Deconditioning in hospitalised older patients

Gippsland Aged Care Conference
3 June 2015
Dr Alice Lac
A real case
Introduction

- Mrs W, 85 year old from home with partner
- Premorbidly independent with PADLs and walking with a 4WF for up to 100 metres
November: Initially admitted for gallstone pancreatitis complicated by ARDS and AF with RVR

December: Transferred to GEM for rehabilitation and d/c planning. Developed UTI and left leg haematoma

January: Transferred back to acute ward for a split skin graft

Late January: Transferred back to GEM for d/c planning

All medical issues now resolved
- Essentially bed bound for the past three months
# Deterioration in Hospital

<table>
<thead>
<tr>
<th></th>
<th>Premorbid condition</th>
<th>Current condition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mobility</strong></td>
<td>With wheelie frame</td>
<td>Non ambulant, transfers 2 X assistance</td>
</tr>
<tr>
<td></td>
<td>without supervision, independent with transfers</td>
<td></td>
</tr>
<tr>
<td><strong>PADLs</strong></td>
<td>Independent</td>
<td>1X assistance</td>
</tr>
<tr>
<td><strong>CADLs</strong></td>
<td>1X assistance</td>
<td>1X assistance</td>
</tr>
<tr>
<td><strong>DADLs</strong></td>
<td>1X assistance</td>
<td>1X assistance</td>
</tr>
<tr>
<td><strong>Continence</strong></td>
<td>Continent</td>
<td>Doubly incontinent</td>
</tr>
</tbody>
</table>
Discharge plan

- From home, now requiring high level care
Overview

- Definition
- Epidemiology
- Risk factors
- Complications
- Interventions
- Residential In-Reach
Look at the patient lying alone in bed
What a pathetic picture he makes.  
The blood clotting in his veins.  
The lime draining from his bones.  
The scybola stacking up in his colon.  
The flesh rotting from his seat.  
The urine leaking from his distended bladder 
and the spirit evaporating from his soul.  
Teach us to live that 
we may dread unnecessary time in bed.  
Get people up and we may save 
patients from an early grave  
- Dr. Richard Asher, 1942
Overview

- **Definition**
- Epidemiology
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Definition of deconditioning

- A process of physiological change following a period of inactivity or bedrest that results in a decrease in muscle mass, weakness, functional decline and the inability to perform daily living activities
Overview

- Definition
- **Epidemiology**
- Risk factors
- Complications
- Interventions
- Residential In-Reach
Epidemiology

- Deconditioning in older hospitalised patients is consistently reported, more often due to hospitalisation rather than presenting medical illness.
- 17% of older medical patients independently ambulating 2/52 prior to admission need assistance to walk at time of discharge.
65% of elderly patients become deconditioned after 2 days of hospitalisation

- 67% failed to improve before discharge
- 10% deteriorated further
Risk factors

- Age >85 yo
- Functional impairment prior to hospitalisation
- Caucasian race
- Use of walker or wheelchair before admission
- > 4 co-morbid conditions
- A cancer diagnosis
Overview

- Definition
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Complications

- Inactivity and prolonged bed rest is an **unnatural** state of the human body
- Results in reduced functional capacity in all organ systems, especially musculoskeletal
Complications

- Weak, wobbly legs
- More muscle weakness
  - Less ability to perform
- More muscle weakness
  - Less ability to perform
  - Disuse atrophy
  - NO ability to perform

A steep & rapid descent
Muscle weakness and atrophy

- Caused by disuse
- Loss of strength: 10-20% per week. 3-5 weeks of total immobility -> 50% decrease in muscle strength
- Loss of muscle mass: 3% loss in thigh muscles within 7 days (young pts use back and leg muscles in bed for repositioning)
- Greatest in postural muscles (low back, quads, gastrocnemius, soleus)
Contractures

- Caused by: pain, casting/splinting, paralysis, improper bed positioning
- Involves muscles that crosses two joints (hips, knees, ankles, shoulders, elbows, wrists, fingers)
- Pathophys: muscle fibres maintained in shortened position (5-7 days) → adapt to shortened length → loose connective tissue change into dense connective tissue (3 weeks)
Disuse osteoporosis

- Caused by: Loss of bone density due to lack of weight bearing, gravity and muscle activity on bone mass
- 12 weeks of bed rest → reduced bone density by 50%
- All bones affected, but especially the long bones
Other musculoskeletal changes

- Synovial atrophy
- Cartilage degeneration → OA
Cardiovascular changes

- Increase in resting HR: 4-15 beats within the first 3-4 weeks then plateaus
- Decrease in blood volume: 5% in 24 hours, 10% in 6 days, 20% in 14 days
- Resulting in decreased exercise tolerance
Postural hypotension

- Normally, when we stand, 500-700mls of blood moves from the thorax to the legs. Baroreceptors in aorta, carotid and heart have less stretch, and cause $\uparrow$HR, $\uparrow$SV, vasoconstriction and antidiuresis to compensate.

