A Novel High Tech Approach to Monitor the Pharmacotherapy of Alzheimer: a Narrative Review

Maryam Parvaneh [a]*, Farshad Hashemian [b]

Authors' Affiliations:
[a] Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University, Tehran-Iran (IAUPS).
[b] Department of clinical pharmacy, Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University, Tehran-Iran(IAUPS).

Abstract Presenter:
Maryam Parvaneh
Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University, Tehran-Iran (IAUPS).
Gmail address: parvanehspring1391@gmail.com

****Correspondence:***
Maryam Parvaneh
Faculty of Pharmacy, Pharmaceutical Sciences Branch, Islamic Azad University, Tehran-Iran (IAUPS).
Gmail address: parvanehspring1391@gmail.com

Abstract

Introduction:
Alzheimer's disease (AD) is a multisystem and multifactor disease with a long no-symptom stage, hence likely not modeled by one or even a few models and very likely not be treated by a single drug. We propose that a more effective approach to use fMRI as a still emerging, repeatable and non- invasive neuroimaging tools that can be very useful for evaluating, diagnosis, treatment and drugs- development.

Methods and Results:
Factors of Alzheimer's disease (AD) is divided into two general types of genetic and non-genetic. We studied 30 articles which published between 2008-2017 that included the effects of different biomarkers and tools for diagnosing AD and assessing, improving and detection of Alzheimer's medications. Attractive alternatives to the animal and human experimental modeling approaches are the "multi-scale"and "multi-level" computational modeling approaches to AD drug discovery and therapy. 6 articles (20%) were about the animal models while we should try accepting the limitations of animal models and focus more on humanize researches so we used it less considering, also as regard to the long waiting queue in AD drug development that we feel crucial factors have been overlooked which could have been important like promising biomarkers including novel imaging methodologies (specially fMRI), metabolomics, proteomics, electroencephalogram and even digital health platform technologies that will reduce the time for validation and encourage data integration across studies. Peer-reviewed publications were identified through search in PubMed, Google scholar and SCI-HUB by using the search terms "fMRI", "Alzheimer", "cognitive side effects", "drug", "pharmacological neuroimaging". The search was limited to articles published in English. Relevant articles were chosen based on clinical experiences and the expertise of the authors.

Conclusion:
FMRI measures hold promise for multiple clinical applications. Generally, models especially pharmacological fMRI showed that drug repositioning is a cost-effective way to develop disease-modifying treatments over shorter timescale and future models should provide a theory of how increasing Ach levels using cholinesterase inhibitors and N-methyl-d-aspartate antagonists (NMDA) impact neural and behavioral processes in AD. Models should also investigate how memantine (NMDA antagonists) can reduce toxicity of beta-amyloids as reported in experimental studies.

Key words:
Alzheimer; drug; FMRI; AD; pharmacological neuroimaging