Labyrinth Learning Impairment in Presenile Dementia: 1 Year Later

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Dear Sir,

In a previous publication [1] we showed that the labyrinth test gave a more precise diagnosis than other investigations of cognitive deficit in the early stages of possible primary degenerative dementia of the Alzheimer type (DAT). 21 patients (54.7 ± 4.1 years) with a presenile onset of primary degenerative DAT (in stage 1 of the Washington University Clinical Dementia Rating, CDR 1), and 14 patients (54.2 ± 4.4 years) with cardiovascular disease (CVD) and a questionable dementia (CDR 0.5) have now been reinvestigated in a modified labyrinth learning test of Milner 1 year later and compared with an age-matched CG51 ($n = 10$, 51.1 ± 4.3 years) and a younger control group CG22 ($n = 16$, 21.9 ± 3.7 years).

After this period of 1 year the small increase of positive and negative errors was not significant in any of the groups, with the same statistical difference of DAT patients to age-matched controls (CG51) as before.

The performance duration had significantly increased after 1 year in the DAT group, namely to 173%. The repetition of the task 24 h later revealed a reduction of errors in both control groups and also in the CVD group, but not in the DAT group. However, a reduction of performance duration in both patient groups was observed. In the subsequent labyrinth test with 90° rotation of the hidden path only the DAT patients showed a significant increase of errors, particularly so in the case of the errors to positive fields, when 208% more time was needed to reach the end point. The following test with a changed hidden pathway showed that DAT patients were not able to change their labyrinth stereotype, and their errors increased to 254% in the second variant compared with the first. The duration of the mean step intervals, an indicator of operational speed, was particularly increased in the DAT group throughout the test. The DAT patients are

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consistently more impaired in the labyrinth test than the CVD group.

The results support the hypothesis that a deterioration of several operational brain functions commences prior to memory decline in the early stage of DAT. We are sure that the onset of a degenerative brain process, which may underlie the early phase of DAT, is characterized by a

decrease of operational speed, attentional lapse, cognitive efficacy and limitation of cognitive load.

Reference

Müller G, Richter RA, Weisbrod S, et al: Labyrinth learning impairment in patients with early symptoms of presenile dementia. *Gerontology* 1990;36:145–149.