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Comprehensive Cognitive Assessment in Older Adults

NYU Rory Meyers College of Nursing
New York University

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FOUNDED PRESENTER:
Linda L. Horvath, PhD, RN, GNP-BC, AGACNP-BC, ACHPN, FAANP
Clinical Assistant Professor

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1. Define comprehensive cognitive assessment in geriatric populations
2. Discuss the components of a comprehensive cognitive assessment
3. Review and discuss how the neurologic system changes with normal aging.
4. Discuss the differences between dementia and delirium
5. Use case based approach to integrate and apply critical assessment, appropriate documentation, and critical thinking to patient scenarios

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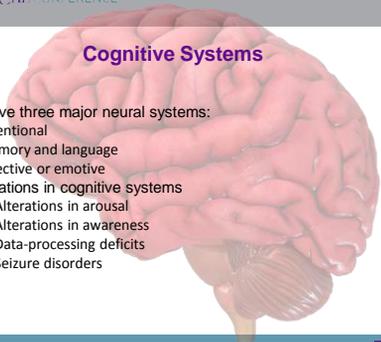
Functional Adequacy

- Complex and integrated process
- Involves three major neural systems:
 - Cognitive
 - Sensory
 - Motor
- Alterations in any of these three systems can cause problems and diseases and ultimately affect functional adequacy

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Cognitive Systems



- Involve three major neural systems:
 - Attentional
 - Memory and language
 - Affective or emotive
- Alterations in cognitive systems
 - Alterations in arousal
 - Alterations in awareness
 - Data-processing deficits
 - Seizure disorders



Cognitive Systems (cont'd)

- Consciousness
 - Full
 - State of awareness of both oneself and the environment and a set of responses to that environment
 - Arousal
 - State of being awake
 - Mediated by the reticular-activating system
 - Awareness
 - Cognitive functions that embody awareness of self, environment, and affective states (moods)
 - Content of thought



Alterations in Arousal

- Structural: Original location
 - Supratentorial: Above the tentorium cerebelli
 - Infratentorial: Subtentorial, below the tentorium cerebelli
 - Subdural: Below the dura mater
 - Extracerebral: Outside the brain tissue
 - Intracerebral: Inside the brain tissue
- Metabolic alterations:
 - In the delivery of energy substrates
 - In neuronal excitability from drugs or toxins
- Psychogenic or psychiatric disorders

State	Definition
Confusion	Loss of the ability to think rapidly and clearly; impaired judgment and decision making
Disorientation	Beginning loss of consciousness; disorientation to time, followed by disorientation to place and impaired memory; recognition of self is lost last
Lethargy	Limited spontaneous movement or speech; easy arousal with normal speech or touch; may not be oriented to time, place, or person
Obtundation	Mild-to-moderate reduction in arousal (awakeness) with limited response to the environment; falls asleep unless verbally or tactiley stimulated; answers questions with minimum responses
Stupor	Condition of deep sleep or unresponsiveness; person may be aroused or caused to open eyes only by vigorous and repeated stimulation; response is often withdrawal or grabbing at stimulus
Coma	No verbal response to the external environment or to any stimuli; noxious stimuli such as deep pain or suctioning yields motor movement
Light coma	Associated with purposeful movement on stimulation
Deep coma	Associated with unresponsiveness or no response to any stimulus

Alterations in Arousal (cont'd)

- Clinical manifestations
 - Level of consciousness changes.
 - These changes are most critical index of nervous system function.
 - Changes can indicate improvement or deterioration.
 - Normal responses are being alert and oriented.
 - Abnormal responses range from confusion to coma.

