Second National Doctors of Nursing Practice Conference: Defining Ourselves

Mild Cognitive Impairment Clinic: Improved Access, Assessment, & Interventions

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MCI Clinic

Goal: Describe a DNP led memory clinic focused on assessment and quality interventions that target cognition, function, and mood with goals of care to maintain independence

Objectives

- 1. Identify innovative practices for nursing excellence as exemplified in development of a clinic for patients with mild cognitive concerns
  - How did we get here?

Objectives

- 2. Explore strategies to improve the quality of care and maintain independence for community-dwelling older adults with MCI, based on assessment, identification of needs, and implementation of stratified interventions.
  - How would we know what works?

Objectives

- 3. Explore brief cognitive assessment strategies for everyday practice and identify referral options
  - What's the take home message for busy clinicians seeing older adults?

What is MCI?

- *Briefly….*
- History
- Literature
- Importance
- Diagnosis

History of Mild Cognitive Impairment

- Benign Senescent Forgetfulness (Kral, 1962)
- Questionable Dementia (Hughes, 1982)
- Age Associated Memory Impairment (Crook, 1986)
- Late-life Forgetfulness (Blackford, 1989)
- Aging-associated Cognitive Decline (Levy, 1994)
- Mild Neurocognitive Disorder (APA, 1994)
- Mild Cognitive Impairment (Petersen, 1999)

Literature Review

- Recommendations for screening for dementia have been made by numerous researchers.
  - The United States Preventive Services Task Force (2003) and others (Decarli, 2003; Petersen, 2004; Winblad et al., 2004).
- The acceptance of MCI as a risk factor or transitional state for AD calls for increased attention from nurses and primary care providers
  - (Pinals & Teresa, 2004; Plassman et al, 2008).
- Researchers found MCI and dementia were frequently missed in primary care
  - In the Cardiovascular Health Study (Lyketsos et al., 2002)

Gaps in the Literature

- Few studies have examined the effect of pragmatic assessment and intervention strategies for MCI
- Despite work in laboratory, radiology and neuropsychology, there is no confirmed method of diagnosing MCI.
- Clinicians will increasingly need knowledge as the aging population swells with citizens who are more informed, and will expect earlier assessment of memory concerns.
- The effectiveness of interventions needs refinement to reflect the pattern of functional change.

Current Issues in MCI: Significance

- Prevalence of MCI
  - 19% in patients < 75 years
  - 29% in those > 85 years in the cardiovascular health study (Lopez et al., 2003)
  - 22.2% ≥71 years in the U.S. had mild cognitive or functional impairment without dementia

    (Plassman et al., 2008)

Current Issues in MCI: Significance

Higher conversion rate to dementia

- Rates of conversion vary greatly;
  - 10-15% - Peterson (2001)
  - 46.3% - Marcos et al. (2006)
- Over a period of 6 years approximately 80% of MCI subjects will convert to dementia (Petersen, 2004).
- Annual conversion rate of 11.7% to dementia, but a 17% - 20% conversion in those with prodromal Alzheimer's disease or stroke. (Plassman et al., 2008)

Bennett, Wilson, Schneider, Evans, Beckett, Aggarwal, et al., 2002. Plassman et al. (2008)

Diagnosis of MCI

- Diagnose MCI if:
  - The person has a memory complaint
  - Testing shows abnormal memory for age and education.
  - Performance on ADL's is normal.
  - General cognitive function is normal.
  - The person is not demented.

