Use of Artificial Networks in Clinical Trials: A Pilot Study to Predict Responsiveness to Donepezil in Alzheimer’s Disease

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OBJECTIVES: To evaluate the accuracy of artificial neural networks compared with discriminant analysis in classifying positive and negative response to the cholinesterase inhibitor donepezil in a group of Alzheimer’s disease (AD) patients.

DESIGN: Convenience sample.

SETTING: Patients with mild to moderate AD consecutively admitted to a geriatric day hospital and treated with donepezil 5 mg/day.

PARTICIPANTS: Sixty-one older patients of both sexes with AD.

MEASUREMENTS: Accuracy in detecting subjects sensitive (responders) or not (nonresponders) to 3-month therapy with ANNs. The criterion standard for evaluation of efficacy was the scores of Alzheimer’s Disease Assessment Scale—Cognitive portion and Clinician’s Interview Based Impression of Change—plus scales.

RESULTS: ANNs were more effective in discriminating between responders and nonresponders than other advanced statistical methods, particularly linear discriminant analysis. The total accuracy in predicting the outcome was 92.59%.


Key words: Alzheimer’s disease; artificial neural network; prediction; responder; treatment