Electronic health records help study drug-effectiveness in Alzheimer's disease

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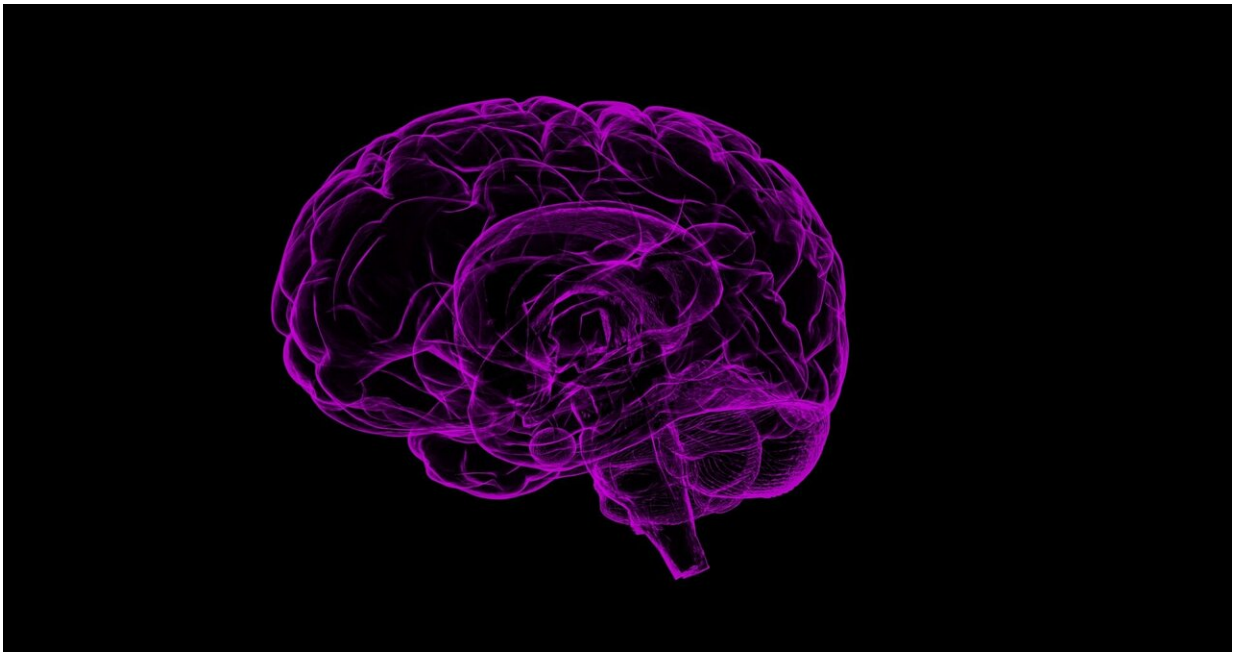

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Researchers have harnessed the power of electronic health records to gain insight in the potential of inflammation-controlling medications to reduce a patient's Alzheimer's disease risk.

Rong Xu, professor of Biomedical Informatics and director of the Center for Artificial Intelligence in Drug Discovery at Case Western Reserve University; Mark Gurney, chairman and CEO of Tetra

Therapeutics; and David Kaelber, chief medical informatics officer and vice president of Health Informatics at The MetroHealth System, accessed nearly 20 years of electronic health records (1999-2018) from the IBM Watson Healthcare Explorys Cohort Discovery platform. The researchers analyzed the de-identified records from 56 million unique adult patients from 26 health-care systems throughout the United States.

The large, retrospective case-control study found that the risk for Alzheimer's disease in patients being treated with adalimumab (Humira) for rheumatoid arthritis and in patients treated with etanercept (Enbrel) or adalimumab for psoriasis was lower than the general population risk. Patients taking adalimumab for psoriasis also showed a decreased risk of dementia.

The findings have been published in the research journal *PLOS One*.

The researchers wanted to test the hypothesis that systemic inflammation involving tumor necrosis factor (TNF) is associated with an increased risk for Alzheimer's disease (AD), and that treating patients who had inflammation with a TNF-blocking agent would be effective in reducing a person's risk for developing AD.

Patients for the study were drawn from the Explorys platform and categorized based on their inflammatory disease diagnoses (including rheumatoid arthritis (RA), psoriasis, inflammatory bowel disease, ulcerative colitis, and Crohn's disease) and medication history.

For the analysis, subjects were included if they were treated with a single TNF blocker, but were excluded if they were diagnosed with more than one disease or treated with two or more TNF-blocking drugs.

The study methodology underscores the immense potential of using big databases, Xu said. "The cloud-based informatics tools and platforms

allow researchers to easily build patient cohorts with specific disease and demographic characteristics," she said.

Also, the Explorys platform contains a study population that includes patients with private insurance, Medicare, Medicaid and military insurance. Not only is it particularly critical for the study of diseases that primarily affect an elderly population, since most patients older than 65 in the United States transition from private insurance to Medicare, it is important for the study of diseases that are affected by economic status, Xu said.

Because the study is an associational study, researchers could not decipher the causal relationships between TNF alpha, TNF alpha inhibitors, and AD/dementia based solely on electronic health records. More study is needed using experimental models and animal models.

More information: Mengshi Zhou et al. Tumor Necrosis Factor (TNF) blocking agents are associated with lower risk for Alzheimer's disease in patients with rheumatoid arthritis and psoriasis, *PLOS ONE* (2020). DOI: 10.1371/journal.pone.0229819

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