Dementia: An Overview
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Objectives

- Provide a road map for dental professional on diagnosis of cognitive change in older adults
- Provide a roadmap for the treatment of cognitive and behavioral symptoms
- Discuss the role of dentistry in maintaining quality of life, in addition to identifying and treating dental problems

Mild Dementia

Mr. Duke age 78 has been your patient for many years. Today he comes for a routine appointment but he is late and mentions something about getting lost on his way. He knows there have been some changes to his routine meds for BP but he cannot tell you specifics. You also notice more plaque than usual on his teeth. What should you do?
Cognitive Changes with Aging

Age Associated Memory Impairment
- Working memory, speed of processing, Memory, Visual-spatial Ability
- Declining performance and increasing variability

Mild Cognitive Impairment (MCI)

Dementia

Early Warning Signs

- **Learning and retaining new information.** Is more repetitive; has trouble remembering recent conversations, events, appointments; frequently misplaces objects.
- **Handling complex tasks.** Has trouble following a complex train of thought or performing tasks that require many steps, such as balancing a checkbook or cooking a meal.
- **Reasoning ability.** Is unable to respond with a reasonable plan to problems at work or home, such as knowing what to do if the bathroom is flooded; shows uncharacteristic disregard for rules of social conduct.
- **Sense of direction.** Has trouble driving, organizing objects around the house, finding his or her way around familiar places.
- **Language.** Has increasing difficulty with finding the words to express what he or she wants to say and with following conversations.
- **Behavior.** Appears more passive and less responsive, is more irritable than usual, is more suspicious than usual, misinterprets visual or auditory stimuli.

Definition

- Dementia is a syndrome of deterioration in cognitive functions in the setting of a clear consciousness accompanied by functional impairment.
Epidemiology of Dementia

- Prevalence of 5% over age 65
- Incidence & Prevalence increase with age
  - prevalence age 65 <2%
  - prevalence age 85 >30%
- Problems in ascertainment

DSM IV Diagnostic Criteria

- Memory impairment
- At least one of the following:
  - aphasia (language disturbance)
  - apraxia (difficulties with motor activity)
  - agnosia (recognize or identify objects)
  - executive functioning (planning, organizing, sequencing, abstracting)
- Above disturbances interfere with normal functioning
- Not occurring exclusively during delirium
- Either:
  - organic etiologic factors identified
  - nonorganic mental disorder (e.g., Major depression) not present

DSM IV Criteria for Alzheimer's Disease

- Criteria for Dementia
- Gradual onset & continuing decline
- Cognitive deficits are not due to other causes of dementia
- Not exclusively during the course of a delirium
- Not accounted for by Axis I Diagnosis
Alzheimer’s Disease Pathophysiology

- plaques and tangles
- genetic component
  - familial (Chromosome 1, 14, 21)
  - sporadic (Chromosome 19/APO-E)
- Amyloid hypothesis
- Risk Factors - age, family history

Relative Proportions of Dementia Diagnoses

Relative proportions of dementia diagnoses:
- Alzheimer Disease: 35%
- Vascular Dementia: 10%
- Dementia with Lewy Bodies: 15%
- Mixed VaD-AD: 15%
- Frontal Temporal Lobe Dementia: 5%
- Infectious: 3%
- Toxic-metabolic: 4%
- Psychiatric: 4%
- NPH: 2%
- Other: 1%

Etiology of Dementia

- Parenchymal disorders
  - Alzheimer's disease
  - Pick's disease
  - Huntington's disease
  - Parkinson's disease/Dementia with Lewy Bodies
  - Progressive supranuclear palsy
  - MS
  - Epilepsy
- Vascular disorders
  - Multi-infarct dementia
  -Binswanger's disease
- Trauma
  - head injuries
  - subdural hematoma
- Brain tumors
- Normal pressure hydrocephalus

Etiology of Dementia cont.

