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NEW PERSPECTIVES: PART II

The Story of Procera AVH

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> *"A new 'natural solution' for forgetfulness, brain fog, poor focus, mood swings, and mental fatigue brought on by aging, stress, sleep loss, and poor diet. The first brain supplement clinically tested for efficacy!"*
>
> —Procera AVH ad

LB is a 68-year-old African-American woman with a history of cath stent placement, obesity, and memory loss who comes to the office for left shoulder pain. After her pain is addressed, she presents a bottle of Procera AVH, a new supplement she has recently bought to improve her memory and cognition. She asks for her physician's blessing to use of this promising supplement and perhaps even a stamp of approval for its well-advertised efficacy.

So what is Procera AVH (cognitive enhancer)? According to the official website, the supplement contains "three miracle memory molecules," which are Vinpocetine (VIN), Acetyl-l-carnitine (ALC) and Huperzine A. To examine this miraculous supplement, let us take a closer look at each of these ingredients.

Vinpocetine (VIN)

VIN is a synthetic ethyl ester of apovincamine, a vinca alkaloid obtained from the leaves of the Lesser Periwinkle (*Vinca minor*).[1] Since its discovery in the late 1960s, there have been several studies looking into its potential and a Cochrane systemic review on its efficacy in acute ischemic strokes. The Cochrane review by Szatmari and Whitehouse specifically looked into VIN's role in treating cognitive impairment and dementia. In this 2003 systemic review, the two authors evaluated all human, unconfounded, double-blind, randomized trials that compared VIN with a control in patients with vascular dementia, Alzheimer's dementia, mixed, and other dementias.[1] The outcomes they were looking for were cognitive function, global impression (a seven-point scale to assess severity and clinical improvement after a treatment trial), quality of life, functional performance, effect on caretakers, death, safety, and adverse effects.[1] Only three studies with a total of 583 patients met the criteria set by the authors. After being independently selected and reviewed, the results of these three studies were deemed inconclusive.[1] While there were some benefits in functional performance and global improvement from the VIN treatment (30mg/day and 60mg/day) compared to placebo, the number of patients treated for six months or more was small. Adverse effects were not consistently reported, and of VIN's effects on depression and quality of life were not adequately addressed.[1] In conclusion, the evidence to support the use of VIN on patients with vascular or degenerative dementia is insufficient to make the recommendation for its clinical use.[1]

Acetyl-l-carnitine (ALC)

ALC is an acetylated form of carnitine, a molecule involved in long chain fatty acid transportation between the cytoplasm and mitochondria.[2] It has been proposed to induce an increase in acetylcholine release and to have a strong anti-oxidant effect on CNS neurons.[2] In the Cochrane review done by Hudson and Tabet, the potential cognitive benefits of ALC on patients with dementia were evaluated. Sixteen double-blind, randomized, controlled trials were included in this meta-analysis. The effect of ALC was compared to that of placebo based on clinical global impression of change, global severity of dementia, cognition, behavior, mood, activities of daily living (ADLs), institutionalization, acceptability of treatment, safety, and mortality.[2] The reviewers found no serious adverse side effects of ALC. The most common side effects of ALC reported were diarrhea, nausea, and vomiting. There was some evidence of improvement in clinical impression. There were also positive effects of statistical significance reported by several earlier trials on memory and severity of dementia.[2] However, there was great heterogeneity among the studies reviewed in terms of durations of treatment, different doses, various age groups, and inconsistent positive effect on mini-mental state examination (MMSE) (at 24 weeks but not at 12 or 52 weeks).[2] All of these studies also focused solely on Alzheimer's dementia. Due to these variations and limitations, the reviewers did not find the evidence to be strong enough to support the use of ALC in clinical practice.

Huperzine A

Huperzine A is a competitive, reversible acetyl cholinesterase inhibitor derived from Chinese club moss *Huperzia serrate*.[3] It has been said to have a protective effect on cholinergic neurons and is considered a promising agent to treat dementia, specifically Alzheimer's dementia.[3] These potential benefits were evaluated by a Cochrane sys-

