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Role of Ibuprofen and Ginkgo Biloba in Treating Alzheimer's Disease

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ABSTRACT

During the development of new drug for treating Alzheimer's disease, we found that the long term use of Ibuprofen has ability to decrease the risk of Alzheimer's disease but there is no exact proved mechanism of Ibuprofen in treating the Alzheimer's disease. The suggested mechanism of Ibuprofen is it can cross the Blood Brain Barrier and suppress neuritic plaque formation and inflammation in Alzheimer's brain and can also act as potent free radical scavenger and reduce lipid peroxidation. The mechanism of Ibuprofen is assumed based on pathology of Alzheimer's disease i.e cholinergic hypothesis, free radical production and extracellular deposition of amyloid plaques which causes Alzheimer's disease. Not only the synthetic medications, natural extracts like ginkgo biloba also used to treat Alzheimer's disease. It has been proved by many small studies conducted on Alzheimer's disease mice but large studies on mice failed to cure the Alzheimer's disease.

Key words: Amyloid plaques, Alzheimer's disease, Ginkgo biloba, Ibuprofen, Tau proteins.

INTRODUCTION

Alzheimer's disease is a neurodegenerative condition and a buildup of plaques and tangles in the brain, along with cell death, causes memory loss and cognitive decline.

- Long term use of ibuprofen and other drugs commonly used for aches and pains was assosciated with lower risk of Alzheimer's disease.
- The study found that people who specifically used ibuprofen for more than 40% less likely to develop.
- Alzheimer's disease, results also showed that longer ibuprofen was used, the lower the risk of dementia.
- In addition, people who used certain types of NSAID'S for more than 25% less likely to develop Alzheimer's disease than non- users.
- Some of these medications taken long term decrease the risk of Alzheimer's disease, but it is very dependent on exact drugs used. It does not appear that all NSAID'S decrease risk at same rate.
- One reason, ibuprofen may have come out so far ahead is that it is by far most commonly used.
- Ibuprofen crosses blood brain barrier and suppress neutric plaque pathology and inflammation in Alzheimer's disease brain.

Pathology of Alzheimer's disease:

- Alzheimer's disease is a neurodegenerative disease which is most common cause of dementia.
- Three major factors in progression of the Alzheimer's disease are :

1. β – amyloid plaques.
2. Neuro fibrilary tangles.
3. Cholinergic hypothesis.

1. Formation of β-amyloid plaques:

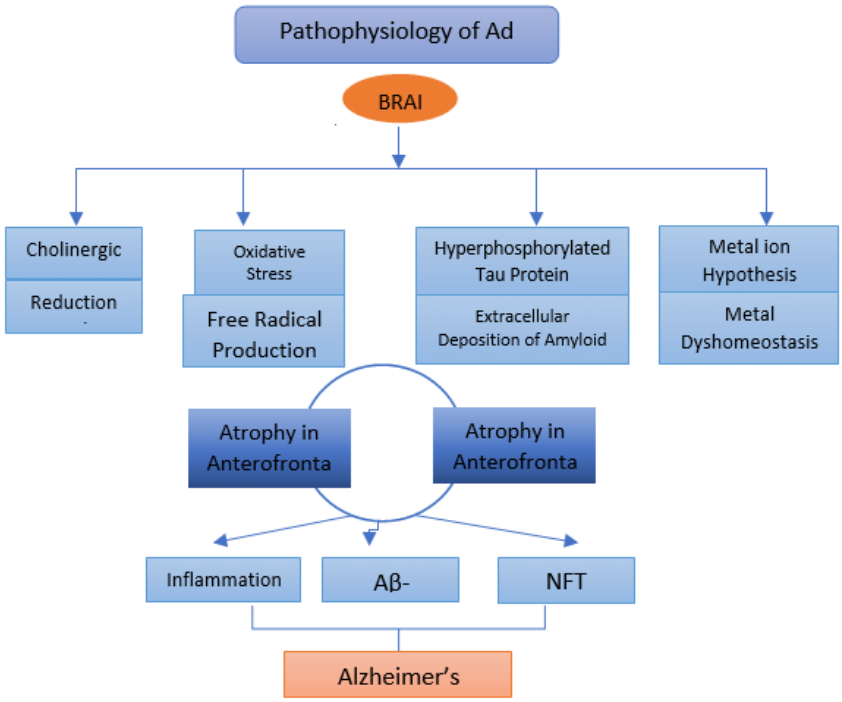
- In cell membrane amyloid precursor protein is present
- β-secretase enzyme breaks amyloid precursor protein into two parts, the major part is β-amyloid monomer proteins which are sticky in nature.
- These monomers aggregate to form oligomers if it is not removed from body form plaques.
- These β-amyloid plaques forms in between two nerve cells and disrupts signaling.

2. Formation of neuro fibrilary tangles:

β-amyloids activate intracellular kinase and phosphorylates tau proteins in the cell membrane. The phosphorylated tau protein detach and aggregate in nerve cells leads to formation of fibrilary tangles which destabilize microtubules and disable intracellular transport and causes neuronal apoptosis.