Alterations in Awareness

- Awareness (content of thought):
- Includes all cognitive functions
 - Awareness of self, environment, and affective states and moods
 - Network of interconnected brain circuits

Alterations in Awareness (cont'd)

- Selective attention
 - Ability to select from available competing environmental and internal stimuli
- Sensory inattentiveness
 - Extinction
 - Unilateral neglect syndrome
- Selective attention deficit: After a seizure

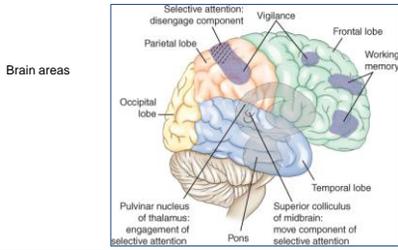
Alterations in Awareness (cont'd)

- Memory: Recording, retention, and retrieval of knowledge
 - Declarative memory
 - Nondeclarative memory
 - Cerebellar memory
 - Emotional memory

Alterations in Awareness (cont'd)

- Dysmnnesia
 - Retrograde amnesia
 - Loss of past memories
 - Anterograde amnesia
 - Inability to form new memories
- Detection: Recognizes an object's identity and realizes the object fulfills a sought-after goal
- Vigilance, detection, working memory deficits
 - Frontal areas mediate these functions

Alterations in Awareness (cont'd)



Alterations in Awareness (cont'd)

- Pathophysiology
 - Direct destruction from direct ischemia and hypoxia
 - Indirect destruction as a result of compression
 - Effects of toxins and chemicals or metabolic derangement
- Clinical manifestations
 - Vary, depending on condition
- Treatment
 - Rehabilitation

Data Processing Deficits

- Agnosia
 - Failure to recognize the form and nature of objects
 - Can be tactile, visual, or auditory
- Aphasia
 - Loss of comprehension or production of language
- Dysphasia
 - Expressive dysphasia versus receptive dysphasia
 - Transcortical dysphasia
- Acute confusional states
- Dementias

Aphasia/Dysphasias

- **Wernicke:** Disturbance in understanding all language—verbal and reading comprehension
- **Conductive:** Disruption of temporal lobe fibers with a failure to repeat words but an ability to initiate speech, writing, and reading aloud
- **Anomic:** Inability to name objects, people, or qualities

Aphasia/Dysphasias (cont'd)

- **Transcortical:** Ability to repeat and recite
- **Broca aphasia:** Expressive dysphasia of speech and writing but with retention of comprehension
- **Global aphasia:** Involves anterior and posterior speech areas, with expressive and receptive aphasia

Acute Confusional States

- Acute organic brain syndromes
- Transient disorders of awareness
- Abrupt onset

Acute Confusional States (cont'd)

- Deficits in attention and coherence of thoughts and action
 - Secondary to drug intoxication, metabolic disorders, nervous system diseases, or other causes
 - Disruption of reticular-activating system of upper brainstem and its projections to the thalamus, basal ganglion, and specific areas of the cortex and limbic areas

Acute Confusional States (cont'd)

Clinical Manifestations

- Impaired or lost detection
- Fluctuating symptoms
- Confusion and restlessness
- Inability to focus, maintain attention, or concentrate
- Delusions
- Hallucinations
- Perseveration
- Impaired vigilance

Treatment

- Identify the cause
- May discontinue drugs
- Institute supportive and protective measures

Delirium

- Hyperkinetic confusional state
- Acute state of brain dysfunction
 - Associated with the right middle temporal gyrus or disruption of the left temporo-occipital junction
- Excited delirium syndrome: Agitated delirium
- Hypokinetic delirium: Hypokinetic confusional states
 - Associated with the disruption of the right-sided, frontal-basal ganglion

Delirium (cont'd)

- Clinical manifestations
 - Autonomic nervous system overactivity
 - Typical development of over 2 to 3 days, most commonly in critical care units, postsurgically, or during withdrawal from central nervous system (CNS) depressants (e.g., alcohol, narcotic agents)
 - Difficulty concentrating
 - Restlessness and irritability
 - Insomnia
 - Tremulousness
 - Poor appetite

Cognitive Dysfunction

- Dementia
 - Prevalence: 30% in community-dwelling patients ≥ 85 years
 - Alzheimer's disease and vascular dementias comprise $\geq 80\%$ of cases
- Risk for functional decline, delirium, falls and caregiver stress

Dementia

- Progressive failure of cerebral functions not caused by impairment
- Pathophysiology
 - Neurodegeneration, possibly caused by inflammation or biochemical alterations
 - Atherosclerosis; multiple foci of infarction throughout the thalami, basal ganglia, cerebral projection pathways, and associated areas
 - Trauma and lesions
 - Compression, increased intracranial pressure, and chronic hydrocephalus