Petersen et al., 2001; Winblad et al., 2004

Development of MCI Clinic

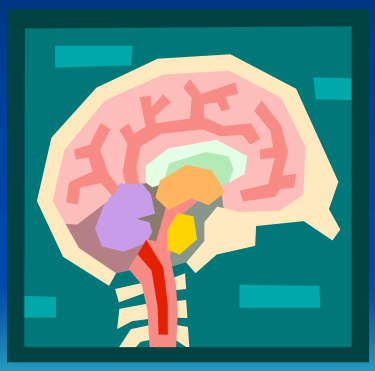
- Uniqueness of our setting
- Initial appointment
  - CC, HPI, Sleep, Pain, Meds review,
  - Function, memory, mood screen
  - Cognitive testing
  - PE – vascular risks
  - Plan of care
- If MCI, follow every 6 months

Probable Etiologies

- Alzheimer's disease (typical or atypical)
- Creutzfeld-Jakob
- Cortical Lewy Body disease
- Focal right hemisphere lesions (stroke or tumor)
- Adult onset diabetes mellitus
- Alcoholic dementia
- B12/Folate
- Pick's disease
- HIV
- Vascular dementias with cortical infarcts
- Hypothyroidism
- Normal pressure hydrocephalus
- Parkinson's disease
- Polypharmacy
- Progressive supranuclear palsy
- Schizophrenia
- Wilson's disease
- Vascular dementias without cortical infarcts
- Huntington's disease

Vascular Risks--Medical

- Hypertension
- Diabetes
- Brain Pathology
- Stroke
- Heart Disease



Vascular Risks--Behavioral

- Mental Stimulation
- Diet and Weight Control (BMI)
- Exercise
- Alcohol and Tobacco Use

Other Non-Vascular Risk Factors

- Family History
- History of Falls
- Auditory and Visual impairment
- Polypharmacy
- Head Injury with loss of consciousness

Challenges in Screening for MCI

- MCI patients are not clinically suspicious
- Bias of MMSE away from vascular symptoms
- MCI amnestic and non-amnestic syndromes under diagnosed or misdiagnosed

Detweiler, Trinkle, & Anderson, 2004; Marcos, 2006

Increased Risk for Conversion to a Dementia

- What differentiates MCI converters (those that will eventually develop a dementia syndrome) from non-converters (normal aging)?
  - Our study
    - What types of screening tools best identify the differentials?
    - Are various treatments suggested from the differentials?

Carilion Clinic Center for Healthy Aging: MCI Clinic

- Screens patients for:
  - Functional Assessment
  - Vascular Risks
  - Objective Memory Impairment
  - Executive Control Deficits
  - Type of MCI
    - Single domain amnestic
    - Multiple domain amnestic

Assessment: Cognitive Impairment

- Screen – MMSE and Function
- Depression - GDS
- Executive Function – EXIT 25, CLOX 1, BNT
- Memory

MMSE

- Orientation
- Registration
- Attention and Calculation
- Recall
- Language
- Must score ≥ 24 (within normal limits) to qualify as MCI

Folstein et al., 1975

Functional Assessment

- Cognition and Function are interdependent in older adults.
- Measures include:
  - **ADL's** - Activities of Daily Living
    - Normal in MCI clients
  - **IADL's** - Instrumental Activities of Daily Living
  - Scoring: Each category offers from 3 to 5 options that are scored "0" for dependent and "1" for independent :
    - 0-3=dependent
    - 4-5=questionable
    - 6- 8=independent

Assessment Depression and Apathy

- Depression was measured with both the GDS and the HAM-D, but no differences found, so utilize the GDS now.

  (Sheikh JL& Yesavage JA , 1986).
- Apathy is also measured using the Marin's Modified Apathy Scale

  (MMAS; Marin R, 1990).

EXECUTIVE FUNCTIONING

- Executive control function deficits may be affected more than memory
  - planning, organizing, sequencing, abstracting disturbance in executive functioning

Clock Drawing Tests (CDTs)

- Bedside screen for cognitive impairment
- Visuospatial task sensitive to right parietal pathology
- Less sensitive to the ECF deficits of MID and subcortical dementias
- No consensus scoring method for the CDTs
- CDT rating systems vary on subject stimuli
- Qualitative differences in dementia subgroups scores

Freedman , 1994; Goodglass, 1972; Darcy, 1962; Lee, 1995; Royall, 1998; Rouleau, 1992; Royall, 1994

