Physical Comorbidities of Dementia
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Physical comorbidities of dementia

• Comorbidity: condition or disease that coexists with another disease, and has a probable pathological link to that disease, and occurs more often in that disease
• Emphasis on cognitive & behavioral Sx
• Little knowledge of physical conditions (comorbidities) more common in people with dementia

Physical Comorbidities of Dementia

• Literature review over 3800 articles
• Selected comorbidities for review:
  - falls
  - epilepsy
  - delirium
  - frailty
  - malnutrition
  - gum & dental disease
  - visual impairment
  - sleep disorders
  - Incontinence
• Did not review pain, BPSD
**MRS K**

- 74 year old lady, lives with husband in own home
- 7 year history of Alzheimer’s disease, on donepezil, now significantly cognitively impaired, requiring prompting or assistance with most ADLs
- 4 years ago experienced visual problems with difficulty seeing and negotiating steps, resulting in occasional trips or falls, and often unable to locate knife and fork on table when eating
- 3 years ago began to lose weight despite eating well, and has lost approx 7 Kg

**Mrs K**

- 1 year ago developed urinary incontinence – uses pads, regular toileting by husband
- 8 months ago developed episodes where right leg twitched then gave way leading to falls, followed by short period of confusion
- 2 months ago, had fall resulting in hip fracture with subsequent hemiarthroplasty → high care

**Falls in dementia**

- Annual incidence of falls in cognitively impaired populations is 70-80%, double rest of population
- Fractures are up to 3x commoner in people with dementia
- Hip fracture is 3x commoner and ...
- People with dementia are 3x more likely to die in the first 6 months
Falls in dementia

- Gait abnormalities are more common in people with dementia especially Vascular Dementia (VaD), Dementia with Lewy Bodies (DLB), Parkinson’s Disease Dementia (PDD)
- Psychotropic drug use is more common in people with dementia, leading to falls
- Orthostatic hypotension is more common in dementia particularly DLB and PDD
- Postural instability more common in dementia

Why do people with dementia fall?

- Impaired executive function and motor planning skills
- Unrealistic perception of motor abilities
- Reduced attention span
- Impaired visuospatial skills
- Impulsivity
- Risk taking behaviour

Management of falls risk

- No interventions proven to prevent falls specifically in people with dementia
- Multifactorial interventions in residential care may help – hip protectors, soft surfaces, lighting, shoes
- Restraints are very likely to worsen falls
- No evidence to screen people with dementia for falls risk but sensible to intervene opportunistically to modify risk
**Recommendations**

- Review medications
- Decrease psychotropic meds if appropriate
- Assess and treat orthostatic hypotension
- Treat cataracts
- Simple strength & balance training exercises
- Environmental modifications
- Fall alarms, hip protectors, helmets
- Consider Vitamin D and calcium supplements, and bisphosphonates if low BMD or previous fracture

**Supportive shoes ... avoid scatter rugs**

**Fear of falling and falls**

- **Anxious**: high fear related to depressive symptoms, neurotic personality and decreased executive functioning (p<0.05)
- **Stoics**: low falls risk, protective for falling and mediated by positive outlook on life and maintained physical activity and community participation (p<0.05)
- **Disparities between perceived and actual fall risk**: are primarily associated with psychological measures and strongly influence the probability of falling

Delbaere et al., BMJ; 2010
Mild Cognitive Impairment & falls

- N= 419 - neuropsychological assessment:
  - 80.7% normal cognitive function
  - 14.8% nonamnestic MCI
  - 4.5% amnestic MCI
- Increased risk of falling in MCI (OR=1.68, 95%CI 1.01 to 2.81)
  - independent of physiological fall risk or other covariates


Mild Cognitive Impairment & falls

- Increased risk of falling in Nonamnestic MCI (OR=1.88, 95%CI=1.07-3.32)
  - mainly explained by impaired executive functioning (OR=1.27, 95%CI=1.02-1.59)
- MCI is an independent risk factor for injurious or multiple falls in community dwelling older people
- Relationship between falls and MCI mainly explained by impaired executive functioning


