The Disease of Aging

COMMON NEUROLOGICAL DISORDERS

Faris M. Fadheel, M.D., MBCHB
IUMS Volunteer Assistant Professor
Midwest Neurological P.C.
AGING!

When does aging start?
One of the most fundamental, yet mysterious aspects of biology.

The science of aging has made progress in describing and analyzing several critical phenotypes of the components of aging including:

- Inflammation
- Oxidative stress
- Endocrine abnormalities
- Cellular changes
- Genomic damage and instability
- Mitochondrial dysfunction
- Increased junk proteins
Aging research has extensively showed conserved protective effects associated with dietary restrictions (DR) or caloric restrictions (CR).

Dietary and caloric restrictions are the gold standards in terms of a basic environmental manipulation that slows aging in virtually every species.
Aging

- CR and DR function as a global metabolic reprogramming for most organisms, reflecting a shift of biological priorities from growth and reproduction towards stasis and conservation.
Western lifestyle and an associated pandemic of obesity, reflecting radical departure from our evolutionary environment will expose us to increased penetration by the disease of aging despite increasing life expectancy.
Multifactorial life style changes may increase many of the phenotypes or components of aging

- Poor sleep
- Little exercise
- Complex dietary shifts
- Increased social isolation
The Aging Process of the Brain

- Cannot be separated from again of the whole organism
- Must consider that aging may be differentially expressed across different organ systems
Changes in Neurological Examination with age

- Diminished smell
- Abnormal upward gaze
- Hearing loss
- Diminished coordination
- Diminished fluidity of movement
- Neurocognitive function decline
Genetic Neurology

- Neurological Exam
  - History
  - Reviewing medications
  - Mental status exam
  - Physical examination
Neurological Conditions

- Stroke
- Parkinson’s disease
- Tremor
- Dizziness and vertigo
- Gait disturbance
- Memory and cognitive decline (Dementia)
Human aging characterized by progressive constriction of the homeostatic reserve of every organ system
- Evident by 3rd decade—gradual and progressive
- Influenced by diet, environment, personal habits, and genetic factors
Stoke

- Changes with Age
  - Increased relative total body fat
  - Decreased circulatory volume
  - Hormonal changes
  - Medications
  - Blood pressure
  - Cholesterol
  - Smoking, alcohol consumption
  - Activity level
Stroke

- Modifiable Risks
  - Personal habits
  - Medical illness
  - Diet
- Non-modifiable Risk Factors
  - Age
  - Genetics
Stroke

- Treatment
  - Decreasing the risk for future strokes
  - Managing the stroke
  - Medications
Parkinson’s Disease

- The Hallmark: Dopamine deficiency in the basal ganglia
- Motor Symptoms
- Non-motor Symptoms
- Treatment
  - Medications
  - Surgery
  - Exercise
Tremor

- Essential Tremor
- Other Tremor disorders
  - Cerebellar
  - Thalamic
  - Cortical Loop
- Differentiates from:
  - Parkinson’s Disease
  - Familial Essential Tremor
Tremor

- Bilateral Hands
- Lower Jaw
- Resting/Postural/Action
- Treatment
Dizziness and Vertigo

- **Benign Paroxysmal Positional Vertigo (BPPV) most common**
  - Treatment include vestibular exercises and medication (Meclizine)
- **Other peripheral causes**
  - Neuritis
  - Meniere’s Disease
  - Medication side effects
- **Central Causes**
  - Vascular
  - Mass
  - Inflammation
  - Infection
Gait Disorders

- Can increase the risk of falls, disability, and mortality

- **Neurological Causes**
  - Vascular
  - Neuropathy
  - Myelopathy
  - Parkinson’s Disease
  - Normal Pressure Hydrocephalus (NPH)
  - Diseases of the Cerebellum

- **Non Neurological Causes**
  - Apraxia
  - Cognitive impairment
Memory and Cognitive Decline (Dementia)

- Neurocognitive function declines with aging, which include:
  - Episodic Memory: Word list recall
  - Working Memory: Digit span forward/backward
  - Spatial Memory: Dimension, Drawing
  - Processing Speed
  - Learning Skills: Learning new information
  - Various Motor Functions: Motor speed and fine motor control
Memory and Cognitive Decline (Dementia)