- Infections
  - Creutzfeld-Jacob
  - Syphilis
  - AIDS
  - Cryptococcal meningitis
  - chronic meningitis
  - brain abscess
- Toxins/Drugs
  - alcohol
  - sedatives
- Metabolic
  - hypothyroidism
  - hypoglycemia
  - chronic liver failure
  - chronic renal failure
  - hypoxia/anoxia
- Deficiencies
  - Thiamine
  - Vitamin B12
  - Pellagra
- Reversible Causes of Apparent Dementia and Contributors/Aggravators of Existing Dementia
- D - Drugs
- E - Emotional illness (depression)
- M - Metabolic/endocrine disorder
- E - Eye/ear/environment
- N - Nutritional/neurologic
- T - Tumors/trauma
- I - Infection
- A - Alcohol/anemia/atherosclerosis
- Features of Vascular Dementia
  - More abrupt onset, stepwise deterioration
  - Transient or persistent neurologic deficits
  - Other risk factors for atherosclerosis
  - Other vascular disease (MI, PVD)
  - Dysarthria, dysphagia, seizures
  - Emotional lability, disinhibited, depression
  - Abnormal gait
Subcortical Dementia

- Parkinson's disease, PSP, Huntington's, Binswanger's disease
- poor recall but intact recognition
- executive dysfunction
- cognitive slowing
- minimal aphasia
- severe depression

Dementia with Lewy Bodies

- Core Features
  - fluctuations
  - visual hallucinations
  - motor parkinsonism
- Supportive Features
  - repeated falls
  - neuroleptic sensitivity
  - systematized delusions and hallucinations

Frontotemporal Dementias

- Prominent personality change and behavior alterations
- impulsive/disinhibited or apathetic
- language disorders with reduced output
- social neglect and impaired hygiene
- memory and orientation are preserved early on
Diagnostic Evaluation

- history and physical examination
- cognitive testing
  - brief cognitive screening tests
  - neuropsychological battery
- complete blood cell count, electrolytes, metabolic screen, thyroid function, B12, and depending on history syphilis, HIV, urinalysis, electrocardiogram, chest roentgenogram
- Neuroimaging

Symptoms & Behaviors

- diminished driving skills
- unadaptability
- personality change
- disinhibition
- delusions, allusions, & hallucinations
- wandering & falling
- aggressive reactions
- demanding & repetitive behavior
- emotional lability & depression
- diminished self-care skills
- insomnia & sundowning

Dementia Severity

- Functional Impairment: IADLs, ADLS
- Clinical Dementia Rating (CDR)
- Behavioral symptoms
- Level of Care
Mrs. N brings her husband to your office. She thinks he has a toothache. He has had dementia for four years. She never leaves him alone. Sometimes he resists her care and she is having trouble getting him to brush his teeth or allow her to do it.

Moderate Dementia

- Discontinue and avoid drugs which may effect cognition (sedatives, alcohol)
- Identify and modify risk factors (hypertension, DM)
- Specific treatment of reversible causes of dementia (antidepressants, B12)
- Drug treatment for Alzheimer’s disease
  - donepezil (Aricept)
  - rivastigmine (Exelon)
  - galantamine (Razadyne)
  - Memantine (Namenda)

Treatment for Cognitive Dysfunction

http://careinaging.duke.edu/clinicians
Clinician’s Interview-Based Impression of Change (CIBIC)


<table>
<thead>
<tr>
<th>Outcome</th>
<th>Donepezil</th>
<th>Placebo</th>
<th>Risk difference</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIBIC improved or no change at 24 weeks</td>
<td>63%</td>
<td>42%</td>
<td>21%</td>
<td>5</td>
</tr>
</tbody>
</table>


**Donepezil – Harms**

<table>
<thead>
<tr>
<th>Adverse Events (%)</th>
<th>Withdrawal Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>0 – 5</td>
</tr>
<tr>
<td>Donepezil</td>
<td>7 – 15</td>
</tr>
</tbody>
</table>

Adverse events – anorexia, diarrhea, nausea, vomiting, dizziness, abnormal dreams, muscle cramps

http://careinaging.duke.edu/clinicia
Treatment for Behavioral and Psychological Symptoms (BPSD)

- Medications
  - Antipsychotics: haloperidol, risperidone, quetiapine, olanzapine
  - Cholinesterase inhibitors: donepezil
  - Benzodiazepines
  - Carbamazepine (Tegretol), valproic acid

Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE)

Schneider et al. NEJM 2006;355:1525-38.

