Monitoring of psychiatric drugs using efficacy and safety markers: usefulness and limitations

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Psychotic illnesses are a group of heterogeneous health conditions caused by a combination of environmental and genetic factors.

There is a growing body of evidence which has assessed the increasing use of many psychotropic drugs to treat mental disorders. Antipsychotic medications are classically divided into first generation or typical and second generation or atypical.

Typical antipsychotics are proven to treat the positive symptoms of psychosis, however they can also cause undesirable extrapyramidal side effects which may lead to tardive dyskinesia. Otherwise, atypical antipsychotics are effective on both positive and negative symptoms of psychotic illness, on the other hand, they can mainly induced metabolic side effects, such as weight gain, dyslipidaemia, and diabetes.

Indeed, despite the efficacy, these drugs are associated with a large interindividual variability among patients treated with the same dose in terms of clinical response and adverse drug reactions (ADRs) which may lead to a discontinuation of therapy and, consequently, requiring switches to other antipsychotics.

As highlighted in several studies, prior to initiating psychotropic treatment it is important to determine the nature of the mental illness and whether antipsychotic medication choose is used at correct dosage, if it could obtain the desired clinical improvements, or may exhibit problems of efficacy or safety by arising ADRs. Any information may help the clinician to optimizing antipsychotics response and minimizing ADRs.

In this scenario, it is important to assess how available tools could be used to prevent efficacy and safety of antipsychotics clinical outcome. Therapeutic drug monitoring (TDM) has proven a valuable tool for optimising psychopharmacotherapy by measuring serum or plasma concentrations to define correct dosage and minimizing interindividual variability. Furthermore

is increasingly recognised the clinical importance of combination of TDM with pharmacogenetic tests which could explained the variability concerning pharmacokinetics and pharmacodynamics pathway of psychoptropic drugs. In addition, pharmacogenetic tests are essential to prevent rare idiosyncratic ADRs prior to starting antipsychotics treatment.

Pharmacogenetics, through genotyping of pharmacokinetic pathway–related genes, in addition to TDM, is essential for personalized dosing and it is particularly important at the beginning of the pharmacological treatment, to modify dosing or switching antipsychotic drug. However, their application in psychiatric care are currently limited or suboptimal. The challenge remains to translate implementation of these tests in clinical practice. The small numbers of studies lead to the absence of robust evidence demonstrating clinical utility of TDM coupled with pharmacogenetic tests in real world conditions.

Therefore, it is possible to implement a potentials tools for improving clinical outcomes by application of the personalised treatments for psychotic illnesses. An active surveillance programme combined with TDM and pharmacogenetic tests could be applied in the future to address safety and efficacy of psychopharmaceutical concerns in mental disorders.