Age-related Cognitive Dysfunction: A Natural Approach

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Note

- The term “age-related cognitive dysfunction” can refer to a number of disorders from the relatively common age-related memory impairment, to progressive dementias such as Alzheimer’s disease.
- This presentation will focus on the dementias
Learning Objectives

• Discuss the types, prevalence & etiology of dementias
• Explain the impact of dementia care on family
• Describe the nutritional guidelines for older adults
• Evaluate dietary supplements with benefits for dementia
• Create natural protocols for individual types of dementia
<table>
<thead>
<tr>
<th>Type</th>
<th>Cause</th>
<th>Conventional Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia of Alzheimer type (DAT)</td>
<td>Plaques, tangles, transmitter defects, abnormal amyloid</td>
<td>Anticholinesterases, nerve growth Factor</td>
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<tr>
<td></td>
<td>deposition</td>
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<tr>
<td>Vascular dementia</td>
<td>Multiple infarcts, stroke, small vessel disease</td>
<td>Aspirin, lower blood pressure, lower cholesterol</td>
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<tr>
<td>Lewy body dementia</td>
<td>Lewy bodies, transmitter defects</td>
<td>Anticholinesterases</td>
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<tr>
<td>Parkinson's disease</td>
<td>Lewy bodies especially in basal Ganglia</td>
<td>Antiparkinsonian drugs do not help Dementia</td>
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<td>Frontal lobe dementia</td>
<td>Various, including Pick's</td>
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<tr>
<td>Normal pressure hydrocephalus</td>
<td>Obstructed cerebrospinal fluid flow due to previous damage,</td>
<td>Surgery (shunt)</td>
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<td>e.g. subarachnoid hemorrhage, meningitis</td>
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<tr>
<td>Punch-drunk syndrome</td>
<td>Repeated head injury</td>
<td>Stop the damage</td>
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<tr>
<td>Slow-growing brain tumor</td>
<td>Pressure causes destruction of brain</td>
<td>Surgery</td>
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<tr>
<td>Aluminum and other metals</td>
<td>Direct toxic effect</td>
<td>Remove the poison</td>
</tr>
<tr>
<td>Wilson's disease</td>
<td>Toxicity of copper</td>
<td>Penicillamine</td>
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<tr>
<td>Alcohol abuse</td>
<td>Toxic effect and thiamine deficiency</td>
<td>Abstinence, thiamine treatment</td>
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<tr>
<td>Huntington's chorea</td>
<td>Genetic abnormality</td>
<td>Screening available</td>
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<tr>
<td>Syphilis (GPI)</td>
<td>Infective</td>
<td>Antibiotics</td>
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<tr>
<td>AIDS</td>
<td>Infective, secondary infection</td>
<td>Anti-AIDS drugs</td>
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<tr>
<td>Vitamin (e.g. B12) deficiencies</td>
<td>Toxic?</td>
<td>Replacement</td>
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<tr>
<td>Hypothyroidism</td>
<td>Toxic?</td>
<td>Replacement</td>
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<tr>
<td>Parathyroid disorders</td>
<td>Calcium metabolism altered</td>
<td>Medical or Surgical</td>
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</tbody>
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TABLE 1 – DEMENTIA: TYPE, CAUSES & TREATMENTS

Types of Dementia

- Most prevalent types include:
  - Alzheimer’s disease
  - Vascular dementia
  - Parkinson’s disease
Alzheimer’s Disease

- Dementia of the Alzheimer’s type (DAT) is the correct name
- Most common dementia
  - Affecting 50-60% of geriatric patients who have dementia
  - Over the age of 65, one person in 10 can be expected to be afflicted
  - Ratio increases to 4 in 10 in those over 85
Alzheimer’s Disease – Cont’d

• Progressive brain disorder
  – Gradually destroys memory and ability to learn, reason, make judgments, communicate and carry out daily activities
  – Individuals may also experience changes in personality and behavior (e.g., anxiety, suspiciousness or agitation, delusions or hallucinations)
  – Areas of the brain controlling memory and thinking skills affected first (cells in other regions of the brain die later)

