Clinical Applications of Pharmacogenetics in Psychiatry

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The available evidence suggests that genetic factors contribute substantially to the variability in response to antidepressant treatments.

Several antidepressants already have a pharmacogenetic precaution/warning in their labeling for risk of side effects or interactions in CYP2D6 poor metabolizers. Promising genetic variants for future applications include a functional polymorphism (5-HTTLPR) in the upstream regulatory region of the serotonin transporter gene (SLC6A4) and replicated results have been reported particularly for HTR2A, BDNF, and ABCB1 genes. On the other hand, inconsistent findings were reported and innovative approaches have been pursued to overcome the limitations of candidate gene studies.

New genes have been recently identified through genome-wide association studies (GWAS), but both individual GWAS and meta-analysis did not show convincing genome-wide significant findings.

Some pharmacogenetic assays have been implemented and their clinical applicability was investigated. More than one trial suggested that a pharmacogenomic report based on CYP2D6, CYP2C19, CYP1A2, SLC6A4 and HTR2A polymorphisms may improve response/remission rates and reduce costs. Anyway, these results should be interpreted cautiously before confirmation in larger samples is achieved.

The integration of genetic information with other biomarkers (e.g. DNA methylation, peripheral blood biomarkers such as cytokine levels) is a possible strategy to develop future predictive algorithms. Biomarkers could represent a valuable guide for depressive and anxiety disorders treatment, but they are not meant to replace clinical judgment and patients' needs.