

COGNITIVE CHALLENGE OF AGING BRAIN AND DEMENTING PROCESSES : A Discussion. August 2016

Alexander Reeves MD

Brain structure and function changes affect all of us during the aging process beginning as early as the fourth decade, but to varying degrees, depending upon both internal and external influences.

The cognitive reflections of these changes vary from minimal symptoms ,in particular memory difficulties best described as delayed recall, to major problems learning new material [imprinting and retrieval], and ultimately major difficulties with important past memories. Further deterioration leads to significant problems with judgment and other intellectual skills loss of which define the term dementia ,or if acute and reversible, delirium –eg excess alcohol intake , dehydration, hypothermia--.

Virtually all of us will have experienced instances of delayed recall throughout our lives and this will become more prominent as we age, and to the point of significant frustration in some. Trying to remember a forgotten name ,safe storage place or other data may become acutely difficult and a frustration, only to literally surface from somewhere on the back shelves of memory storage minutes to days later. The emotion [frustration] generated by these instances is counter productive and appears to further block retrieval of the material. Later ,minutes to days or more, when there is less or no pressure to remember the material, the information not infrequently surfaces.

Of interest, the brain regions underlying both emotionality and learning and memory overlap in the the limbic system ,and one can hypothesize that excessive emotive activity -- eg frustration—might temporarily usurp or block memory functions. On the other hand , an appropriate amount of motivation and attention capacity is necessary for learning [imprinting] new material.

However, because delayed recall is a universal phenomenon it is difficult to consider out of the norm . As mentioned above, its severity varies considerably and does become more prominent as we age. And it may be a precursor in some to frankly dementing conditions, and in particular Alzheimer's disease. This is not proven and countered by statistics which indicate that close to half of us will develop some degree of dementia while all of us have delayed recall difficulties , which have been present but less prominent beginning as early as our teens.

Pathologically based dementia typically causes major defects in learning new material and it is worth noting : if you can remember you are having trouble remembering - ie have insight - you are unlikely beyond the norm of senescent [aging] delayed recall .

This can be encouraging but does not attend to the major problem the developed world is facing, the apparent inexorable emergence of dementing processes in as many as 10% of those 65 years old ,and progressing to 50% of those 85 years of age and older , and 3/5ths [~30%] likely will have what has been defined as Alzheimer's disease. Is this just a reflection of an inevitable natural brain deterioration of aging and our increasing life span? Although the brains of most adults will show the cellular hallmarks of Alzheimer's disease, neuronal tau protein tangles and beta amyloid plaques ,signs of neuronal deterioration progressively more prevalent with age ,the number of these structures is much greater in the demented person. One might conclude that Alzheimer's is just accelerated aging of the brain. This does have some traction but the presence of large populations with a much lower incidence of Alzheimer's disease does not support this negative hypothesis. India has approximately 10% the prevalence of Alzheimer's disease present in the US. However, when Indians migrate to the US and assimilate , they develop an increased incidence of the disorder.

And at least 70% of us do not develop Alzheimer's .

There is some small but significant familial predisposition for Alzheimer's, but one can conclude positively from the above observations that external etiological factors are likely at play , and searching for ways to prevent brain deterioration by elucidating these external factors is a critical venture. This will be the subject of our discussion . Delaying aging or allowing normal aging , both physically and mentally, is also our goal. . Many approaches will have reasonably supported bases ,while others will be hypothetical and at least of heuristic value.

The first order of business before dealing with Alzheimer's disease is to attend to the statistic which is of greatest significance, that 50% of us will develop some degree of dementia by the time we are in our mid eighties and beyond. But this is not carved in stone, and a closer look at the many possible causes of intellectual deterioration will reveal a number of likely preventable and reversible brain structure and function challenges.

1: Evaluate possible effects of medications commonly prescribed and associated with memory defects :

- a. All cholesterol lowering medications eg Statins among others, and statins not only lower cholesterol ,but have multiple other effects which challenge cerebral function.

Cholesterol is a major structural element of neurons and their processes. Some statin associated changes may be at least in part irreversible.

b. All medications which depress the function of acetylcholine a major neuronal transmitter throughout the nervous system and a key neurotransmitter for the memory system. Most changes are reversible but chronic daily use may cause irreversible changes.

Examples:

Antihistamines eg Benadryl which is a major content of most over the counter sleep aids and in many medication compounds used for asthma and other allergies. This is mainly a problem when antihistamines are used on a daily basis ,and they also can exacerbate cognitive decline present for other reasons.

Tricyclic antidepressants eg amitriptyline ,imipramine;
Trazadone [Desyrel] ,a tetracyclic antidepressant frequently used as a sleep med.

SSRIs [Prozac,Paxil,Zoloft etc]are associated with an increase in delayed recall , even in young adults

Oxybutinin [Ditropan] and other overactive bladder suppressants.

