Neuroimaging: Amyloid PET Scans For Alzheimer's Diagnosis

A Bibliometric Analysis of the top 100 Cited Literatures

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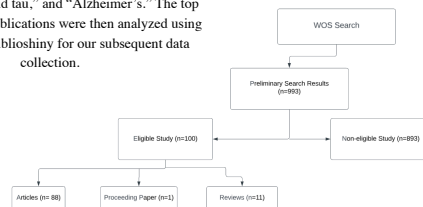neuro

Introduction/ Background

With the continual advancement of technology, the medical industry has been utilizing it to a greater extent. One example of such technology is the positron emission tomography (PET) scan, which involves the use of a radioactive tracer to detect illnesses and other conditions, thus improving diagnostic accuracy. This study investigates the amyloid PET scan with a focus on its ability in detecting Alzheimer's disease, as it can detect Amyloid-β tau proteins, an indicator of Alzheimer's progression. PET Scan diagnostics are being developed as alternatives to highly invasive, inaccessible procedures such as the lumbar puncture which is to detect Amyloid-β using spinal fluid.

- Safer and less invasive than lumbar punctures.
- Lumbar puncture is a method of diagnosing Alzheimer through using an individual's spinal fluid.
- Later complications for lumbar puncture include headache, cranial neuropathies, prolonged backache, nerve root injury, meningitis, and cerebral and spinal herniation.
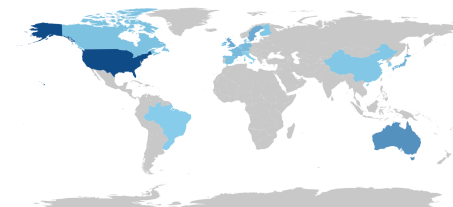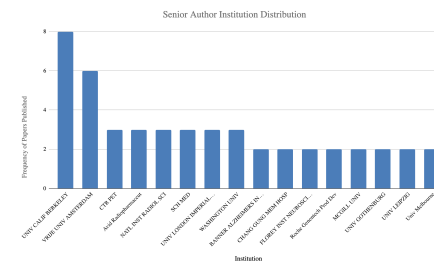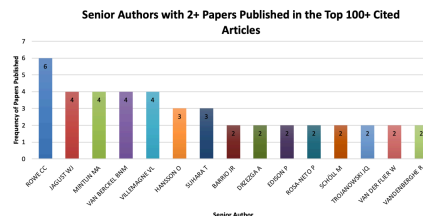- More accessible to the elderly

Amyloid Scans

Negative Scan

Positive Scan
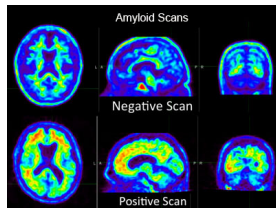
Objectives

The objective of our research is to explore Amyloid PET scans as a safer, non invasive alternative to Alzheimer's diagnosis, along with understanding the geographical prevalence of this research to predict this treatment's accessibility.

Methods

We utilized the Web of Science database to source 993 publications using the keywords "PET Scans," "Amyloid/amyloid tau," and "Alzheimer's." The top 100 most-cited publications were then analyzed using R Studio and Biblioshiny for our subsequent data collection.

WOS Search

Preliminary Search Results (n=993)

Eligible Study (n=100) — Non-eligible Study (n=893)

Articles (n= 88)   Proceeding Paper (n=1)   Reviews (n=11)

Results

These publications consisted of 88 Articles, 1 Proceeding Paper and 11 reviews. The range of the publication dates of these results spans from 1991 to 2022. Although Amyloid PET scans were first employed in the early 2000s, the role of the Amyloid-β tau protein in Alzheimer's was being studied many years before, which could explain the 1991 publication being one of the most cited. Furthermore, 30 of these articles originated from New York and 22 originated from Oxford, showing how over half of the most cited articles originate from first-world countries like the US and England.

Senior Authors with 2+ Papers Published in the Top 100+ Cited Articles

Senior Author Institution Distribution

Discussion/Conclusion

This research emphasizes the role of non-invasive amyloid PET scans for diagnosing Alzheimer's. The increasing trend in publications, particularly from 2011 to 2019, signifies growing recognition in neurological research. However, the analysis focused on the top 100 results, possibly missing valuable insights in emerging research. Furthermore, diagnostic assessment and treatment research of neurodegenerative disorders continues to be inaccessible outside first-world countries. This study supports amyloid PET scans' diagnostic role and need for global expansion for more treatment accessibility, encouraging further exploration to enhance neurological disorder diagnostics.

Future Directions:
- Conduct literature review to assess the scientific progression of Amyloid PET Scans
  - Will allow us to predict funding capabilities and make room for future project possibilities
- Distribute funding for neurodegenerative research outside of first-world countries
- Provide more access for diagnostic technology access outside of major cities

References

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Patwardhan, M. B., McCrory, D. C., Matchar, D. B., Samsa, G. P., & Rutschmann, O. T. (2004). Alzheimer disease: Operating characteristics of PET— A meta-analysis. Radiology, 231(1), 73–80. https://doi.org/10.1148/radiol.2311021620

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Web of Science Database

RStudio Application

Biblioshiny Software