• Eventually, complete care is needed
• Even if no other serious illness, loss of brain function itself will cause death
Etiology of DAT

- Cerebral hemispheres shrink and lose weight; an indication of cell death.
- Neurofibrillary tangles and neuritic plaques appear to contribute to this problem.
- Some evidence of a genetic predisposition to DAT.
Alzheimer’s Disease – Cont’d

– Some evidence that aluminum involved in the genesis of DAT.
  • Higher incidence in patients receiving renal dialysis
    – Due to concentration of aluminum in the water
  • Rabbits fed aluminum found to develop tangles similar to those found in patients with DAT
  • High concentration of aluminum thought to be found in the plaques of DAT patients
  • No increased incidence of DAT in areas with high aluminum in the water

– Concentration of free radicals implicated in the development of DAT.
Vascular Dementia

- Vascular dementia (VaD) accounts for 20-30% of all dementias
- Primarily a disease of the arteries
  - Patients typically show vascular disease in other areas of the body (e.g., heart disease, poor circulation to the legs, high blood pressure)
  - Different types of VaD. Most common is multi-infarction dementia (MID)
Vascular Dementia – Cont’d

• **Etiology**
  - Basically MID caused by atherosclerotic blood vessels to the brain
  - Periods of decreased blood flow, resulting in repeated ministrokes in brain
  - Ministrokes cause areas of cell death called infarcts.
  - If the ministrokes continue, symptoms similar to DAT appear
Vascular Dementia – Cont’d

– The causes and risk factors for VaD generally same for vascular disease in general:
  • high levels of serum cholesterol and triglycerides
  • high levels of homocysteine and C-reactive protein
  • smoking, etc.

– People with VaD seem to have exposure to higher levels of fibrinogen (clotting factor) over a long period of time
Parkinson’s disease

• Best known due to celebrities with PD
• 1.5 million Americans with PD, 60,000 newly diagnosed cases each year
  – Usually develops after the age of 65, though 15% of those diagnosed are under 50.
• About 20% of patients develop DAT, so PD is considered to be a type of dementia
Parkinson’s disease

- **Etiology**
  - Neurons in part of the brain (substantia nigra) die or become impaired (cause unknown).
  - These cells produce the dopamine.
    - Dopamine allows smooth, coordinated function of the body’s muscles and movement.
    - When approximately 80% of the dopamine-producing cells are damaged, PD symptoms appear.
Parkinson’s disease – Cont’d

– PD symptoms: tremor (shaking), slowness of movement, rigidity (stiffness), and difficulty with balance; may also include small, cramped handwriting, stiff facial expression, shuffling walk, muffled speech and depression

– In PD, dopamine unable to cross the blood-brain barrier
  - L-dopa, however, is a precursor to dopamine, and can help reduce muscle rigidity and tremors, and improve posture and speech
Family & Dementia Care

- Families bear the major responsibility as caretakers for dementia patients.
- How families react and cope with dementia sufferer plays a significant role in outcomes...both for the sufferer and the caregivers.
- Family reactions to dementia:
  - the dying relationship
  - the changing relationship
  - the continuing relationship.
Family & Dementia Care – Cont’d

• The dying relationship
  – Due to the decline in personality, self-care and intellect, dementia has been described as living death.
  – Family members often experience feelings of loss and go through the phases of grief related to death.
Family & Dementia Care – Cont’d

– Caregivers may experience depression
– In one study about 35% of caregivers were classified as depressed
  • Scores positively correlated with frequency of using coping strategies to manage distress as well as frequency of the patients' disruptive behavior
  • Scores correlated negatively with the educational years of the caregivers
• The changing relationship
  – Relationship between family and sufferer tends to change as family comes to terms with the sufferer’s decline
  – Change primarily characterized by the sufferer’s shift to dependence upon the family, or family member
  – Caregivers tend to judge their own health to be poorer than that of controls
  • Caregiving in dementia appears to be at least as stressful as that in chronic physical illness and depression.
Family & Dementia Care – Cont’d