Cerebral white matter lesions & falls

- N= 287 - T1 and FLAIR MRI scans
  - WMLs present in all subjects
  - Mean volume: 8.5 (± 14.2) ml
- Severe WMLs (volumes in 4th quartile) associated with poorer performance in Executive Function and Physiological Fall Risk Assessment (p<0.05)
- Severe WMLs (volume in 4th quartile) associated with greater physical decline over 12 months
  - (OR = 3.02, 95% CI 1.02 – 8.95)
  - independent of executive fn/ other covariates

Zheng et al., Stroke; Neurobiol Aging; 2011
**Cerebral white matter lesions & falls**

- Greater volumes of WMLs (cut-off at median) associated with falls during the 12-month follow-up (OR=1.89, 95% CI 1.07 – 3.36)
- Relationship between falls and WMLs appear to be partially mediated through reduced executive function and sensorimotor performance

Zheng et al., Stroke; Neurobiol Aging; 2011

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**Depression and falls**

![Figure 1. Prevalence of fallers based on the number of risk factors present (GDS ≥5, PPA>0.40, TMTB>105)](Kvelde et al. Arch. Gerontol. Geriatr. (2014), http://dx.doi.org/10.1016/j.archger.2014.09.003)

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**Vitamin D and dementia**

- Vit D deficient older adults have increased risk of dementia
- 1,658 65 yo+ in US Cardiovascular Health Study without dementia followed for ≈ 6y ¹
- 171  →  dementia; (including 102 with AD)
- Those with low vitamin D levels (<50nmol/L) almost 2x as likely to develop dementia & AD
- Assoc³ betw. Vit D level & cognition, AD risk²,³

¹TJ Littlejohns Neurology, 2014
Vitamin D & falls (N = 463)

• 30% prevalence of vitamin D insufficiency (serum 25OHD ≤ 50nmol/L)
• Small association with cognitive function
  – executive function, visual-spatial domain, processing time
• Strongly related with poorer neuromuscular function and balance

Menant et al., Osteoporos Int; 2011

Vitamin D & falls (N = 463)

• Increased risk of injurious and multiple falls for men with vitamin D insufficiency (RR=1.63, 95% CI=1.10–2.40)
• Vitamin D insufficiency associated with impairments in physiological and cognitive functions that predispose older people to fall

Menant et al., Osteoporos Int; 2011

Vitamin D

• Vit D receptors in brain, including hippocampus
• Vit D regulates neurotrophin expression and enhances the survival of brain cells
• Vit D can stimulate brain cells that may play a role in clearing amyloid beta plaques.
• > 50% of Australians and ≤ 95% of people in residential aged care are Vit D deficient
• No evidence that taking Vit D improves cognition or reduces risk

11/17/2014
Vitamin D

- Synthesise vitamin D in skin
- Convert to 25-OH D in liver
- Convert to 1,25-di-OH D in kidney

- Daily intake – 1,000iu/day
- Aim for Vit D level >50nmol/L
- Consider liquid form especially if very low vitamin D levels

Nutritional performance
- Nervous tissue
- Cardiac benefits
- Protective against malignancy
- Bone health
- Muscle function
- Prevents falls

Epilepsy

- Seizure incidence slightly higher in patients with VaD vs AD
- Both generalised and partial seizures seen – partial more common in early AD, generalised more common later in AD
- Case reports:
  - amnestic wandering
  - “transient epileptic amnesia”
  - unexplained falls, and symptoms subsided with anti-epileptic treatment

Epilepsy

- 5 - 10% of people have a seizure during course of dementia
- 6x increase in dementia vs normal older population
  - 87x for 50-59 yo; 3x for 85 yo+
- Down Syndrome:
  - DS with AD – 50% had seizures
  - DS with no AD – 11% seizures
Recommendations

• Be aware
  – seizures > common in pts. with dementia
  – seizures may be atypical
• EEG may not be conclusive
• ChEI may increase chance of seizures (but no trial evidence for this)
• Consider treatment with anticonvulsants:
  – valproate, carbamazepine

Malnutrition and weight loss

• Described by Alzheimer in patient JF
• AD patients likely to lose on average >5kg during course of disease
• Appears to be dysregulation of energy balance with most patients likely to lose up to 10% of body weight
  (some gain up to 5% of body wt)
• People w. VaD & FTD also lose weight

