Neurological conditions and falls
Victoria Goodwin
Research Fellow
PenCLAHRC

Epidemiological data
Risk factors
Interventions
- Stroke
- Parkinson’s disease
- Multiple sclerosis
- Huntington’s disease

Proportion who fall

<table>
<thead>
<tr>
<th>Neurological Condition</th>
<th>Fall (%)</th>
<th>Fractures (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older people</td>
<td>28-35%</td>
<td>5%</td>
</tr>
<tr>
<td>Stroke</td>
<td>40-70%</td>
<td>0.6-8.5%</td>
</tr>
<tr>
<td>PD</td>
<td>63-68%</td>
<td>13-27%</td>
</tr>
<tr>
<td>MS</td>
<td>31-63%</td>
<td>15-23%</td>
</tr>
<tr>
<td>HD</td>
<td>40-80%</td>
<td>?</td>
</tr>
</tbody>
</table>

In-patient falls following stroke
- Usually when transferring
- 4 to 22% fall during acute admission
- 11 to 47% fall during inpatient rehab
- Many people fall immediately post discharge

Balance, mobility and falls in stroke
- Use of balance tests and mobility as predictors of falling is mixed
- Self-reports ↓ balance increases risk
- Most falls occur when walking
  - Walking speed not a risk factor
  - ? Effect of dual or complex tasks
  - ? Effect of gait impairment eg dropped foot
Physiotherapy and stroke

- Green et al 2002
  - N=170 a year post-stroke
  - 3 months community physiotherapy vs usual care
  - No difference in falls

- Marigold et al 2005
  - N=40
  - Balance and agility programme vs weight transference exercises
  - 3x per week, 10 weeks
  - Fewer falls

FLASSH study

- Otago exercise programme
  - 3 physiotherapist visits in a year
  - Home exercise 5 x per week
  - Additional risk factor modification
  - Calcium and Vitamin D
  - Hip protectors

Batchelor et al 2009

Functional electrical stimulation (FES)

- Improves gait
- Not explored with particular reference to falls

Are falls common in PD?

- Prior falls
- Fear of falling
- Freezing
- Mobility and balance impairment
- Reduced power

Risk factors for falls

- ? Postural hypotension
- ? Disease severity
- ? Cognitive impairment
- ? Motor fluctuations
- ? Dyskinesia

Hospital admissions and PD

- Miscellaneous admissions, 117 (16)
  - Stroke, 23 (3.6)
  - Herpes simplex, 2 (0.3)
  - Nonpulmo, 40 (5.9)
  - Gastroenteritis, 17 (2.5)
  - Cardiac, 79 (11.8)
  - Genitourinary infections, 17 (1.1)
  - Syncope, 28 (4.1)
  - Encephalopathy, 41 (6.2)
  - Dementia, 22 (3.3)
  - Prostatectomy, 78 (11.5)
  - Fracture, 85 (12.6)
Exercise to prevent falls in PD

- Physiotherapy led programmes
- Variety of programmes and delivery
- Some evidence that exercise can reduce the rate of falls but not risk

Deep brain stimulation

Weaver et al (2009)
- DBS (Gpi or STN) vs best medical care
- N=255
- Reduced dyskinesia
- Improved motor function and QOL
- Increase in falls

Ferraye et al (2010)
- PPN
- N=6
- Reduced freezing
- Fewer falls

Cueing

Nieuwboer et al (2007)
- Reduced freezing
- Fewer falls

Multiple sclerosis

Falls associated with
- Gait and balance impairment
- Spasticity
- Urinary incontinence
- Fatigue
- Reduced cognition
- Injurious falls
- Fear of falling
- Osteoporosis

Preventing falls in MS

Cattaneo et al 2007
- 3 group RCT
  - Functional balance, gait and sensory training
  - Functional balance training
  - No balance training
- N=44
- Unclear impact on falls
- Improved balance
- No difference in confidence and gait

Medication

- Dopaminergics
  - no beneficial effect on falls
- Anticholinergics
  - Increase falls
- Cholinesterase inhibitors
  - May reduce falls
Huntington's disease

Fallers tend to
- Have worse balance
- Walk more slowly
- Be less confident
- Be less physically active
- Have worse cognition
- Be more aggressive

Can we prevent falls in HD?

- No studies examining interventions to reduce falls
- Physiotherapists consider falls to be a major issue
- Walking aids and gait re-education may be less useful
- Whether balance training may be beneficial

Conclusions

- Research in this area less well established
- Falls are very common
- Risks factors often associated with disease-specific symptoms
- Applying current evidence base to these populations needs further exploration
- Other technologies may be beneficial

Thank you for listening

Victoria.goodwin@pms.ac.uk