

Healthcare Science and the Future of Medicine: Opportunities for Sustainable Health Improvement

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Abstract

Pharmacogenomics investigates how an individual's genetic makeup affects drug response, providing an opportunity to optimize treatment, enhance efficacy, and reduce adverse effects. This case report highlights the role of pharmacogenomic testing in psychiatry to guide personalized psychopharmacological interventions. The report emphasizes the importance of considering genetic variations in drug metabolism, absorption, and pharmacodynamics in managing psychiatric disorders.

KEYWORDS: Pharmacogenomics, Psychiatry; Personalized medicine; CYP2D6; Antidepressants; Neuropsychopharmacogenomics.

INTRODUCTION

Pharmacogenomics is the study of how genes influence individual responses to medications. Precision medicine integrates pharmacology and genomics to tailor drug selection and dosing to each patient's genetic profile. Genetic variations can alter liver enzyme function, influencing drug metabolism and metabolite profiles, which may impact therapeutic efficacy and the risk of adverse effects [1].

In psychiatry, interindividual variability in response to antidepressants, antipsychotics, and mood stabilizers is common, complicating treatment. Neuropsychopharmacogenomics focuses on identifying genetic variations relevant to psychiatric medications to improve individualized therapy [2]. This case report illustrates the application of pharmacogenomics in clinical psychiatric practice.

CASE DESCRIPTION

A 42-year-old patient with treatment-resistant major depressive disorder was referred for pharmacogenomic testing after multiple trials of selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) yielded partial or minimal response. The patient reported significant side effects, including gastrointestinal upset and fatigue, which limited adherence.

Pharmacogenomic analysis revealed the patient was a CYP2D6 poor metabolizer, impacting the metabolism of several antidepressants. Based on these results, the patient's treatment plan was revised to include medications metabolized by alternative pathways with dosage adjustments according to pharmacogenomic recommendations [3].

Outcome

Following the personalized treatment plan, the patient achieved significant improvement in depressive symptoms within six weeks, with minimal side effects. The use of pharmacogenomic testing allowed precise medication selection, reducing trial-and-error prescribing and enhancing adherence.

DISCUSSION

Drug response in psychiatry is influenced by multiple factors including age, comorbidities, environmental factors, and genetic makeup. Pharmacogenomics provides valuable information on gene variants affecting drug metabolism, absorption, distribution, excretion, and pharmacodynamics [4]. Applying pharmacogenomic data in psychiatry can improve treatment outcomes, reduce adverse events, and shorten the time to achieve symptom remission.

Despite these advantages, challenges remain, including limited availability of population-specific pharmacogenomic data, cost, and the need for clinician education. Developing regional pharmacogenomic databases and integrating genetic testing into routine psychiatric care are crucial for advancing personalized medicine.

CONCLUSION

Pharmacogenomics enables individualized psychiatric treatment by identifying genetic variations that affect drug metabolism and response. Integrating pharmacogenomic testing into clinical practice improves efficacy, safety, and patient outcomes. Continued research and the creation of region-specific pharmacogenomic data will further expand personalized medicine applications in psychiatry and other medical fields.

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