- Assessment of Cognitive Status in Geriatric Neurology
  - Mental Status Examination
    - Level of consciousness
    - General appearance
    - Mood and Affect
    - Behavior
    - Movement
    - Speech and Communication
    - Thought Form and Content
    - Perception
    - Insight
    - Cognitive assessment
Memory and Cognitive Decline (Dementia)

- Cognitive Assessment
  - Attention/Concentration
  - Orientation
  - Memory
  - Language
  - Abstract Thinking
  - Judgment
  - Construction Skills
  - Calculations
Mild Cognitive Impairment (MCI)

- MCI is a transitional state between cognitively normal state and dementia syndrome.
- The rate of progression from MCI to Alzheimer’s Disease is 12-15%.
- The primary benefit to diagnosing MCI is to recognize the risk and progression to full dementia and to find early therapeutic interventions.
Defining MCI

• Episodic Memory
• Anomia
• Visual Agnosia
• Abulia
• Disinhibition
• It is challenging to determine whether a clear history of cognitive deterioration is present
• Lowering the criteria or threshold may increase false positive results
Criteria for MCI require the following features:

- Memory complaints
- Evidence of objective memory impairment
- Preserved global cognition
- Intact Activity of Daily Living (ADL)
- Absence of dementia
- Follow and reassessment
Intervention and treatment

- Pharmacologic
- Non-pharmacologic
  - Regular cognitive activity
  - Physical exercise
  - Cognitive rehabilitation
By far the most common form of dementia in the US
Affects 5.4m people, mainly above 65yr
1-2% at age 65yr
Doubles every 5yr
As high as 50% by age of 85
Estimated number of patients will be 16-80 million by 2050
50% of cases are mixed type
Memory and Cognitive Decline
Alzheimer’s Disease

- Symptoms
  - History
  - Memory
  - Cognitive
- Differential Diagnosis
  - Vascular
  - Lewy Body Disease
  - Parkinson’s Disease
  - Fronto-temporal Dementia
  - Pseudo-dementia
The 2nd leading cause of dementia, either alone or in combination

Potentially preventable, but recent increase in vascular risk factors warn that the frequency of VD may rise

Usually abrupt onset or shortly after a stroke

Symptoms
- Apathy
- Naming
- Comprehension
- Insight
- Other neurological symptoms
Progressive dementia syndrome with parkinsonism, dominated by attentional visuospatial and executive dysfunction, visual hallucinations, sleep disturbance
Memory and Cognitive Decline

Dementia of Lewy Bodies

- Clinical Symptoms
  - Similar to dementia of Alzheimer’s disease with progressive loss of cognitive function
  - Relative preservation of short and medium term recall and recognition
  - Greater impairment of visual perception and performance tasks
  - Fluctuating attention
  - Delusions
  - Sleep disorder
  - Gait instability
Memory and Cognitive Decline
Treatment of Dementias

- Pharmacological treatments
  - Primary—Preventative therapy
  - Secondary—Disease modifying and curative (rare)
  - Tertiary—Palliative and to improve quality of life
Memory and Cognitive Decline

Treatment of Dementias

- Primary pharmacological treatments
  - No available preventative medications
  - Recent advances in research and identifying markers
  - Knowledge of neural injury to find neuroprotective medication
Secondary pharmacological treatments

• Current symptomatic treatment includes:
  ▪ Namenda
  ▪ Aricept
  ▪ Exelon
  ▪ Razadyne

• These medications demonstrate only modest symptomatic benefit that is sustained for 6 months to a few years
Memory and Cognitive Decline
Treatment of Dementias

- Tertiary pharmacological treatments
  - To help control patient’s behavioral problems
Memory and Cognitive Decline
Treatment of Dementias

- Non-pharmacological treatment
  - Nonspecific intervention
    - Empathy
    - Attention
    - Social issues
  - Specific intervention
    - Environmental
    - Personal
    - Behavioral
    - Medications
  - Caregiver education and resources
References

