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1. Title:

Phenotyping encephalitis through electronic health records (EHR): a computational approach.

2. Scientific abstract:

Encephalitis is a severe inflammatory process of the brain that is potentially reversible if properly treated. There are multiple etiologies and recent investigations have revealed an extensive number of antibody-associated disorders that mimic infectious or psychiatric diseases. These antibodies are very useful disease biomarkers, but there are multiple caveats in antibody testing that make difficult a prompt and definite diagnosis in many cases, decreasing the chance of recovery. The digital transformation of health and the technical advances are enhancing the opportunity to leverage clinical data from electronic health records (EHR) for research-based analyses, providing a framework to create new predictive tools for clinical decision support. The purpose of this work is to explore the potential of such computational approach to increase diagnostic accuracy in encephalitis, using EHR data and machine learning to build predictive models that automatically classify groups of diseases. First, it will be explored in a large de-identified mental health dataset (SLaM BRC) using a cohort of patients with first-episode psychosis, since psychosis is a core symptom of certain encephalitis. The objective is to find an algorithm able to distinguish a primary psychosis at presentation. The know-how learnt in this former group with strong expertise in phenotyping mental illness using EHR, will serve to analyse encephalitis admitted to a reference center (HospitalClinic) with the aim to early differentiate an autoimmune from an infectious cause. The results of this investigation will offer a powerful alternative to better recognize encephalitis and a novel tool for the discovery of knowledge in these (and other) disorders.

3. Keywords:

Encephalitis, psychosis, machine learning, electronic health records, natural language processing.