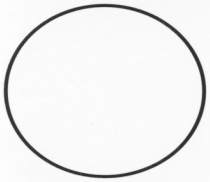
Date_____ Name:_____

Clox: An Executive Clock Drawing Task©Royall, 1995

STEP 1: Turn this form over on a light colored surface so that the circle below is visible. Have the subject draw a clock on the back. Instruct him or her to **"Please draw me a clock that says 1:45. Set the hands and numbers on the face so that a child could read them."** Repeat the instructions until they are clearly understood. Once the subject begins to draw no further assistance is allowed. Rate this clock (CLOX 1).

STEP 2: Return to this side and let the subject observe you draw a clock in the circle below. Place 12, 6, 3, and 9 first. Fill in the rest of the numbers. Set the hands again to "1:45". Make the hands into arrows. Make the hour hand shortest. Invite the subjects to copy your clock in the lower right corner. Score this clock (CLOX 2).

Rating			
Organizational Elements	**Point Value**	**Score 1**	**Score 2**
Does figure resemble a clock?	1		
Circle face present?	1		
Diameter > 1 inch?	1		
Numbers inside the circle?	1		
No sectoring or tic marks?	1		
12, 3, 6 and 9 placed first?	1		
Spacing Intact? (Symmetry on either side of 12 and 6 o'clock?)	1		
Only Arabic numerals?	1		
Only numbers 1 – 12 among the numerals present? (ignore notation)	1		
Sequence 1 – 12 intact? No omissions or intrusions.	1		
Only two hands present? (ignore sectoring / tic marks)	1		
All hands represented as arrows?	1		
Hour hand between 1 and 2 o'clock?	1		
Minute hand obviously longer than hour?	1		
None of the following: 1) hand pointing to 4 or5 o'clock?	1		
2) "1:45" present?			
3) Any other notation (e.g. "9:00")?			
4) Any arrows point inward?			
5) Intrusions from "hand" or "face" present?			
6) Any letters, words, or pictures?			
7) Any intrusion from circle below?	Total		



EXIT25

- The EXIT25 is a brief (25 item) bedside measure developed to assess ECF in dementia patients. (Royal, Mahurin, & Gray. 1992)
  - Internal consistency (alpha=.85) and interrater reliability (r=.91) are high.
  - EXIT25 correlates well with other measures of ECF (e.g., Trail Making Part B, Test of Sustained Attention)
- A score of >15/50 best discriminates normal elderly from ECF dysfunction.

Boston Naming Test

- Consists of 15 pictures presented to patients one at a time
- Stimulus cues are used when it is clear the patient is unable to identify the picture
- Phonemic cues are used when the patient is clearly identifying the picture but cannot find the appropriate name
- Tests for expressive aphasia
- Norms are age correlated in the MOANS (ages 57 – 85 for BNT)

Cognition and Memory: Neuropsychological Screening

- Neuropsychological testing contains both memory tasks and non-memory tasks.
- Memory deficits are more typical in MCI subjects than in control and dementia subjects.
- Deficits in non-memory tasks are more typical in AD subjects than in MCI or control subjects.

Memory Impairment and MCI

- One indicator of MCI is abnormal memory for age and education (≤ 1.5 SD below normal) (Petersen, 2000; Winblad, 2004).
- A decline in objective memory performance is helpful in detecting patients that may be predisposed for developing AD

  (Petersen et al., 1999)

Cognitive Battery: Memory Tests

Wechsler Memory Scales-Revised

1. **Auditory Verbal Learning**
2. **Logical Memory**
3. **Visual Reproductions**

- **Auditory Verbal Learning** (Learning Over Trials)
  - Brief Delayed Recall of a word list read aloud
  - 30-Minute Extended Delayed Recall
  - 30-Minute Extended Delayed Recognition

