Psychoradiology Analysis on Mental Health

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INTRODUCTION

•In 2024, psychiatric disorders affected approximately 23.08% of the U.S. population.

•Radiologic imaging plays a critical role in diagnosing a wide range of diseases, injuries, and abnormalities, and its application has extended into the field of mental health through psychoradiology.

•Psychoradiology utilizes imaging technologies to help diagnose and understand mental illnesses and neurological disorders, including conditions such as:

*Depression
*Alzhiemer's
*Obsessive Compulsive Disorder (OCD)
*Schizophrenia

DIAGNOSING

•In psychoradiology, it is equivalent to neuroradiology in the sense that the brain is under study and being analyzed.
•The diagnosis comes from assessing patients who are experiencing symptoms of mental illness.
•The use of medical imaging permits us to see various pathologies or abnormalities within the anatomy that may be useful in the diagnosis of any disorders.
•One of the most common modalities used in psych radiology is MRI.
•MRI can evaluate brain activity as well as help spot any atypical neural patterns.
•Seeing these abnormalities is significant for the psychiatrist to continue treatment for the patient, to relieve their symptoms.

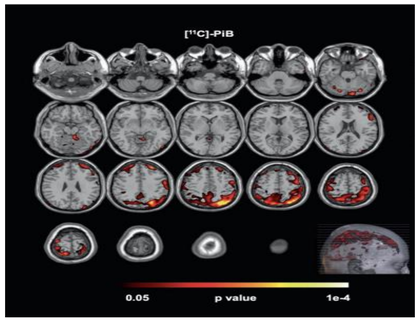
DEPRESSION

•Depression is a mental illness that consists of persistent sadness, disinterest, and low moods in an individual.

•Studies say that depression has affected 8% of Americans yearly.

•One form of radiology used to help diagnose depression is PET scans.

•PET scans can compare brain activity when a person is depressed versus when they are not depressed.
•PET can compute cerebral blood flow and then receive information on neuronal activity.
•This is very important because this activity may present insight into the neural mechanisms that may be related to depression.



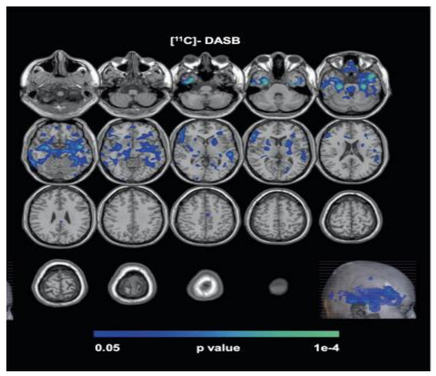


Figure 1:PET scan of brain showing high beta-amyloid (top) versus low serotonin (bottom).

ALZHIEMER'S

•Alzheimer's is said to be the most common form of dementia, and it affects a person's thinking, memory, behavior, judgement, and more.

•About seven million Americans have Alzheimer's, and that number is predicted to increase by about 13 million by the year 2050.

•MRI and CT are commonly used imaging modalities that can analyze any changes in the brain.

•With diagnosing Alzheimer's, radiology allows us to see the buildup of beta-amyloid.

•Beta- amyloid is a protein fragment that demolishes synapses (how neurons communicate with each other) and they clump together and form plaque.

•This plaque interferes with cell function, and supports potential evidence of Alzheimer's disease.

•Research shows that the use of MRI is about 80% accurate in prognosticating a further conversion to Alzheimer's in an mild cognitive impairment case (MCI).

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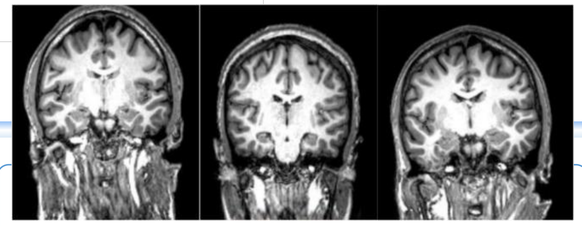

Figure 2: MRI of brain with Schizophrenia

SCHIZOPHRENIA

•Schizophrenia is a serious mental illness that can alter the way a person can think and behave.
•Common acts of schizophrenia may include hallucinations, disorganized thinking, and intense changes in behavior.
•With the use of MRI and CT, brain imaging on patients with schizophrenia are said to have ventricular enlargement with cortical atrophy.
•Ventricle enlargement is one of the earliest signs of patients with schizophrenia.
•In relation to this, MRI can detect temporal lobe volumes in patients who have schizophrenia.
•This correlates to a decrease in size of the hippocampus complex.
•The hippocampus complex is located on the left and right side of the brain, and it is in control of your learning as well as memory.

CONCLUSION

•Psychoradiology is extremely helpful with the diagnosing of mental illnesses.
•The use of MRI, CT, and PET scans make it possible to identify abnormalities that may appear in the brain.
•These modalities may also differentiate whether the abnormality could be something life threatening as opposed to something mental illness related.
•The use of psychoradiology is a significant step in discovering potential mental illness in patients.