Cognitive deficits, acquired (not dementia) in adults

I. Cognitive deficits

II. Etiologies (causes)

III. Diagnostic testing

IV. Treatment or therapies

I. Cognitive deficits

A. Inattention-freedom from distraction

B. Short term memory deficit

C. Long term memory retrieval deficit (visual or auditory)

D. Sensory processing deficits

E. Processing speed - measures the ability to perform simple, relatively automatic, visual-motor tasks and maintain attention under timed conditions.

F. Visual processing/perceptual organization

G. Comprehension/knowledge/verbal comprehension/expression

H. Abstract reasoning

II. Etiologies

A. Allergies

1. Food- inflammation, fatigue, cognitive fog, inattention


B. Cardiovascular disease

1. Hypertension

Hypertension is associated with decreased verbal learning and memory ( *Stroke.* 1998;29:2334-2340)

2. Atherosclerosis-- Peripheral vascular disease (sugar diabetes, high blood pressure, high cholesterol, high triglycerides) patients performed *significantly* worse *(P<.002)* than control subjects on eight neuropsychological measures of executive function, attention, and visuospatial function. *Stroke.* 1997;28:777-784
C. Nutritional deficiencies
1. Lithium
2. Amino acids
3. B vitamins
   a. Vitamin B1
   b. folate
   c. Vitamin B12 deficiency (vegetarian diet without supplementation)
   d. Vitamin E Higher vitamin E plasma levels might provide significant protection against cognitive impairment and dementia in elderly subjects *Neurobiology of Aging* Volume 26, Issue 7, July 2005, Pages 987-994

4. Essential fatty acids-the major polyunsaturated fatty acid in the brain is DHA. High levels of DHA are in the synapses (synaptosomes, synaptic vesicles and in nerve growth cones) *Int. J. Devi Neuroscience* 18 (2000) 383±399
5. Iron
6. Iodine

D. Metabolic abnormalities
1. Diabetes mellitus with sugars not in good control Glucose control led to better working memory in adults with diabetes mellitus Type 2 (Ryan et al, 2006, *Diabetes Care* February 2006 vol. 29 no. 2 345-351)
2. Hypothyroidism
3. Hyperhomocysteinemia Patients with hyperhomocysteinemia had worse performance in visuoconstructional performance such as in geometric figure copy and clock drawing tests. *Dement Geriatr Cogn Disord* 2008;26:506-512

E. infections
a. herpes simplex virus causes lowered immediate memory (Dickerson et al, *Arch Gen Psychiatry.* 2003;60:466-472)

b. Tick born disease- deficits in attention, memory, executive functioning, and sensory processing

c. Postbacterial encephalitis

F. Toxins
a. heavy metal poisoning
   i. lead
   PbB below 70 µg/100 ml reduce neurobehavioural abilities, particularly visuospatial abilities and executive functions referring to the prefrontal cortex (Barth et al, *International Archives of Occupational and Environmental Health*, Volume 75, Number 6, 394-398 (Reduced cognitive abilities in lead-exposed men).

G. Sleep disorder
Daytime sleepiness is associated with functional impairments in a broad range of activities, including a moderate to large negative effect (effect size range from 0.59 to 0.83, P < .005) on the following functional domains of the FOSQ: social outcome, general productivity, vigilance,

1. Obstructive sleep apnea
2. Periodic limb movements of sleep
3. Insomnia
4. Nocturnal seizures

H. Post traumatic brain injury
Naming and word fluency under timed conditions, verbal and visual memory, and the ability to infer similarities (Goldstein et al, J Neurol Neurosurg Psychiatry 1994;57:961-966 Neurobehavioral consequences of closed head injury in older adults).