Malnutrition and weight loss

• In several cohort studies (> 25 years follow up)
  – significant association between weight loss and subsequent development of AD
  – ? relationship to causative pathology with link between medial temporal cortex atrophy and decreased BMI
• Dementia increases risk of malnutrition in Finnish NH study
  – OR 2.1 (1.45 – 2.93) for malnutrition in patients with vs patients without dementia
**Recommendations**

- Identify dementia patients at risk of weight loss and protein energy malnutrition, and treat to prevent:
  - Loss of muscle mass and strength
  - Pressure ulcers
  - Loss of immunity and increased infection rate

**Recommendations**

- Intervene where weight loss of >5% in preceding 3-6 months
- Education of family and professional carers in nutrition is effective
- Enteral feeding in late stage dementia is unlikely to be effective
- Dietary strategies ...

**Dietary strategies**

- Oral supplements 2 hours before meal
- Finger foods
- Favourite foods
- Homelike environment (eg table cloths)
- Contrast colours of plate and food
- Make meal times pleasurable eg music
- Regular exercise
- Prevent dehydration
Frailty

- Rockwood (2003): multidimensional syndrome of loss of reserves (physical ability, cognition, health) which leads to increased vulnerability
- Fried (2001): weight loss, low grip strength, self-reported exhaustion, slow walking speed, low physical activity
  - Weight loss, low activity, slow gait are all risk factors for dementia
- Cognitive impairment contributes to physical frailty

Frailty and Dementia

- Decreases in strength and walking speed ("frailty") antedate AD onset by many years
- In cohort study of 800+ older people, more AD cases developed in frail compared to non-frail over several years (Rush Aging and Memory Project)
- Low grip strength is associated with cognitive impairment in many cohort studies

Frailty and dementia

- Frailty and dementia may share common underlying mechanisms:
  - Cardiovascular and cerebrovascular disease risk factors for both frailty and AD
  - Raised levels of pro-inflammatory cytokines eg interleukins, CRP, TNF-α common to both, indicating possible state of low-grade chronic inflammation
  - Mitochondrial malfunction
  - Oxidative stress
Recommendations

• Exercise:
  – Increases hippocampal size
  – Slows cognitive decline
  – Resistance/strength training (lowers interleukins and TNF-α)
• Address nutrition requirements
• Address psychological factors

Delirium

• Dementia is the strongest risk factor for delirium
  – Presence of dementia ↑ risk of delirium x 5
  – 2/3 of cases of delirium occur in dementia
• Many cases unrecognised...
• Dementia blamed for symptoms
  ≈ 50-80% of NSW Hospital pts
(Close J, 2012)

Delirium

• Lower cognitive reserve (lower education level) predicts higher risk of delirium
• More severe dementia predicts greater severity of delirium
• Multiple causes:
  – Acute medical illness and infection
  – Medications and alcohol
  – Discomfort and pain (eg urinary retention)
  – Hypoxia
  – Post operative
Delirium

- Both delirium and dementia associated with:
  - decreased cerebral metabolism,
  - cholinergic deficits
  - inflammation (causing oxidative stress)
- Delirium is associated with:
  - low ACh levels
  - excess dopamine levels
  - dysfunction in other neurotransmitters
  - low IGF-1

Recommendations

- Expect delirium in unwell and hospitalised older patients with dementia
- Assess regularly e.g. with CAM (Confusion Assessment Method)
- Treat underlying cause
- Keep mobile, well hydrated, orientated
  - Lighting, external cues, personal mementos

Recommendations

- Systematic process for identifying patients with dementia or delirium
- Staff training
- Minimise bed moves
- Appropriate ward accommodation
- Minimal use of antipsychotic medication
- Educate staff and family
- Avoid anticholinergic medications
- Do not use physical restraints
Oral Disease

Without protection of salivary enzymes and basic dental care teeth will rot away rapidly

Slide courtesy of Peter Foltyn

Oral disease

Poor oral health more common in people with dementia

- Increased plaque accumulation and caries
- Fewer natural teeth
- Dry mouth (xerostomia)
- Use dentures less often

- Occurs before diagnosis of dementia
- Chronic inflammation suggested as link between poor cognition and poor dentition
Why poor oral health?

