Algorithms Predictive for Prodromal Teens

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Screening for specific combinations of risk factors can significantly increase the predictive accuracy of standard prodromal criteria for psychosis in high-risk adolescents, a study has shown.

In a longitudinal investigation of 291 adolescents, median age 16, who met the criteria for prodromal psychosis based on the Structured Interview for Prodromal Syndromes (SIPS), the risk of conversion to psychosis was 35%, Tyrone D. Cannon, Ph.D., of the University of California at Los Angeles, and his colleagues reported in the Archives of General Psychiatry.

The positive predictive power of the risk assessment more than doubled, however, with the application of algorithms combining two or three out of five "uniquely predictive" baseline variables, including baseline assessments of deteriorating social function, family history of psychosis together with a recent functional decline, increase in unusual thoughts, increase in suspicion and paranoia, and past or current drug abuse, the authors wrote (Arch. Gen. Psychiatry 2008;65:28-37).

Depending on the combination of variables, the refined predictive system increased the positive predictive accuracy up to 81%, which is comparable with the accuracy of risk assessment models seen in areas of preventive medicine such as diabetes.

The prospectively identified, treatment-seeking patients recruited for the study were evaluated across eight clinical research centers over the course of 2½ years as part of the North American Prodrome Longitudinal Study (NAPLS). All of the study sites collected information on demographics, prodromal symptom severity, family history of mental illness, schizotypal personality disorder diagnosis, social and role functioning, comorbid psychiatric diagnosis, and substance abuse.

The follow-up assessments were administered at minimum 6-month intervals to detect clinical deterioration or conversion to psychosis.

In addition to determining the rate of conversion to psychosis in a high-risk population, the investigators sought to ascertain the shape of survival function across 2½ follow-up years and to develop a multivariate risk prediction algorithm to guide case selection for future studies.

Of the 291 patients—which represents the largest database of prodromal cases followed up longitudinally worldwide—22% developed psychosis within the first 12 months, and approximately 11% and 2% had evidence of conversion at 24 and 30 months, respectively, they reported. None of the 134 healthy, age-matched controls developed psychotic illness during the study period.

Univariate analyses uncovered 37 potential predictor variables associated with conversion to psychosis. Of these, only the five aforementioned predictors continued to be related significantly and uniquely in multivariate models, according to the authors. The investigators generated prediction statistics for the five variables, independently and in each of 26 combinations. Among the algorithms requiring the co-occurrence of two risk factors, the models were associated with positive predictive values of 69% and 61%, respectively, the authors wrote.

In addition, two of the three-factor models—specifically, those involving genetic risk with recent functional decline, unusual thought content, and either suspicion/paranoia or impaired social functioning—had positive predictive values of 74% and 81%, respectively, while no further gain in prediction was associated with any of the four- or five-factor models, according to the authors. Controlling for the use of antipsychotic medication during the follow-up period did not alter the significance or the magnitude of the results, they stated.

The results of the study "provide a benchmark for the shape and rate of conversion risk against which to compare in future studies assessing comparable populations provided with a standardized intervention program," the authors wrote.

In an accompanying editorial, Dr. Patrick D. McGorry of the University of Melbourne, and his colleagues, stressed that the NAPLS findings apply only to an ultrahigh-risk, treatment-seeking population and not to the general population (Arch. Gen. Psychiatry 2008;65:25-7).

They also cited the limitations inherent in the study's naturalistic design and called for a "large international multicenter clinical trial" to build on the NAPLS findings. ■