

Letters to the Editors

A Comment and a Reply to the Paper by Kristinn Tomasson et al.: “Failed and Short Seizures Associated with Prior Electroconvulsive Therapy”*

Comment by Richard Abrams

Dear Sir,

Although the authors of this paper correctly point out that age is a well-known determinant of seizures threshold, they have not convinced me that their findings are independent of age.

Men who got prior ECT are likely to have been older than those who did not, but mean ages for these two groups are not provided. The multiple stepwise regression analyses presented in Table 5 do not resolve this question because the order of entry of the dependent variables (as determined by the program, not the authors) shows that, because it was most highly correlated with seizure threshold, “No. of previous ECT treatments” was selected for entry before, rather than after, the variances explained by other factors (including, of course, age) had been accounted for.

Although stepwise regression is useful for selecting models to be tested, hypothesis testing may be more appropriately accomplished with a forced entry (hierarchical) model, especially when specific correlations between variables (e.g., age and threshold) are already well-known. Had the authors employed such a model, and forced age into the equation first, followed by other well-known determinants of seizure threshold (e.g., number of current treatments, methohexital dosage, etc.),

one wonders whether the addition of “No. of previous treatments” would then have accounted for a significant portion of the variance. The authors’ argument that “the number of medical problems . . . took the place of age” in their stepwise regression model, simply because the two variable were significantly correlated, is not convincing. The fact that variables are significantly, or even highly, correlated does not make them interchangeable in a stepwise regression analysis, and, in any case, age and number of medical problems share only a modest 28% of variance.

Moreover, unless the authors are proposing the virtually untenable – and extremely unphysiological – hypothesis that a single course of ECT permanently raises seizure threshold, the failure of “time since last ECT treatment series” to predict the occurrence of short or failed seizures further suggests that prior ECT does not affect seizure threshold, and that the relationship they claim is an artifact of age. The facts that neither the duration of the first seizure, nor the mean number of induced seizures, were significantly greater in men who had a prior history of ECT than those who did not, further supports this interpretation of their data.

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Reply to Richard Abrams’ Letter by Kristinn Tomasson

Dr. Abrams first point is that the findings are not independent of age. This is a misunderstanding, as the statistical analysis used controls for age and other variables and thereby increases the power of the study by using all available data. In order to control for age we could have chosen to match on age and several other variables be-

fore conducting any statistical analysis. However this method may be associated with substantial loss of information and is not preferred when the data is readily available. Furthermore after matching it is impossible to draw any conclusions regarding the variables used in that process. The mean age of men who had had prior ECT

is of course higher than that of those having ECT for the first time. This is unimportant as age is controlled for in the stepwise regression analysis.

The second point regards the method of having the stepwise regression program itself chose the variables that predict failed or short seizure rather than to use a forced entry model. This can in the authors opinion be argued either way depending on how convinced one is of cause and effect relationship between variables (e.g. age and seizure threshold). We have created a forced entry stepwise regression model where age, is entered first followed by number of current treatments, methohexital dosage, electrode placement, benzodiazepam during and before treatment and starting frequency (Hz), subsequent to this the program enters the variable with the highest F-value and stops entering at $F < 3.96$. The coefficients of history of previous ECT treatments for, failed session, failed seizures, short seizure and short session were 0.267 (s.e. 0.062), 0.368 (s.e. 0.039), 0.455 (s.e. 0.137) and 0.216 (s.e. 0.083) all of them still significant. This results in models that are more complex with between 3 to 7 additional variables in the different models. However they only explain 4% to 13% more of the overall variance compared to the less complex models selected by the computer.

Regarding age and number of medical problems our analysis did not show any substantial improvement in the amount of the variance explained by including both variables in the model and furthermore as the decrease in the variance explained was minimal by using age alone we elected to state that "the number of medical problems... took the place of age".

Physiological or not our data indicates that the association between prior ECT and short and failed seizure is

a lasting one as it is independent of time since the prior treatment and this is not explained by increasing age. Whether that is an cause and effect relationship is not possible to clarify using the data in this study.

Dr. Abrams statement about seizure duration appears to us to be reversed. In accordance with other (1) investigators we could have expected that the prior ECT group given its apparent higher seizure threshold be associated with shorter seizure durations. However, we are not aware of any study that should lead us to expect the prior ECT group to require more successfully induced seizures.

Finally, we consider it a strength of our method that we were able to identify previously known predictors of seizure threshold thus giving more support to our main results of an association between prior ECT and failed and short seizures.

Reference

1. Sackeim HA, Decina P, Portnoy S, Neeley P, Malitz S (1987) Studies of dosage, seizure threshold and seizure duration in ECT. *Biol Psychiatry* 22:249-268

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