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temic review in 2008 that looked at six double-blind, randomized, controlled trials with a total of 454 Alzheimer's patients. The outcomes measured in these studies were changes in cognitive function, global clinical assessment, mortality, behavioral disturbance, functional performance, quality of life, caregiver burden, and adverse effects. The analyzed results showed that, compared to placebo, Huperzine A significantly improved cognitive function based on MMSE and ADAS-Cog (Alzheimer's disease assessment scale-cognitive subscale), global clinical impression, behavioral disturbance, and functional performance. They also reported the most common adverse events of Huperzine A to be symptoms of cholinergic side effects, such as dizziness, anorexia, constipation, nausea, insomnia, and somnolence. Despite these promising results and mild adverse effects, the reviewers cautioned against routine use of Huperzine A in patients with Alzheimer's disease because of the limitations of these six studies—all of which were published in Chinese and conducted in China where there is little racial diversity as well as an unusually high proportion of positive results in publications.[3] With these limited results from six studies with small numbers of participants, the reviewers concluded that the evidence was insufficient to support the use of Huperzine A to treat Alzheimer's disease. Along the same line of thought, Rafii et al. conducted a phase II trial of Huperzine A in patients with mild and moderate Alzheimer's disease in 2011. There were 210 patients who were age 50 or older with a probable diagnois of Alzheimer's disease in this double-blind, randomized, placebo-controlled dose escalation trial.[4] Patients were assessed at baseline and weeks 8, 11, 16, 20, and 24 for changes in cognitive performance (ADAS-cog and MMSE), daily function, behavior, and global status.[4] It was concluded that Huperzine A at 200 µg BID did not indicate efficacy in treating mild to moderate Alzheimer's disease.[4] However, the 400 µg BID dose showed promising improvement in cognitive function as measured by ADAS-cog and MMSE at 16 weeks and in secondary analyses at 24 weeks.[4] Additionally, the study reported no serious adverse effect aside from nausea. In the end, due to the limited power (11.4% of subjects unable to tolerate Huperzine A) and confounding factors (such as previous anti-cholinesterase treatment), the authors suggested that further studies needed to be done to ascertain the long-term effects of Huperzine A and its efficacy.

Conclusion

While the search for research articles on Procera AVH in PubMed yields no result, the company behind this supplement provides its own evidence of efficacy from a randomized, double-blind, placebo-controlled study by Stough et al. from 2009. The researchers reported improvements on mental clarity, mental energy, memory, and mood disturbances in the Procera arm at the dose of 1,515 mg (3 pills) per day over the course of 30 days.[5] However, the value of this study is limited by the small number of participants (74) who were healthy adults without dementia and the use of the CDR (Cognitive Drug Research) program, an automated computerized cognitive assessment system, instead of the MMSE and ADAS-cog. In addition, this article was published in the *Journal of the American Nutraceutical Association* (JANA) and was not accessible through PubMed. Therefore, combined with the insufficient evidence on the efficacy of each ingredient in Procera AVH, the research fails to support the health benefits as well as cognitive enhancing properties claimed in the advertisement. Only the promise of Procera's mild side effects seems to hold true since the above studies reported solely tolerable symptoms such as nausea, GI disturbances, and headache. In conclusion, it would be unwise to advocate for the use of Procera AVH without informing patients about its side effects and lack of conclusive evidence on its cognitive benefits.

Discussion

In addition to Procera AVH, a quick search on Google yields numerous supplements and memory pills that promise to improve cognitive function for both healthy clients and dementia patients. Some of the popular memory enhancers are vitamin E, B6, B12, folic acid, ginkgo biloba, ginseng, and omega-3 fatty acid, and each has been examined in separate Cochrane systemic reviews in recent years. Looking only at unconfounded, double-blind, randomized trials of treatment versus placebo, the reviewers have found no convincing evidence to support the benefits of vitamin E, B6, B12, folic acid with or without B12, ginkgo biloba, ginseng, and omega-3 fatty acid on cognitive function of people with or without dementia/cognitive impairment.[6-12] Fortunately, there is one treatment that seems to have a positive effect on cognitive function, and that is physical activity. In the 2008 Cochrane review of physical activity in people without cognitive impairment, the reviewers found that aerobic exercises that improve cardiorespiratory fitness (hour-long training programs performed two to three times a week for an average of 14 weeks) showed significant positive effects on cognitive speed, motor function, and visual and auditory attention.[13] Furthermore, a 2013 Cochrane re-

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view of exercise in dementia patients found improvement in cognitive functioning and ability to perform ADLs among the treated patients.[14] But due to the heterogeneity in diagnosis/severity of dementia and exercise program duration among the studies examined, the authors recommended that more large-scale trials be done to solidify these promising early results.[14] Lastly, there is also consistent evidence of effectiveness of cognitive stimulation (group activities such as discussion of events, completing word games or puzzles, listening to music, baking, or gardening) on cognitive functions, quality of life, and communication in patients with mild to moderate dementia.[15] While cognitive stimulation has been demonstrated to be beneficial, similar but more directed programs such as cognitive training (guided practice with standardized tasks and stratified levels of difficulty) and cognitive rehabilitation (one-on-one intervention strategized by a therapist) have not shown sufficient evidence of positive effects and significant benefits due to the limited quality and quantity of studies.[16] Hence, from the above results, the best recommendation for memory supplement and enhancement for patients like LB may just be to stay physically active with daily aerobic exercises and mentally engaged in shared activities or personal hobbies.

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