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Perspective

An Effective Pharmacogenomic Approach to Facilitate Personalized and Precise Schizophrenia Treatment

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DESCRIPTION

Schizophrenia is a severe, chronic, and persistent mental illness with a 0.3%-0.7% global incidence. The illness typically occurs in late adolescence or early adulthood and causes impairments in social or occupational functioning that range in severity. Studies have shown that genetic, psychological, and environmental variables all have a role in the development of schizophrenia. There are indications that genetics may account for 70% to 80% of individual differences in risk for schizophrenia. The genetic variance has not yet been fully considered in schizophrenia treatment, unfortunately. Clinical drug treatment is essentially a method of efficient drug use. Drugs (dose, dosage form, administration time, dosing interval, combination medication) and human body conditions (age, gender, physiology, pathology, genetics of the patients) may both be the primary elements influencing the final therapeutic efficacy of drugs. Numerous studies show that hereditary variables may have the greatest impact on how differently people respond to certain medicines. Pharmacogenomics examines how human genes get affected and how they respond to medications by relating genetic variation and levels of gene expression to pharmacokinetics (drug absorption, distribution, metabolism, and elimination) and pharmacodynamics. Pharmacogenomics studies the role of the genome in drug response. The use of pharmacogenomics and big data analysis in psychiatric research will progress medicine by providing patients with mental illness, an important drug therapy for tailored medication and lowering the occurrence of adverse responses.

Another complicated psychiatric illness that affects millions of people worldwide is Major Depressive Disorder (MDD). Several algorithms, including Gene sight and IMPACT, have been created in recent years to direct the prescription based on the findings of patients' genetic tests (Individualized Medicine: Pharmacogenetics Assessment and Clinical Treatment). Gene Sight examines the genetic variations of numerous chosen genes, the majority of which are connected to the metabolism, effectiveness, or adverse pharmacological reactions of MDD drugs (ADRs). 1167 MDD patients were randomly divided into two groups in the large-scale clinical trial that was published in 2019. One group's treatment was carried out in accordance with Gene sight recommendations based on the results of genetic tests, while the other group adhered to the conventional non-guided treatment protocol. Throughout the study period, the severity of each patient's depression was measured on a regular basis using the 17-item Hamilton Depression Scale (HAMD-17). After an 8-week period of observation, the guided group's response rate (defined as a HAMD-17 score reduction of more than 50%) was 30% higher than the non-guided group's, and the guided group's remission rate (defined as a HAMD-17 score reduction of less than 7) was 50% higher than the non-guided group's. Many antipsychotic medications are mostly metabolized by *CYP2D6*. In the Chinese population, *CYP2D6** is a common mutation that results in decreased enzyme activity. This could raise blood concentration and peak value of medications processed by *CYP2D6* and have an impact on therapeutic efficacy and severe side effects. Another element that could significantly alter someone's capacity to metabolize drugs is Copy Number Variation (CNV) of *CYP2D6*. The *CYP2D6* gene's polyploidy frequency can reach up to 45% in Asians, who have a greater incidence of ultra-rapid metabolizers (around 7%) than Caucasians. Future medical practices will increasingly focus on precision medicine. Despite quite a few positive reports about the genetic test based on pharmacogenomics directing the treatment of psychiatric illnesses in North American and European clinical services, there were still detractors in China. One important practical inference we may draw from this study is that patients tend to have better long-term efficacy when their genetic profiles match their pharmacological treatments. Along with this, there are additional advantages like fewer ADR risks and an emphasized alarm for blood concentration monitoring that are not covered by this study. As a result, genetic testing is strongly advised for everyone taking antipsychotic medicines to treat schizophrenia.

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