• The continuing relationship
  – Providing care is a heavy task, often associated with varying degrees of difficulty, stress and burden
  – The continuing relationship will likely require some outside help
    • Should be introduced gradually and sensitively
  – Research shows a positive outcome from the continuing relationship may be raising a child with a greater sense of empathy and caring
Family & Dementia Care – Cont’d

• Carer support agencies
  – Family Caregiver Alliance
  – National Family Caregiver Support Program
  – The Alzheimer's Association
  – The National Family Caregivers Association
  – The National Respite Locator Service
Dietary & Nutritional Guidelines

- Energy requirements (i.e., kcal)
  - Decrease in energy is appropriate since basal energy requirements decrease with advancing age
  - For elderly:
    - Low stress: 20 kcal/kg/day
    - Moderate stress: 25–30 kcal/kg/day
    - Severe stress: 35 kcal/kg/day

- Carbohydrate requirements
  - Should comprise about 55% to 60% of total energy intake with whole grain and complex carbohydrate rich in fibers foods being emphasized
Dietary/Nutritional Guidelines – Cont’d

• Protein requirements
  – 1 g/kg/day (and further increased to 1.2 to 1.5 g/kg/day in periods of stress to offset a negative nitrogen balance).

• Fat requirements
  – 30% or less of fat, with 10% polyunsaturated fatty acids, 10% to 15% monounsaturated fat, and less than 10% saturated fat

• Fluid requirements (3 guidelines):
  – 30 mL/kg body weight
  – 1 mL/kcal/energy consumed
  – 100 mL/kg, 50 mL/kg for the next 10 kg, and 25 mL/kg for the remaining kg
Dietary/Nutritional Guidelines – Cont’d

• Micronutrient requirements
  – 50% of older adults fail to meet RDIs for vitamins & minerals
    • 10%-30% have subnormal levels
  – All elderly should use a multiple vitamin supplement (at least)
    • More on this later
Modified Food Pyramid

- Highlights specific selections within each food group category in order to emphasize foods with a high ratio of nutrients to energy to help ensure adequate nutrient intakes.
- Narrowed to reflect lowered energy needs.
- Includes a small supplement flag at the top and symbols for water and fiber.
Individual Dietary Supplements

- Ginkgo biloba extract
  - Improves cerebral & peripheral circulation
  - Vast amount of research treating dementias and other cognitive functions
  - 8 randomized, db, pc studies on Gbe showed modest effects on improving the symptoms of dementia and cerebral insufficiency.
  - Improvement equivalent to therapy with ergoloid mesylates (Hydergine)
Dietary Supplements – Cont’d

- Ginkgo biloba extract (cont’d)
  - A meta-analysis showed significant benefit of Gbe on objective measures of cognitive function in patients with Alzheimer’s disease
    - Comparable with the benefits of donepezil (Aricept)
  - In studies lasting at least 6 months, Gbe was equally effective in mild to moderate Alzheimer’s dementia in comparison to second-generation cholinesterase inhibitors
  - In 309 patients with mild to moderately severe forms of Alzheimer’s or multi-infarct dementia, Gbe was capable of stabilizing cognitive performance and social functioning
  - Excellent safety profile
    - Possible increase risk of bleeding when used in combination with antiplatelet medications such as warfarin
  - Dosage: 120-240 mg daily
Dietary Supplements – Cont’d

• Phosphatidylserine (PS)
  – Phospholipid active at cell membranes (including synaptic membrane zones)
  – In a db, pc study of 33 Alzheimer’s patients, PS improved symptoms & shifted EEG power more towards the normal level.
  – In a db study of Parkinson’s patients with Alzheimer’s, PS improved symptoms & EEG
Dietary Supplements – Cont’d

• In a preliminary trial elderly patients with multi-infarct dementia, Alzheimer’s disease or minor depression, PS significantly decreased depression & improved biochemical parameters; with benefits persisting after PS withdrawal.
  – Excellent safety profile
    • Compatible with most drugs
  – Dosage: 300 to 700 mg daily
Dietary Supplements – Cont’d