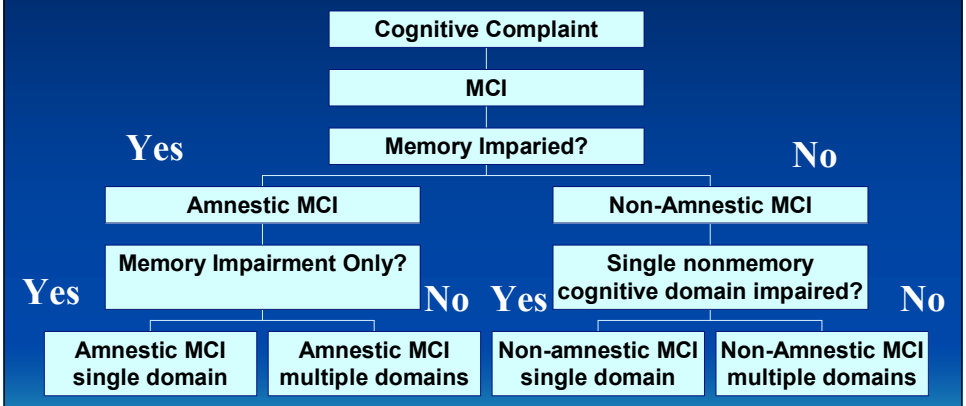
Cognitive Battery: Memory Tests

- **Logical Memory**
  - Consists of two brief paragraph long stories.
  - Recall is tested immediately and then again in 30 minutes.
- **Visual Reproduction**
  - Consists of four geometric figures presented to subjects one at a time.
  - Reproduction of each figure is required immediately after viewing the figure and again 30 minutes later.

MOANS Scoring

- Scores from the eight memory impairment tests are given a normative score that is adjusted for age.
  - as obtained from Mayo's Older Americans Normative Studies (Ivnik et al., 1992, 1996)
- Abnormal score definition - 1.33 standard deviations below the norm for the patients age
- Deficit score definition - 2.00 standard deviations below the norm for the patients age

SUBTYPES OF MCI



Petersen, R.C. (2004). Mild cognitive impairment as a diagnostic entity. Journal of Internal Medicine, 256, 183-194.

Cognitive Impairment Not Demented

- Cognitive Impairment-Not Demented **(CIND):**
  - Normal scores for cognitive domains (CLOX 1 and 2, EXIT25, and BNT) and all of the eight objective memory tests, but
  - Average MOANS scores places their memory below the 80th percentile for the patient's age.

Classification of MCI Subtypes with Probable Aetiology

Amnestic	Domain	Degen-erative	Vascular	Psych.	Medical Cond.
Yes	Single	AD		Depr	
Yes	Multiple	AD	VaD	Depr	
No	Multiple	DLB	VaD		
No	Single	FTD or DLB			

Petersen, R.C. (2004). Mild cognitive impairment as a diagnostic entity. Journal of Internal Medicine, *256*, 183-194.

Our MCI Study: Preliminary Findings at Intake

Demographics **as of 10/08**

- n = 109
- (39 male, 70 female) patients are enrolled that meet MCI criteria
- Age range: 53-87 Average Age: 71.65
- 29 are taking acetylcholinesterase inhibitors at intake
- 45 are taking an antidepressant at intake
- Focus: **53 subjects who have completed testing at intake and again at 12 months (n=48) or who have converted to dementia in that 12 month period (n=5; 9% conversion annually)**
  - 22 males, 31 females
  - average age 73.9 years

Eligibility Criteria for Study

- **Exclusion Criteria**
  - ≤ 50 years of age
  - Presence of delirium
  - ETOH >3 glasses/day
- Not MCI
  - MMSE < 24/30
  - Functionally dependent
  - Diagnosis of dementia*

Risk Factors
n=53

Vascular

- 54% HTN
- 23% cardiac disease
- 8% diabetes
- 48% depression
- 12% head trauma with LOC
- 10% stroke
- 19% obese