Dementia (cont'd)

- Clinical manifestations
 - Impairment of intellectual function, memory, and language
 - Alterations in behavior

Dementia (cont'd)

- Treatment
 - No specific treatment or cure exists for most progressive dementias; goal is to delay the process
 - Maintain or maximize remaining capacities
 - Restore functions, if possible
 - Infectious process requires antibiotics
 - Resectable mass may require neurosurgery
 - Nutritional deficiencies are corrected
 - Accommodate lost abilities, and control behavioral changes
 - Include the family in the treatment

Delirium versus Dementia

Delirium

- Acute state of brain dysfunction.
- Abrupt onset
- Autonomic nervous system is overactive.
- Common in critical care units, postsurgically, or during withdrawal from CNS depressants (e.g., alcohol, narcotics)

Dementia

- Progressive failure of many cerebral functions.
- Gradual
- Progressive dementias produce nerve cell degeneration and brain atrophy
- Age is greatest risk factor.

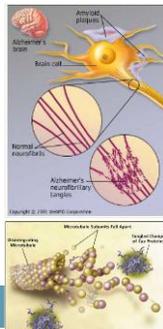
Alzheimer Disease

- Dementia of the Alzheimer type (DAT), a senile disease complex.
 - Specific diagnosis can only be made by postmortem examination.
 - Clinical history, cognitive testing, course of the illness, laboratory tests, and brain imaging are used for diagnostic evaluation.
- Leading cause of dementia
- Irreversible

Alzheimer Disease (cont'd)

- Greatest risk factors: Age, family history
- Familial: Early or late onset
- Pathophysiology
 - No known cause
 - Neurofibrillary tangles
 - Neuritic plaques

- Neuropathic and neurotransmitter changes
- Cortical atrophy and loss of neurons
- Neuritic (senile) amyloid plaques
- Neurofibrillary tangles in cytoplasm
- Amyloid angiopathy



Alzheimer Disease (cont'd)

- Clinical manifestations
 - Progresses from mild short-term memory deficits and culminates in a total loss of cognition and executive functions; exhibits different stages
 - Forgetfulness; emotional upset; disorientation; confusion; lack of concentration; and declines in abstraction, problem solving, and judgment
 - Insidious onset
- Treatment
 - No disease-arresting therapies are available
 - Cholinesterase inhibitors can enhance cholinergic transmission

Frontotemporal Dementia

- Previously called Pick disease
- Rare, severe degenerative disease of frontal and anterior frontal lobes
 - Produces death of tissue and dementia
- Age of onset: Younger than 60 years of age
- Autosomal dominant pattern of inheritance is in 30% to 50% of cases
- Difficult to distinguish from Alzheimer disease

Facets of the mental status exam:

- ✧ Appearance & behavior
- ✧ Speech & language
- ✧ Mood & Affect
- ✧ Thought & perceptions
- ✧ Cognitive function:
 - ✧ Memory, attention, judgment
 - ✧ Abstract thinking

General Survey

posture, movement, grooming, facial expression
manner of interacting

Acutely Ill Patient: Level of consciousness

Alert (awake & aware)

Lethargic (Must speak loudly/forcefully to get response)

Obtunded (Must shake pt to get response)

Stuporous (Unarousable except for painful stimuli)

Coma (Completely unarousable)

Mental Status Exam

- Appearance & behavior
- **Speech & language**
- **Mood & Affect**
- **Thought & perceptions, insight**
- Cognitive function:
 - Memory, attention, judgment
 - Abstract thinking

Mini-Mental Status Exam

- Most commonly used mental status exam (Folstein, 1975)
- 11-question measure that tests 5 areas of cognitive function:
 - **Orientation, registration, attention & calculation, recall, and language.**
- Used for dementia screening & following cognitive function over time.
- Total score = 30, Score 24 = impairment.
- Disadvantages: needs to be adjusted for age, education, & ethnicity, copyright issues.