CATIE-AD

- 421 AD patients with psychosis or agitation
- Randomized to olanzapine (Zyprexa), quetiapine (Seroquel), risperidone (Risperdal), or placebo
- Primary outcome: Time until discontinuation
- Secondary outcome: Minimal or greater improvement on CGIC

http://caringinge.duke.edu/clinician
Effectiveness of Atypical Antipsychotics

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Olanzapine (N=99)</th>
<th>Quetiapine (N=94)</th>
<th>Risperidone (N=84)</th>
<th>Placebo (N=139)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discontinuation (wks)</td>
<td>8.1</td>
<td>5.3</td>
<td>7.4</td>
<td>8.0</td>
</tr>
<tr>
<td>D/C due to lack of efficacy</td>
<td>39 %</td>
<td>53 %</td>
<td>44 %</td>
<td>70 %</td>
</tr>
<tr>
<td></td>
<td>22.1 wks</td>
<td>9.1 wks</td>
<td>26.7 wks</td>
<td>9.0 wks</td>
</tr>
<tr>
<td>D/C due to adverse effect (%)</td>
<td>24 %</td>
<td>16 %</td>
<td>18 %</td>
<td>5 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement on CGIC (%)</td>
<td>32 %</td>
<td>26 %</td>
<td>29 %</td>
<td>21 %</td>
</tr>
</tbody>
</table>

CATIE-AD

- Olanzapine, and perhaps Risperidone, more efficacious than Quetiapine
- All therapies short-lived
- All 3 drugs cause adverse effects

Atypical Antipsychotics: Adverse Events

- Somnolence
- Abnormal gait
- Extrapyramidal symptoms
- Peripheral edema
- Metabolic (weight gain, dyslipidemia, DM)
- Cerebrovascular events

<table>
<thead>
<tr>
<th>Rate over placebo</th>
<th>NNH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risperidone</td>
<td>2.5</td>
</tr>
<tr>
<td>Olanzapine</td>
<td>~3</td>
</tr>
</tbody>
</table>

Schneider et al. NEJM 2006;355:1525-38.
Atypical Antipsychotics: Increased Mortality

- 17 pooled trials, 5106 patients
  - 1.6 – 1.7X
  - Heart-related or infectious (pneumonia)
- Meta-analysis of 15 trials, 5110 patients
  - OR 1.54 (1.06-2.23)
  - AR difference .012, NNH 80 (53 – 1000)

Summary of Evidence

- Evidence for efficacy in the short term exists for:
  - Antipsychotics
  - Pain Management
  - Cholinesterase Inhibitors
  - Citalopram
  - Carbamazepine
  - Trazodone (FTD)
  - Propranolol
  - Prazosin
- All drug treatments are off label, No FDA approved treatments

Non-Pharmacologic

- “Individualized”
- Based on
  - Cognitive level
  - Physical functioning
  - Long standing personality, interests/abilities
  - Preferred routines and schedules
  - Personal/family/facility resources
Non-Pharmacologic

- Individualized or Classical Music
- Aromatherapy (lavender oil, lemon balm)
- Massage and Touch
- Pet therapy

Non-Pharmacologic

- Snoezelen/Multisensory Therapy
- Physical Exercise
- Tapes of family

Non-Pharmacologic

- Light therapy

- Bathing Without a Battle
  - http://www.bathingwithoutabattle.unc.edu/
Mrs. G is an 85yo nursing home resident. She does not speak. She no longer walks. She is pleasant but becomes anxious on occasion when unfamiliar caregivers approach her. She cannot follow simple commands reliably like ‘open your mouth’. Her family has signed her up for a visit with the dentist.

### Severe Dementia

#### Weight Change > 5%

![Graph showing weight change categories for different groups: AD men, AD women, Control men, Control women.]

#### Weight Change > 10%

![Graph showing weight change categories for different groups: AD men, AD women, Control men, Control women.]