- Huperzine A
  - Natural substance derived from extract of *Huperzia serrata*
  - Acetylcholinesterase (AChE) inactivates acetylcholine
    - A normal function
    - Can get out of hand & adversely effect cognitive functions
  - Huperzine A is a selective AChE inhibitor
Dietary Supplements – Cont’d

• Huperzine A (cont’d)
  – In db study of patients with multi-infarct, senile dementia, huperzine A significantly improved cognitive functions
  – Similar research has shown memory, cognition, and behavior improvements in Alzheimer’s patients
  – Huperzine A has an ability to reduce neuronal cell death (caused by exposure to a toxin)
  – Safety
    • No severe side effects have been reported in human trials using huperzine A
    • Theoretically, concurrent use might have additive effects with drugs that promote acetylcholine activity
  – Dosage: 60-100 mcg daily
Dietary Supplements – Cont’d

• Vinpocetine
  – Natural substance derived from Periwinkle seeds
  – Improves brain circulation and oxygen utilization
  – Elevates cerebral concentrations of ATP
  – Increases the firing rate of certain neurons (cholinergic pathway)
Dietary Supplements – Cont’d

- Vinpocetine (cont’d)
  - Helped improve cognitive function and short-term memory in both animal and human research (extensive studies in Europe)
  - Effective for patients with cerebrovascular disease
  - Excellent safety profile
    - Even has antioxidant properties
  - Dosage: 10-15 mg daily
Dietary Supplements – Cont’d

• Alpha-GPC
  – Alpha-glycerylphosphorylcholine (Alpha-GPC) is an acetylcholine precursor derived from soy
  – Increases acetylcholine release
  – Found to produce symptomatic improvement in patients with mild to moderate vascular dementia
  – Resulted in significant improvements in patients with probable Alzheimer's dementia
Dietary Supplements – Cont’d

• Alpha-GPC (cont’d)
  – Helped promote functional recovery of patients with cerebral stroke
  – 71% of the patients 2044 patients suffering from recent stroke or transient ischemic attacks experienced “no cognitive decline” or “forgetfulness” when given Alpha-GPC
  – Safety: Well tolerated
  – Dosage: 1,200 mg daily
Dietary Supplements – *Cont’d*

- **Acetyl-L-carnitine (ALC)**
  - Ester derivative of the amino acid l-carnitine
  - Structurally related to acetylcholine
  - Clinical trials found that ALC supplementation delays the progression of Alzheimer’s disease, improves memory and enhances overall performance
Dietary Supplements – Cont’d

• ALC (cont’d)
  – Most short-term studies have shown clinical benefits, and most long-term studies have shown a reduction in the rate of deterioration
  – Excellent safety profile
  – Dosage: 3,000 mg daily
Dietary Supplements – *Cont’d*

- **Vitamin B12**
  - Studies indicate that Alzheimer’s patients often have significantly lower serum vitamin B12 than control subjects
  - Possible relationship between B12 levels and severity of cognitive impairment in patients with AD
  - Dosage: 1,000 mcg twice weekly
    - Sublingual or methylcobalamin preferred
Dietary Supplements – Cont’d

• Antioxidants
  – Free radicals associated with cognitive decline in dementia
  – Alzheimer’s patients have statistically significant decrease in serum levels of glutathione peroxidase, vitamins E, C and A, and the mineral zinc
  • Nearly 60% had serum vitamin E levels below the accepted normal range
Dietary Supplements – *Cont’d*

- **Antioxidant’s (cont’d)**
  - In db study of Alzheimer’s patients, 2000 IU vitamin E daily allowed them to continue caring for themselves (e.g., bathing, dressing, and other necessary daily functions), compared with people taking a placebo
  - In study of people with early Parkinson’s disease given 3,000 mg of vitamin C and 3,200 IU of vitamin E daily, they were able to delay the need for drug therapy by an average of about two and a half years, compared with those not taking the vitamins
  - A higher consumption of green tea was associated with a lower prevalence of cognitive impairment in humans
Dietary Supplements – Cont’d

