Opt out program
- Starting on one 30 bed unit
- Goal is two aides; providing therapeutic ambulation and mobility for pts age > 65
Mobility in the hospital, St. Pats

• Mobility aides will also perform a basic delirium bundle:
  • Blinds up
  • Enhance sensory input: glasses on, hearing aides in, dentures in, brush teeth, up to chair for meals
  • Ambulate with patients in a progressive manner
My Practice

- Talk with patients, family, nurses, CNAs

Sticky: Provider

Delirium prevention and treatment protocol:

1. Avoid centrally acting medications
2. Exercise or therapeutic ambulation at least three times per day
3. Blinds up to maintain day / night cycle
4. Frequent redirection / reorientation
5. Sensory input in place: hearing aids, dentures, glasses on, etc during day
6. Talk loud enough for patient to hear
7. Water within reach, food within reach
8. Avoid excessive noise at night / interruptions / waking

Last edited by Joseph M Miller, MD on 09/12/22 at 15:11

Walk in hall 3x/day

☐

Up to chair with meals

☐
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• Delirium
• Solutions: Early mobility
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Conclusion

• An epidemic of immobility exists in our hospitals
• Immobility leads to measurable harms with real, long-term consequences
• The harms caused by immobility in the hospital could be viewed as iatrogenic, probably cost billions of dollars
• Multicomponent strategies to engage patients in ADLS during their stay can help
• Remind your patients, nurses, and all staff that bed rest is harmful