

**PREDICTION OF DIAGNOSIS OF EARLY-ONSET SCHIZOPHRENIA SPECTRUM DISORDERS USING SUPPORT VECTOR MACHINES**

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Diagnosis of schizophrenia spectrum disorders (SSD) may be difficult in clinical practice, particularly during the first episodes of early-onset psychosis (FE-EOP). Aims: To develop a Support Vector Machine (SVM) algorithm as a predictive tool for diagnostic outcome in patients with FE-EOP, based on clinical and biomedical data at the emergence of the illness. Methods: Two-year, prospective longitudinal study, where 81 patients (9-17 years of age) with a FE-EOP and stable diagnosis at follow-up and 41 age and sex-matched healthy controls (HC) were included. Structured diagnostic interviews, clinical and cognitive scales, a MRI scan and biochemical tests were conducted at baseline. Three SVM classification algorithms were developed (SSD vs HC group, non-SSD vs HC group, and SSD vs non-SSD group). Jackknifing was used to validate the algorithms and to calculate performance estimates. Enhanced-Recursive Feature Elimination was performed in order to gain information about the predictive weight for diagnosis of each variable. Results: The SSD-versus-non-SSD classifier achieved an overall accuracy of 83.1%, sensitivity of 86.6% and specificity of 77.8%. The variables during a FE-EOP with higher predictive value for a diagnosis of SSD were clinical variables such as negative symptoms preceding or during the psychotic onset, poor insight and duration of illness until first psychiatric contact. Biochemical, neuroimaging, and cognitive variables at baseline did not provide any additional predictive value. Conclusions: SVM may serve as a predictive tool for early diagnosis of SSD during a FE-EOP. The most discriminative variables during a FE-EOP for a future diagnosis of SSD are clinical variables.