All psychotropic meds eg Abilify, Seroquel, Haldol,thorazine , and many more.

All narcotics and narcotic derivatives

c. BP medications ie beta blockers [Inderal etc]

d. Sleep medications eg Ambien, Lunesta, Rozerem and others
Barbiturates , alcohol [actually a sleep inducer and then interrupter]

e. Proton inhibitors eg Nexium, Prilosec , Prevacid , Protonics etc
All decrease Vit B12, folate ,magnesium ,calcium, zinc ,iron, and Vit C absorption.

2: Consider metabolic problems associated with or exacerbating cognitive difficulties.

a. Disorders and diseases

[There is a great deal of overlap in these entities]

Diabetes

Hypertension

Decreased thyroid function

Renal failure

Liver dysfunction

COPD

Congestive heart failure – and meds used to treat it

B12 deficiency

Vit D3 deficiency

Magnesium deficiency

Obesity

Dehydration ,a very common problem in the elderly

- b. Life style problems which lead to multiple medical problems as in a. and include cognitive burdens and deterioration

Today's Western Diet

Lack of adequate or appropriate exercise

Smoking

Poor oral and dental care eg chronic gingivitis

Poor bowel flora [probiotic]maintenance

Alcohol abuse

- c. Pollution of air,water and earth

Thousands of chemicals are burdening our environment, most of which are unvetted, and many are known metabolic toxins and can directly or indirectly affect brain structure and function - eg herbicides and pesticides are associated with the development of Parkinson's and also Alzheimer's disease ; chronic air pollution --'smog'-- also associated with brain atrophy and dementia.

Many of the above problems can be ameliorated or prevented , but some may need be weighed relative to their benefits versus risks. For example, some medications may solve major life threatening problems ,and the side effect profile and expected collateral damage which includes cognitive challenge may need be neglected.

LIFE STYLE FORMULA FOR PREVENTING OR FORSTALLING DETERIORATION OF BRAIN STRUCTURE AND FUNCTION-

Diet :

High intake of fresh produce ,organic where possible. Increase raw produce intake.

Mediterranean or similar anti-inflammatory menu[Dr Andrew Weil has a good anti-inflammatory diet pyramid on line]

Mediterranean Diet : Primarily plant based with a high intake of fresh veggies and fruit ,nuts ,legumes and whole grains. Poultry and fish [not smoked] best but a modicum of grass fed ,appropriately minimally cooked ,and not charcoaled or seared red meat also reasonable. Good fats key and extra virgin olive oil, coconut oil, palm oil, lard, avocado and nut oils all good but need to avoid heating to smoke point if used in cooking.

Red wine is a significant part of the Med Diet and should be imbibed with food ---- above and beyond the toxicity of ethanol its dose of beneficial polyphenols appears healthy. – Limit should be approximately two glasses/day for men ,one for women who, in general, have a lower alcohol metabolism capability.

Red wine is not the cause of the French paradox[high fat and white flour intake ,but in spite of this better health and longevity than many other ‘advanced ‘ nations]--- the total Med Diet is, and the fresh produce, high good fat aspect appear the most significant.

In general follow a low and unprocessed carb ,high good fat[eg extra virgin olive and coconut oils, lard, butter, nut oils, etc] regimen. Up to 50% daily calories from good fat is healthy. Avoid omega 6 salad and cooking oils [corn, canola, peanut, soy, sun and safflower oils],and hydrogenated oils including margarine. Most processed Omega 6 oils are oxidized during the processing, and more so when used in high temperature cooking such as deep frying, and for this reason are highly inflammatory.

Supplement with omega 3 oils, or eat fatty fish, preferably wild caught. High DHA content fish oil supplements appear best for cerebral maintenance..

Both omega 3 and also omega 6 oils are essential for health. Omega 3s are best sourced as supplements or directly from fish, squid, algae and krill, while the best source for non-oxidized omega 6 oils is in fresh produce.

Avoid processed grains, in fact , as many processed foods as possible.

[The story on wheat and gluten intolerance is not yet clarified, but decreasing wheat intake ,even whole grain, not unreasonable, even if just to decrease the glycemic load, which is higher than that of sugar. The text ‘Grain Brain’ by neurologist David Perlmutter should be read before accepting the PC position on all wheat or the other gluten containing grains, ie rye and barley .]

Sugar, and high fructose corn syrup should be discontinued or greatly diminished . Raw honey in modest amounts an ok compromise but its healthy nutrients are destroyed by heating so cool your coffee or tea a bit before adding the honey.. Xylitol, erythritol , and other sugar alcohols acceptable [Xylitol toxic for pets]. Stevia also reasonable though long term risk studies not yet available.