Non-vascular

- Falls within the past two (26%) and six (20%) months
- 39% visual deficits
- 31% hearing deficits
- 42% family history of memory loss or dementia

Distributions of Subsample
(n=53) at Intake

- Average MMSE score: 27.58
- 94% scored wnl for CLOX 1
- 92% scored wnl for CLOX 2
- 87% scored wnl for EXIT-25
- 64% scored wnl for BNT

Distributions of Subsample (n=53) at Intake

- Memory assessment:
  - 14% - no abnormal scores
  - 32% - 1-2 abnormal scores
  - 8% had 3-4 abnormal scores
  - 15% had 5-6 abnormal scores
  - 21% had 7-8 abnormal scores

Improvement and Conversion as of 10/08

- Of 53 patients followed for 12 months, 30% remained stable (within same MCI subtype), 23% improved, and 20% declined.
- Of the 53 patients, five (9%) have converted to mild dementia. This is less than the 10-15% predicted by Petersen (2004)

Possible Predictors of MCI Status

- There were no statistically significant differences between MCI types and
- IADL scores
- Apathy or Depression scores
- Neither of the two depression scales (GDS and HAM-D) were significantly correlated with any of the mental status exams
- Higher levels of apathy (MMAS) were significantly correlated with more impaired executive functioning
  - CLOX 1, r=-.24, p<.10
  - EXIT25, r=.39, p<.01.

Analysis of Change Over 12 Months

- At six month follow-up appointment participants significantly improved their BNT scores from a mean of 8.10 (intake score) to 8.90. At 12 months, further significant improvement is noted (M=9.70).
- At six month follow-up appointment participants significantly improved their IADL scores from 6.00 (intake score) to 6.55. This improvement was maintained at the 12 month appointment (M=6.40)

Treatment Plans

- Physical
- Affective
- Cognitive

Treatment of Vascular Risks

- Lipid Modification
- Hypertension Control
- Recently, both were ineffective in slowing decline in AD patients with "white matter lesions of vascular origin" (Richard, E., Kuiper, R., Dijkgraaf, & Van Good, W. A., (2009). JAGS.
- Diabetes Control
- Aspirin

Treatment of MCI

- Vitamins
  - No evidence for use of large doses of Folate, Vitamin B12, Vitamin B6
  - Vitamin E was beneficial but side effects lead to withdrawal of use
- Ginkgo – slight benefit in normal aging in some studies; no benefit in MCI

Treatment of MCI

- Memory Drugs
  - acetylcholinesterase inhibitors
  - memantine
- Referral Options
  - Neurology; Neuropsychology
  - Clinical trials

Targeted Interventions in Older Adults Experiencing Mild Cognitive Impairment

Results

Targeted Interventions Independent Variable

Targeted interventions in each of **3 functional domains** were categorized:

- **Primary**
  - Identify stressors – ex. Worry about having dementia, family or financial concerns
  - Spiritual stress – ex. Change in baseline of church attendance, religious reading or study
  - Social stress - ex. Decrease or absence of hobbies, friends
- **Secondary**
  - Recommend counseling
  - Improve coping – ex., exercise, socialization, reduce isolation
  - Education and counseling on stressors identified
- **Tertiary**
  - Strategies to address non-compliance
  - Add or increase medications
  - Recommended assistance– ex., filling pillbox, monitoring medications, driving

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Implications

- Depression in MCI subjects is significant and should be identified
- Brief cognitive measures such as a CLOX 1 demonstrated change in MCI subjects
- Conversion rate to dementia was lower than traditionally reported suggesting the model of regular assessment and targeted interventions as potentially beneficial.

Recommendations

- Practice: Routine screening for memory, mood, and mental health issues
- Research: Which standardized tools are best for nurses to feel comfortable using reliably.
- Policy: APRNs should be leaders in policy development and advocacy (health care system and legislative) in cognitive, functional, and physical assessment of older adults