3. Cholinergic hypothesis:

In the 1970's, neocortical and presynaptic cholinergic deficts were reported to be related to the enzyme acetylcholine transferase, which is responsible for the synthesis of acetylcholine(Ach). Due to essential role of Ach in cognitive function, a cholinergic hypothesis of Alzheimer's disease was proposed. Ach is synthesized in the cytoplasm of cholinergic neurons from choline and acetyl-coenzyme A by the acetylcholine transferase enzyme and transported to synaptic vesicles by vesicular acetylcholine transporter. In the brain acetylcholine is involved in various physiological process such as memory, attention, sensory information, learning and other functions. Any damage to these cholinergic neurons leads to Alzheimer's disease and causes alteration in cognitive function and memory loss.



Role of ibuprofen in treating Alzheimer's disease:

Ibuprofen belongs to a category of non steroidal anti-inflammatory drug(NSAID) and it works by blocking body's production of certain natural substances that cause inflammation. So, Ibuprofen is used to relieve pain from various conditions such as headache, dental pain, muscle ache or arthritis and helps to decrease swelling, pain or fever. Not only the above therapeutic uses, some studies has proved that Ibuprofen has ability to relieve the symptoms of Alzheimer's disease. So, one assumed theory has been established that Ibuprofen crosses Blood Brain Barrier and supress neuritic plaque formation and inflammation in Alzheimer's brain. Additionally, Ibuprofen acts as a potent free radical scavenger and it can reduce lipid peroxidation which is responsible for Alzheimer's disease.

Dose: Mostly Ibuprofen is administered orally, for every 4-6 hours with water. The dose taken for the use of Ibuprofen in adults is 800 mg/dose or 3200 mg/day(4 maximum doses). Child dose is based on age and weight of children overdose of Ibuprofen may cause stomach and intestine disturbances.

Side Effects: use of ibuprofen may cause some side effects such as

- Upset stomach.
- Nausea.
- Vomiting.
- Diarrhoea.
- Constipation.
- Dizziness.
- Anemia.
- Edema, Haematuria.

Interactions of Ibuprofen with other drugs:

- Increased risk of GI bleeding with Warfarin, Corticosteroids and Aspirin.
- It may reduce natriuretic effects of diuretics.
- Reduced anti hypersensitive effects of ACE inhibitors.
- May increase toxicity of lithium and methotrexate.

GINKGO BILOBA

- Ginkgo biloba consists of leaves obtained from dioeceous tree ginkgo biloba (maiden hair tree) belongs to family: ginkgoaceae.
- It has medicinal medicinal values in treating dementia and Alzheimer's disease.
- Ginkgo biloba, acts as a dietary supplement to enhance cognitive functions.
- One of the major hallmarks of Alzheimer's disease is the buildup of amyloid
- beta(Aβ) plaques outside of brain cells. These abnormal proteins deposits cause inflammation, which damages the neurons, this leading to cognitive impairment seen in Alzheimer's disease

GINKGO BILOBA PLANT

Role of ginkgo biloba in treating Alzheimer's disease:

- A dry natural extract from ginkgo biloba leaves has exhibited anti Alzheimer's disease effects in several preclinical and clinical studies conducted on transgenic mice.

- Even though some preclinical and clinical studies on Alzheimer's disease mouse shows improvement of cognitive functions. Some researches has said that ginkgo biloba is not an accurate treatment of Alzheimer's disease.

Study of ginkgo biloba activity in Alzheimer's disease mice:

- When ginkgo biloba extract administered to Alzheimer's disease mice as a dietary supplement for 2 or 5 months.
- Plasma concentrations of ginkgo biloba extract (EGb 761} components in mice were in same range as in humans taking EGb 761 as recommended dose (240 mg daily).
- Treatment with EGb 761 for 5 months improved cognitive function of mice.
- It was measured by BARNES MAZE TEST.
- It also reduces loss of synaptic structure proteins, such as PSD -95, Munc18-1, and SNAP25.
- Treatment with EGb 761 for 5 months inhibited microglial inflammatory activation in brain.
- The effects of treatment of EGb761 for 2 months were weak and not statistically significant.
- Additionally, long term treatment with EGb761 may reduce Aβ pathology by inhibiting β secretase activity and Aβ aggregation.
- Therefore, long term treatment with ginkgo biloba extract EGb 761, a clinically available and well tolerated herbal medication, ameliorates Alzheimer's disease pathology by anti inflammatory and Aβ – directed mechanism.
- Most research on ginkgo focuses on its effect on dementia, memory and pain caused by too little blood flow.
- Researching facts on ginkgo biloba shows that there is no exact evidence to support the ginkgo in preventing dementia or improving mild cognitive impairment.
- Evidences on ginkgo treating in Alzheimer's disease has both positive and negative claims.
- Mostly indicate that ginkgo does not improve memory, attention or brain function. Only few studies told that it has useful activity in improving memory.
- Even though ginkgo extract is safe as dietary supplement it is not scientifically proved in treating Alzheimer's disease. So, be cautious while using.

CONCLUSION

There is currently no cure and also no way to prevent Alzheimer's disease so ongoing research is looking at ways to detect the disease earlier and stop its prevention but drugs and other treatments can help slow or ease the cognitive, emotional and behavioural symptoms and improve the person's quality of life. Based on the provided information the active constituents of ginkgo biloba and ibuprofen can treat or relieve the symptoms of Alzheimer's disease. The combination of gingko biloba and Ibuprofen acts as a good medication to treat Alzheimer's disease until the accurate medicine is available in the market.

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