I. Seizures can cause memory loss, can be nonconvulsive

III. Diagnostic testing
a. Fasting blood amino acids, vitamins B1, 2, 3, 5, 6, 12, biotin, essential fatty acids, folate (Kado et al, The American Journal of Medicine, Volume 118, Issue 2, February 2005, Pages 161-167), urine MMA, 3rd generation TSH, free T3, free T4
   Hgb A1C, fasting glucose and insulin, glucose tolerance test
   Herpes simplex type 1 IgG and IgM, HSV Type 2 IgG and IgM
   Venous blood gas (for pesticide poisoning looking for lack of oxygen extraction)
   Homocysteine
   C reactive peptide testing (in older adults with cardiovascular disease) is associated with cognitive deficits, including deficits in global cognitive performance, attention/psychomotor function, executive function, memory, and visuospatial abilities (Gunstad et al, Journal of Clinical Neuroscience, Volume 13, Issue 5, June 2006, Pages 540-546)
   ESR
   Meridian Valley for IgE and IgG reaction to foods and environmental allergies
b. Hair lithium testing
c. Urine fractionated porphyrin
d. Consider head MRI, especially for focal neurologic dysfunction or if there are no identified causes for cognitive decline
e. Consider EEG, especially if there is episodes of urinary loss, loss of time, significant memory deficits

IV. Treatment
A. Diet
   Protein, 5 vegetables/day, 1-2 fruits per day, measured starch carbohydrates, nuts and good oils (olive oil)
   Antidiabetic diet, if appropriate
   Protein every 3-4 hours
   Limit excessive starch carbohydrates and concentrated sugars
   Chromium
   Vanadium
   Omega 3 fatty acids, take fish oils 3000 mg per day
Anti-inflammatory diet (omega 3, 6, 9 fatty acids, grass fed animals, wild fish, organic), avoid dairy (except yogurt) and corn fed or grain fed animals

B. Nutritional supplementation for nutrients which are deficient

C. Consider methylcobalamin injections (methylated vitamin B12 injections)

D. Exercise 1 hour/day to boost neuronogenesis (could even exercise 30 minutes 2x/day)

E. Blood pressure control (avoid hypertension), best to treat with good diet and exercise, better than antihypertensives and statins or anticholesterol medications, due to risk to liver of medications

F. Treat infections such as herpes simplex virus (antiviral medication, nutritional supplements and homeopathy) or Tick born disease (treat with antibiotics, herbs, homeopathy and nutritional support)

G. Measures to reduce toxin exposure
   i. Reverse osmosis water filtration or distilled to remove heavy metals, infectious organisms
   ii. Not eat fish with high mercury content
   iii. Organic foods to reduce pesticides and some heavy metals associated with the pesticides, reduce arsenic
   iv. Organic gardening- no pesticides, fungicides nor insecticides

H. Oxygen therapy improves working memory. Inhalation of oxygen prior to learning a word list gave a significant increase in mean number of words recalled 10 min later, compared to subjects who inhaled oxygen immediately prior to recall or to controls who underwent no intervention (Moss and Scholey, Psychopharmacology Volume 124, Number 3, 255-260.

I. memory remediation is effective for head-injury patients with memory deficits. Memory remediation 1992, Vol. 6, No. 1, Pages 65-70

J. Donepezil. Aricept may be associated with a relative maintenance of CBF and improved list-learning. 1992, Vol. 6, No. 1, Pages 65-70

K. Computer programs
   i. Brain Fitness program by Posit Science Corporation

   225 Bush Street, San Francisco, CA 94104 (415) 394-3100 positscience.com

   Faster name recall, greater attention to detail, better concentration, and quicker problem-solving skills

   Brains become smarter, faster and more flexible

L. Caffeine —100-200 mg can improvement in alertness, vigilance, mood and physical endurance (but excessive caffeine can cause side effects such as anxiety, headache, insomnia, dehydration)

M. Sleep beneficially affects insight formation, novel-language perception, visual discrimination, and motor skills. Napping has been shown to increase alertness and promote learning on some memory tasks. Behavioural Brain Research Volume 193, Issue 1, 3 November 2008, Pages 79-86

N. Quercetin and or Turmeric for anti-inflammatory effect as needed

Disclaimer: All information from this handout should be discussed with your health care provider, prior to obtaining laboratory testing or treatment.