

Interventions for Mild Cognitive Impairment Following Stroke

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Mild Cognitive Impairment (MCI)

- Geriatric medicine term
- obvious impairment in one cognitive domain,
- Or marginal impairment in several domains,
- With adequate functioning in cognitive aspects of daily life

Mild Cognitive Impairment (MCI)

- Contrasted with dementia:
 - meaning a significant decline in daily functioning due to cognitive impairment
- Don't confuse MCI with mild global impairment

Vascular MCI

- How frequent?
- Sydney study: 37% VaMCI, 21% VaD
- Maastricht study: 60 - 64% MCI at 6-12 months
- EBRSR: about 30-40% of patients at follow-up

Cognitive Domains

- Language & academic skills
- Spatial Reasoning
- Spatial Neglect
- Attention: auditory, visual, simple and complex
- Processing speed
- Executive skills – initiation, organization, execution
- Memory (final common outcome of attention and planning issues)

Common areas of impairment

- Processing Speed
- Attention
- Executive Skills
- Memory
 - In pre-dementia, memory issues are most common

Interventions

- Medications
- Exercise
- Cognitive Rehabilitation
- Other techniques? (TENS, prisms, TMS)

Medications

- Antidepressants - SSRIs
 - Work by increasing synapses, axonal sprouting, neurotrophic factors?
- Stimulants - dextroamphetamine
 - Work by increasing dopamine, NE levels
- Piracetam - ACh agonist
- Memantine
- Donepezil

Exercise

- Clearly improves cognition in healthy adults
- Linked to improved outcome after stroke
- May work by increasing hippocampal plasticity, nerve growth factors, glutamate receptors
- Also may increase blood flow and capillary development in the brain

Exercise

- Moderate exercise is helpful
 - 30+ minutes, 3 times per week as minimum intervention
- Too much exercise?
 - Studies in healthy population indicate fitness gains on cognition are minimal for the most active adults

Cognitive Rehabilitation

- Direct training - build up the affected skill
- Strategic training - learn better ways to do tasks

Areas for cognitive rehabilitation

- Attention (sustained, selective, divided)
- Reasoning (strategies, retrieval)
- Language
- Memory (strategies)
- Executive (planning, focus, goal-setting, self-monitoring)

Effectiveness?

- Good evidence for a weak effect of cognitive rehabilitation.
- Cicerone et al, 2000: remediation of language and perceptual skills after stroke.
- Attention, memory, executive after TBI
- Cicerone et al, 2005. 79% of studies showed a benefit from cognitive rehabilitation.

Evidence-Based Review of Stroke Rehabilitation

- A large, comprehensive review of rehabilitation research in stroke, regularly updated <http://www.ebrsr.com/>
- **Attention** training may have a positive effect on specific, targeted outcomes.
- Compensatory strategies can be used to improve **memory** outcomes.
- **Visual Neglect**: Enhanced visual scanning techniques improve visual neglect with associated improvements in function.

Evidence-Based Review of Stroke Rehabilitation (2)

- **Perceptual**: training interventions improve perceptual functioning poststroke.
- **problem-solving skills training** may improve problem solving and IADLs
- Although **multi-modal** interventions appear effective in traumatic brain injury, there is little evidence regarding stroke.

Evidence-Based Review of Stroke Rehabilitation (3)

- **Language**: Language therapy is efficacious in treating aphasia when provided intensely for the first 3 months.
- **Trained volunteers, group therapy, community-based language therapy, supported conversation, forced-use aphasia therapy** are all helpful

Cochrane reviews

- Cochrane collaboration - systematic reviews of clinical trials, in all areas of medicine and rehabilitation, linked to outcome
- das Nair, 2007; **Memory** – little evidence
- Lincoln et al, 2000. **Attention** - indication that training improves alertness and sustained attention but no evidence to support or refute
- Bowen et al, 2007: **Neglect** – improved test performance, little indication of functional impact.
- Greener, et al, 1999: **Aphasia** – no evidence

Why the differences?

- Date of review, and newer studies
- Comparison of best available vs. best possible evidence?

Can we get some detail?

- **Neglect** (Luauté, Halligan, Rode, Rossetti & Boisson, 2006)
- Approaches with reasonable evidence:
 - Visual Scanning Training
 - Mental Imagery Training
 - Video Feedback Training
 - Trunk Rotation / Neck Muscle Vibration
 - Limb Activation

Can we get some detail?

- **Perceptual relearning** following primary visual cortex loss ('blindsight')
- **Working Memory** using computerized tasks emphasizing working memory (attention and holding material in memory for brief periods)
- **Attention & Problem-Solving** training: using attention and goal-management/executive training to address self-identified issues in a group setting. Modest improvement found

Can we get some detail?

- **Executive Skills** – (Cicerone et al., 2006)
- Developing subgoals,
- Emotional self-regulation,
- Problem analysis

Can we get some detail?

- **Memory** – (Sohlberg & Mateer, 2001)
- **Deliberately Attend** to information
- **Rephrase/check** information
- **Record** notes/use checklist
- **Link** to previous knowledge
- **Organize** (semantic, chunking)
- **Recode/Visualize**
- **Practice** and Rehearse

How long does it take?

-

Does anything not work?

- Medications:
 - Bromocriptine, Dextran 40, MAO inhibitors, citicoline
- Cognitive approaches
 - Computer-based visual scanning
 - Filmed programmed language instruction
 - Target-specific therapy for global aphasia
- Other modalities
 - Electroacupuncture

Characteristics of better programs?

- **Intensity** – programs need to be done often so skills become automatic, and strategies are overlearned.
- **Generalization** – Skills need to be practiced using various materials, in varied settings, with different therapists
- **Transfer!!!** Skills won't be used without practice and plans to use them. Build in engagement and attention to task, by linking them to important outcomes, and identifying ways to be successful.

Doc Longman's Plan for Effective Rehabilitation

- **Get Ready**
 - exercise/medication
- **Get Set**
 - Learn the skills and practice them
- **Go**
 - Take those skills into the world
 - **plan, schedule, and feedback**

Case Study

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Evidence from extreme cases?

- Memory-Link program: teaching patients with severe memory impairments to use PDAs (e.g., Blackberry)
- Return to work after ACoA (with amnesia, executive deficits). DeLuca & Locker, 1996)
- High degree of structure, repetition. Learning task, maintaining engagement, then slowly taking it into practice, with cuing and social support.

Questions and thanks

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- **Questions?**