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### The Estimated Rate of Weight Change in AD Cases Compared to Controls

<table>
<thead>
<tr>
<th></th>
<th>AD Cases</th>
<th>Controls</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(n=1094)</em></td>
<td><em>(n=451)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Entry Weight</td>
<td>147</td>
<td>159</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Estimated Weight Change/year (lbs.)</td>
<td>-0.7</td>
<td>-0.1</td>
<td>&lt;0.02</td>
</tr>
</tbody>
</table>

*Controlling for age, sex, education, and marital status

### Weight Change Measurements

- **Percent weight change/year**
- **Maximum percent weight loss over one year**
- **Standard deviation of measurements/subject**

### A Cox Proportional Hazard model of the impact of weight change and other selected covariates on the risk of death in Alzheimer's Disease *(n=633).*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coefficient</th>
<th>Standard Error</th>
<th>P value</th>
<th>Relative Risk</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight gain ≥5%*</td>
<td>-0.605</td>
<td>0.213</td>
<td>0.004</td>
<td>0.55</td>
<td>0.380, 0.829</td>
</tr>
<tr>
<td>Weight loss ≥5%*</td>
<td>0.409</td>
<td>0.163</td>
<td>0.012</td>
<td>1.51</td>
<td>1.094, 2.072</td>
</tr>
<tr>
<td>Stage in the year prior to death</td>
<td>0.632</td>
<td>0.096</td>
<td>0.001</td>
<td>1.88</td>
<td>1.559, 2.271</td>
</tr>
<tr>
<td>Weight at entry</td>
<td>-0.002</td>
<td>0.003</td>
<td>0.199</td>
<td>0.99</td>
<td>0.992, 1.004</td>
</tr>
<tr>
<td>Age at entry</td>
<td>0.053</td>
<td>0.011</td>
<td>0.0001</td>
<td>1.05</td>
<td>1.032, 1.077</td>
</tr>
<tr>
<td>Education</td>
<td>0.006</td>
<td>0.002</td>
<td>0.778</td>
<td>1.01</td>
<td>.964, 1.050</td>
</tr>
<tr>
<td>Race (white vs non-white)</td>
<td>-0.370</td>
<td>0.364</td>
<td>0.31</td>
<td>0.69</td>
<td>0.338, 1.410</td>
</tr>
<tr>
<td>Marital status (married vs not married)</td>
<td>-0.030</td>
<td>0.203</td>
<td>0.881</td>
<td>0.97</td>
<td>0.652, 1.445</td>
</tr>
</tbody>
</table>

*5% weight gain or loss in any year prior to death or censorship
Summary of Weight Changes

- Clinically important weight loss occurs
- Natural history
  - Acute changes
  - Increased variability
- Risk increases with severity of AD
- Weight loss increases mortality in AD

Contributors to Weight Loss

- Feeding dependence
- Dysphagia
- Depression
- Dementia with behavioral disturbance
- Therapeutic diets
- Pressure ulcers
- Social situation
- Psychotropic drug reduction
- Tooth and gum disease
Weight Loss Prevention

- Avoid therapeutic diets
- Improve the social aspects of eating
- Dental care
- Physical activity

Treatment of Weight Loss

- Throw out all the rules
- Frequent small meals
- Finger foods
- Liquid oral supplements
- Appetite stimulants
- Feeding tubes

Feeding Tubes

- Indications
  - Acute rehabilitation
- Complications
  - Tube placement
  - Electrolyte imbalance
  - Hyperglycemia
  - Diarrhea
  - Dislodged
Explaining Alzheimer’s to the Family

- Give the diagnosis
- Discuss significance of family history
- Educate: books, Alzheimer’s Association
- Support: Alzheimer’s Association, caregiver groups, Area Agencies on Aging, Councils on Aging
- Find help: daycare, respite, nursing home
- Emphasize caregiver health maintenance
- Emphasize preserved skills, not all features intensify with time

Anticipatory Planning

- Anticipate home care & placement needs
- Guardianship, healthcare power of attorney
- Caregiver burden
- Setting realistic goals of care
- Advance directives

Summary

- Diagnosis of dementia remains clinical
- Treatment remains rudimentary and dependent on identifying and avoiding exacerbating factors
- Dentistry and good oral care remains crucial to the health and wellbeing of older adults with dementia