Artificial sweeteners are all potentially toxic in any concentration [Sucralose, aspartame, acesulfame, saccharin, cyclamate] and have direct and /or indirect effects on the nervous system--- and also paradoxically predispose to diabetes and obesity. Do Not Use !

Exercise:

a. Body

At least three, preferably five sessions /week of approximately 30 minutes of aerobic exercise which includes 5-7 30 second intervals when exertion is enough to keep one breathless [~anaerobic], unable to converse, resting for enough time between intervals to catch your breath. The type of exercise not critical. Brisk walking is fine, but jogging, swimming, cycling, rowing, gym machine modes etc are all reasonable, and 1-2x week resistance [isometrics or weights] exercise also useful.

Rationale: Intervals and also resistance exercise, less so aerobic level exercise, increase growth hormone release, important for total body maintenance. They also increase brain derived neurotrophic factor which stimulates neuronal repair and stem cell activation in the brain,---and an added dividend is the endorphin rush which helps lead to the desirable exercise addiction. In addition to brain maintenance effects, interval exercise is most appropriate for building and maintaining cardiac and immune health.

b. Brain:

Truly, like muscle, use it or lose it.

Some recommendations:

Read, read and read some more.

Learn new intellectual skills- eg Language lessons for planned trip to ?

or to converse with your increasingly numerous Spanish speaking neighbors.

Sign up for adult education courses

Develop or pursue hobbies.

SOCIALIZE !!!

Congregate, catch up, volunteer

And yes, be a skeptic---definitely more brain exercise than the 'road more travelled' passive acceptance of 'expert' advice, and do remember :

“Unthinking respect for authority is the greatest enemy of truth”
Albert Einstein

Music is a total but prominently right brain stimulator. Some studies have suggested classical music best.

New motor skills also improve brain function. Painting, acquiring a musical instrument capability, fly fishing, model building and an infinite number of other possibilities all useful.

Television is passive entertainment, and at best a mediocre stimulus, but some video games, if challenging, useful.

The heavily advertised ‘Lumosity.com’ program and some others appear to be useful

Sleep:

This is a somewhat controversial subject, but it is clear that inadequate sleep length and quality is detrimental to brain function. Seven to nine hours non-drugged sleep with few interruptions appears ideal and naps of less than an hour during the day are healthy.

At bedtime, a quiet, dark ambience sans TV or computer good. Avoiding a big meal or alcohol within 3 hours of sack time helpful.

Sleep apnea, frequently heralded by excessive snoring, is a destructive phenomenon which can be ameliorated, and is easily diagnosed in a sleep lab.

Stress:

Chronic stress creates a chronic inflammatory internal environment, predisposing to depressed cognitive function and a compromised immune system.

Stress management programs have been shown to be of ameliorative and prophylactic value. Yoga and meditation modes also can be helpful.

Diet and exercise as discussed above clearly shown to be useful.

Pharmaceutical approaches may relieve symptoms, and as a rule are only useful short term if at all, and otherwise fraught with significant side effects. None have been shown to halt or reverse Alzheimer’s disease.

Alzheimer’s Disease

The common etiological denominator for most chronic Western diseases is INFLAMMATION.

Inflammation is a necessary body protective and restorative function . When an injury or infection occurs inflammatory functions are marshaled up to counter the problem and initiate and maintain repair. The inflammation recedes when the problem is under control. The immune system is part of the inflammatory mechanism which intercedes when threats are perceived such as infection or malignant transformations.

When the inflammatory stimulus becomes chronic ,destructive forces come into play, and overlap into normal tissues. The results in the nervous system are degenerative diseases, and Alzheimer's and Parkinson's disease are the most common. Atherosclerosis and cancer are also at base diseases triggered and maintained by chronic inflammation.

We have discussed various important life style changes above , all of which help to avoid chronic inflammation, and are the most important modes for countering or avoiding chronic inflammation.

It is not surprising that a multitude of dietary and supplemental approaches to the degenerative disorders are anti-inflammatory ,and many also antioxidant . Many of these modes have been shown to be effective in laboratory models and/or clinically, but some are still at the intuitive stage and at least promising .

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Listed below is a multitude of substances, some of which we can discuss but all of which can be researched on line.

It is important that you avail yourself of due diligence on all of these materials and recommendations. Greenmedinfo.com is an excellent resource which attempts to keep all its material evidence-based and has an enormous reference bank which is easily resourced.

There are more, and the common denominator for most appears to be an anti-inflammatory/antioxidant effect. This effect is useful in preventing or ameliorating most of the self imposed chronic diseases of the developed world, including atherosclerosis and cancer ,and autoimmune diseases.

Again, to date, the pharmaceutical approaches to Alzheimer's disease have had a mild symptomatic effect, but have not had a curative or significant preventative effect, and are associated with significant known and unknown risks.