- Bed rest $\rightarrow$ $\uparrow$diuresis and less ability to compensate $\rightarrow$ $\downarrow$blood volume and postural hypotension.
Respiratory

- Bed rest → diaphragm moving more cephalad → ↓ chest expansion → pooling of mucous and impaired ciliary function, poor cough → hypostatic pneumonia and atelectasis
- Further bed rest → collapsed lung unable to re-expand
- Atelectasis in bilateral lower lobes
Skin changes

- Pressure ulcers – extrinsic pressure greater than 30mmHg for an extended period of time → ischaemia (heels, sacral).
- Dependent oedema → cellulitis
- All worsened in the presence of incontinence
Stage 3 heel pressure sore which began as a blister
Gastrointestinal changes

- Decreased appetite
- Constipation
- Atrophy of intestinal mucosa
- Decreased gastric secretion
- Distaste for protein-rich foods
Urinary changes

- Increased diuresis
- Incomplete bladder emptying → stone formation 15%
- Urinary tract infection
- Functional incontinence (immobility, environmental barriers): 40-50% become incontinent after 1 day of hospitalisation → intense psychological distress and labour intensive
Psychosocial

- Depression
- Loss of independence
- Loss of motivation
- Helplessness
- Apathy
- Lack of social stimulation
- Increased irritability
Cognitive/Perceptiive

- Caused by: bed rest and sensory deprivation
- Decreased concentration, impaired judgement
- Disorientation to time and place (time may seem to pass slower)
- Lowered pain threshold
Endocrine

- Glucose intolerance (reduced insulin binding sites)
- Altered circadian rhythm
- Altered temperature and sweating response
- Altered regulation of hormones: thyroid, adrenal, growth, plasma renin activity
Overview

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Interventions

PROGRESSIVE MOBILIZATION
A slow long climb

Stair Climbing
Walking
Standing
Transferring
Sitting
Bed Activities
<table>
<thead>
<tr>
<th>Level</th>
<th>Type of Evidence</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>Systematic review of all relevant RCTs</td>
</tr>
<tr>
<td>II</td>
<td>At least one properly designed RCT</td>
</tr>
<tr>
<td>III – 1</td>
<td>Well designed controlled trial without randomisation</td>
</tr>
<tr>
<td>III – 2</td>
<td>Well designed cohort or case control trial</td>
</tr>
<tr>
<td>III – 3</td>
<td>Multiple time series with or without the intervention</td>
</tr>
<tr>
<td>IV</td>
<td>Opinions of respected authorities based on clinical experience</td>
</tr>
</tbody>
</table>
## Mobility/Vigour/Self-care

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Assess for falls and fracture risk</td>
</tr>
<tr>
<td>II</td>
<td>Early mobilisation within 48 hours of admission</td>
</tr>
<tr>
<td>II</td>
<td>Attendance at daily exercise class</td>
</tr>
<tr>
<td>III - 2</td>
<td>Avoid physical and chemical restraints at all times and keep cotsides down</td>
</tr>
</tbody>
</table>
## Skin

<table>
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<th>Level of evidence</th>
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<tr>
<td>II</td>
<td>Pressures relieving devices such as air mattresses for those at risk of developing a pressure ulcer</td>
</tr>
<tr>
<td>III – 2</td>
<td>Systematic skin assessment on admission</td>
</tr>
<tr>
<td>III - 2</td>
<td>Maintain dietary intake and mobility</td>
</tr>
<tr>
<td>IV</td>
<td>Skin assessment whenever there is a change in health status</td>
</tr>
</tbody>
</table>
# Nutrition

<table>
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<tbody>
<tr>
<td>III</td>
<td>Protected meal times</td>
</tr>
<tr>
<td>III – 2</td>
<td>Pay special attention to patients with depression or impaired cognition</td>
</tr>
<tr>
<td>IV</td>
<td>Calculate BMI on admission</td>
</tr>
<tr>
<td>IV</td>
<td>Assess patients for risk of malnutrition</td>
</tr>
<tr>
<td>IV</td>
<td>Encourage sitting out of bed for meals</td>
</tr>
</tbody>
</table>
## Development of urinary incontinence

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Recommendations</th>
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<tbody>
<tr>
<td>I</td>
<td>Prompted voiding</td>
</tr>
<tr>
<td>III – 2</td>
<td>Avoid IDCs where possible</td>
</tr>
<tr>
<td>III - 2</td>
<td>Review indication for IDC daily</td>
</tr>
<tr>
<td>IV</td>
<td>Treat causes such as UTIs, constipation, medications, delirium or lack of access to toilet</td>
</tr>
</tbody>
</table>
# Development of delirium

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>MMSE is a reliable and valid screening device for cognitive impairment</td>
</tr>
<tr>
<td>II</td>
<td>Reduce rate of sedatives used for sleep</td>
</tr>
<tr>
<td>II</td>
<td>Target known risk factors for delirium, e.g. immobility, visual and hearing impairment</td>
</tr>
<tr>
<td>III – 2</td>
<td>Critically review all medications, especially psychoactive drugs</td>
</tr>
</tbody>
</table>
Interventions – who should be involved?

- Special care programme (multidisciplinary team) including exercise:
  - Patients discharged 1 day earlier
  - 6 more patients out of 100 may go home instead of to a nursing home or other care facility (NNT 16)
  - ~ $300 decreased cost per patient hospital stay
Main message – get them up and walking! (if you can)
Overview

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- **Residential In-Reach**
Residential In-Reach

- New program commenced at Latrobe Regional Hospital in February 2014
- For clients from residential care facilities in the Latrobe Valley region
- Provision of acute medical care where safe and appropriate in resi care facilities
- Available 7 days a week, 8am to 4:30pm
Residential In-Reach

- Refer via our mobile 0418-591-454
- To provide timely and appropriate medical care in the best environment (reduces deconditioning and hospital acquired complications)
References

References

- Evidence Based Guidelines – Prevention of functional decline in elderly patients, The Royal Melbourne Hospital, July 2002
- Best practice approaches to minimise functional decline in the older person across the acute, sub-acute and residential aged care settings, Melbourne Health, November 2004
- Best care for older people everywhere toolkit, Department of Health, 2012
Images references

- http://www.szote.u-szeged.hu/radio/mellk1/amelk7c.htm
- http://www.jupitermed.com/body.cfm?id=280
- http://en.wikipedia.org/wiki/Muscle