- Phosphatidyl choline (PC)
  - Derived from soy
  - Research shows the less choline uptake in RBC, the more severe the dementia in Alzheimer’s
  - Some research demonstrated moderate improvements in orientation, learning and memory in AD
  - In research showing no improvement, PC still seemed to delay the rate of progression of the disease
  - Dosage: 900 mg daily
Dietary Supplements – Cont’d

• Co-enzyme Q10 (CoQ10)
  – A vitamin-like substance involved in cellular energy metabolism
  – An antioxidant that is beneficial in the prevention and treatment of various cardiovascular disorders, including angina, congestive heart failure, and hypertension
  – In a db study of Parkinson’s patients, 1,200 mg CoQ10 daily for 16 months significantly slowed the progression of the disease, compared with a placebo
  – Excellent safety profile
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<th>Natural Protocols</th>
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### Primary Recommendations

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<tr>
<th>Supplement</th>
<th>Dosage</th>
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<tbody>
<tr>
<td>BFP</td>
<td>4 tablets taken with breakfast or lunch</td>
</tr>
<tr>
<td>Ginkgo biloba (24% flavonoid glycosides and 6% terpene lactones)</td>
<td>120 to 240 mg daily, taken in two to three doses</td>
</tr>
<tr>
<td>Acetyl-L-Carnitine</td>
<td>3000 mg daily, taken in three doses</td>
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<tr>
<td>Vitamin E (d-alpha)</td>
<td>2,000 IU daily</td>
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<tr>
<td>Huperzine A</td>
<td>60 to 100 mcg daily, taken in two doses</td>
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<tr>
<td>Phosphatidylserine</td>
<td>300 to 700 mg daily, taken in two to three doses</td>
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### Secondary Recommendations

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Dosage</th>
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<tbody>
<tr>
<td>Vinpocetine</td>
<td>10 to 15 mg daily</td>
</tr>
<tr>
<td>Phosphatidyl choline</td>
<td>900 mg daily</td>
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<tr>
<td>Green tea</td>
<td>3 cups daily</td>
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<tr>
<td>Vitamin B12 (sublingual)</td>
<td>If deficient, 1,000 mcg twice weekly</td>
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**Vascular dementia**

<table>
<thead>
<tr>
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<tr>
<td>BFP</td>
<td>4 tablets taken with breakfast or lunch</td>
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<tr>
<td>Ginkgo biloba (24% flavonoid glycosides and 6% terpene lactones)</td>
<td>120 to 240 mg daily, taken in two to three doses</td>
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<tr>
<td>Vitamin E (d-alpha)</td>
<td>800 IU daily</td>
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<tr>
<td>Huperzine A</td>
<td>60 to 100 mcg daily, taken in two doses</td>
</tr>
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<td>Alpha-GPC</td>
<td>1,200 mg daily</td>
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<tr>
<td>Vinpocetine</td>
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<tr>
<td>Cardiovascular support supplements (Coenzyme Q10, Policosanol, etc.)</td>
<td>Varying</td>
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<tr>
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<tr>
<td>Phosphatidylserine</td>
<td>300 to 700 mg daily, taken in two to three doses</td>
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<tr>
<td>Green tea</td>
<td>3 cups daily</td>
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### Parkinson’s disease

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<tr>
<td>BFP</td>
<td>4 tablets taken with breakfast or lunch</td>
</tr>
<tr>
<td>Coenzyme Q10</td>
<td>1,200 mg daily</td>
</tr>
<tr>
<td>Vitamin E (d-alpha)</td>
<td>3,200 IU daily, taken in four divided doses (Note: this high dose should only be used when working with a physician monitoring serum vitamin E levels)</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>3,000 mg daily, taken in three to four divided doses</td>
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<tr>
<td>Phosphatidylserine</td>
<td>300 daily, taken in two to three doses</td>
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Conclusion

• The treatment of the dementias requires a multifaceted approach. Ideally, this includes a family support structure, a healthcare professional support structure, proper nutrition for the elderly, and the use of select dietary supplements.