THE FOLSTEIN MINI-MENTAL STATE EXAMINATION

- Orientation:
 - What is the year/season/date/day/month?
 - Where are we state/county/town/hospital/floor?
- Registration:
 - Name 3 objects: 1 second to say each
 - Ask patient to name all 3 after you have said them.
- Attention/ Calculation:
 - Serial 7's
 - Alternatively, spell "WORLD" backwards.
- Recall:
 - Ask for all 3 objects repeated above.

THE FOLSTEIN MINI-MENTAL STATE EXAMINATION

- Language:
 - Show a pencil & a watch and ask the patient to name them
- Repetition:
 - "No ifs, and or buts"
- Processing/language:
 - 3 stage command: "Take the paper in your right hand fold it in half, and put it on the floor"
 - Read and obey the following: CLOSE YOUR EYES
- Ask a patient to write a sentence
- Copy a design (complex polygon)



MMSE

- Median scores based on age and educational level:
- >85 y/o and >12yrs educ. 28
- 70-74 y/o and >12yrs educ. 29
- 65-69 y/o and 0-4 yrs educ. 22

• Crum, RM, Anthony, JC, Bassett, SS, et al. Population-based norms for the mini-mental state examination by age and educational level. JAMA 1992

The Mini-Cog

- Components
 - 3 item recall: give 3 items, ask to repeat, divert and recall
 - Clock Drawing Test (CDT)
 - Normal (0): all numbers present in correct sequence and position and hands readably displayed the represented time
- Abnormal Mini-Cog scoring with best performance
 - Recall =0, or
 - Recall ≤ 2 AND CDT abnormal

Clock Drawing Test Instructions

- Subjects told to
 - Draw a large circle
 - Fill in the numbers on a clock face
 - Set the hands at 8:20
- No time limit given
- Scoring (subjective):
 - 0 (normal)
 - 1 (mildly abnormal)
 - 2 (moderately abnormal)
 - 3 (severely abnormal)



Clock Drawing Test

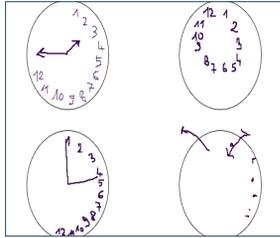
Clock Drawing Test:
"Draw a clock"
Sensitivity=75.2%
Specificity=94.2%

MINI COG: a brief screen

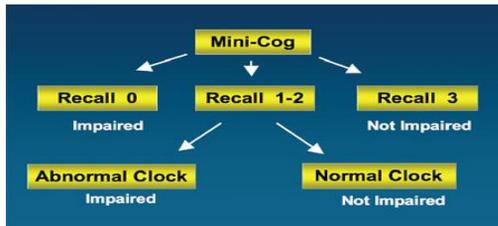
Word Recall

“Table”
“Dog”
“Apple”

Clock Drawing Test



Mini Cog Scoring



Animal Naming Test

- Category fluency
- Highly sensitive to Alzheimer's disease
- Scoring equals number named in 1 minute
 - Average performance = 18 per minute
 - < 12 / minute = abnormal
- Requires patient to use temporal lobe semantic stores
- 60 seconds
- Using a cutoff of 15 in one minute:
 - Sens 87% - 88%
 - Spec 96%

Depression

- 10% of >65 y/o with depressive symptoms
- 1% with major depressive disorder
- Associated with physical decline of community-dwelling adults and hospitalized patients

GERIATRIC DEPRESSION SCALE (Short Form)

1. Are you basically satisfied with your life?
2. Have you dropped any of your activities?
3. Do you feel that your life is empty?
4. Do you often get bored?
5. Are you in good spirits most of the time?
6. Are you afraid that something bad is going to happen to you?
7. Do you feel happy most of the time?
8. Do you often feel helpless?

GERIATRIC DEPRESSION SCALE (Short Form)

9. Do you prefer to stay home at night, rather than go out and do new things?
10. Do you feel that you have more problems with memory than most.
11. Do you think it is wonderful to be alive now?
12. Do you feel pretty worthless the way you are now?
13. Do you feel full of energy?
14. Do you feel that your situation is hopeless?
15. Do you think that most persons are better off than you are?



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