- Deterioration in ability to self care
- Inability to follow instructions
- Decreased motivation and executive function
- Increasing dyspraxia and agnosia
- Decreased ability to adapt to changes such as dental plates or new dentures
- Combative behaviour during personal care
- Sucking reflexes and involuntary tongue movements in late stage dementia makes mouth care very difficult to deliver

Recommendations

- Integrate oral health care into care plan:
  - Twice daily brushing
  - Chlorhexidine containing mouth wash
- Dental review early in disease process with focus on retention of natural teeth
- Use adequate sedation for dental work in later stages of dementia
- Review medications, esp. antipsychotics, anticonvulsants, anticholinergics

Visual dysfunction

- Changes in visual acuity & contrast sensitivity, and visual field defects (with normal neuroimaging) may be early symptoms of AD and VaD
- Problems w colour vision & spatial localisation
- Blurred vision, reading, writing, depth perception, driving, locating familiar objects, identifying people or objects, visual agnosia
- Occurrence of visual hallucinations may be linked with impaired visual acuity

### Visual dysfunction

- Blue Mountains Eye Study – significant association between impaired visual acuity and cognitive impairment (MMSE<24)
- Age related macular degeneration is associated with cognitive impairment
- Possible increased incidence of glaucoma in people with dementia
- Retinal changes in AD:
  - Decrease in retinal nerve fibres
  - Vascular changes

### Recommendations

- Be aware of possibility of visual problems
- Educate families about visual agnosia
- Early optometry/ophthalmology review for refractive errors, intraocular pressures, cataracts
- Encourage people with moderate to severe dementia to use their spectacles
Sleep dysfunction
- Age related changes in sleep in most older people
  - Circadian rhythm disrupted in AD with delays and fragmentation of the sleep-wake cycle
  - Appears to be due to decreased cell numbers in suprachiasmatic nuclei (the “body clock” which controls circadian rhythm) and presence of tangles
  - Loss of cholinergic neurones can lead to decrease in REM sleep especially in LBD

Sleep dysfunction
- Increased night time wakenings and daytime sleeps
- Break down of sleep architecture
- ≤50% of people with dementia or their carers report sleep disturbances
- Severity of disturbance increases with severity of dementia
- Sleep apnoea > common in people w. dementia

Lewy Body Dementia and Sleep
- REM sleep behavior disorder where people act out their dreams may be early symptom of PD and LBD
- Sleep disorder may precede LBD by years
- In most people, the brain turns off muscle activity during our REM sleep
- In REM sleep behaviour disorder, the brain part that “paralyses” people during REM sleep is damaged, allowing them to move about
- They may act out often violent dreams in which they are attacked or pursued – punching or kicking
Recommendations

- Exercise during day
- Adequate exposure to bright light during day
- Avoid/limit daytime napping
- Sleep hygiene measures
- Use sedatives with caution
- Possible use of melatonin (Circadin) to reset circadian rhythm and Bright Light Therapy

Urinary Incontinence in dementia

- Loss of cognitive ability to interpret the sensation of a full bladder
- Loss of motivation to inhibit passage of urine
- Inability to plan how to self-toilet
- Inability to find toilet or to reach toilet in time
- Dressing dyspraxia
- Visuospatial problems

Urinary Incontinence

- Occurs earlier in vascular dementia, LBD and FTD than in AD
- Possible causes for urinary incontinence, DRIP, DRIP ….
  - D: delirium, drugs
  - R: retention, reduced mobility
  - I: infection, impaction
  - P: polypharmacy, polyuria
**Recommendations**

- Assess and treat reversible causes
- Prompted voiding 2 to 3 hourly
- Pelvic floor exercises
- Absorbent pads
- Beware anticholinergic medications
- Use catheterisation rarely

**Conclusion**

- In clinical practice many conditions associated with dementia are unrecognised
- It is important that these are identified and managed appropriately to improve the care of people with dementia and to improve their quality of life

[www.cambridge.org/9781107648265](http://www.cambridge.org/9781107648265)

[www.dementiaresearch.org.au](http://www.dementiaresearch.org.au)