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Accuracy of clinical diagnosis of Alzheimer's disease

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There is no specific antemortem marker for Alzheimer's disease, and the diagnosis may be uncertain even after examination of cerebral tissue.¹ In 1988 Homer *et al* emphasised the problems of correctly predicting the pathological findings in various types of dementia and implied that Alzheimer's disease was often not confirmed at necropsy.² The aim of our study was to assess prospectively the ability of current rigorous clinical criteria to diagnose Alzheimer's disease successfully during life.

Patients, methods, and results

We studied elderly psychiatric patients living in the area covered by Camberwell Health Authority, London. Altogether 180 were enrolled in the study, of whom 86 had died by three years. Necropsy was performed on 54 patients, and we report here on the first 50.

The clinical criteria used were those of the National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association.³ Probable Alzheimer's disease was diagnosed in patients with a history of a slowly progressive dementia without concomitant physical illness. Possible Alzheimer's disease was diagnosed in patients with atypical features of the disease or physical illness. Definite Alzheimer's disease was diagnosed only when the disease was confirmed by histopathological examination—that is, by the finding of widespread neocortical and hippocampal disease with plaques or neurofibrillary tangles, or both. Diffuse Lewy body disease was diagnosed when Lewy bodies were found not only in the substantia nigra and

locus coeruleus but also in the cortex, particularly in the parahippocampal gyrus. Vascular damage was considered to be important when multiple, widespread macroscopic or microscopic lesions were identified.

The average age of the 50 patients studied was 82.3 years (range 70-99). The table shows the numbers of patients predicted by the clinical criteria to have probable and possible Alzheimer's disease and the neuropathological diagnoses. The criteria for predicting probable Alzheimer's disease had a sensitivity of 88% (28/32), and those for predicting possible Alzheimer's disease had a sensitivity of 78% (14/18). We could not assess specificity as we did not include in the study patients who did not satisfy the clinical criteria for the disease. The table also shows the ability of the criteria to exclude patients with vascular disease. Two patients had evidence of only vascular disease; in both cases the criteria had predicted possible Alzheimer's disease.

Comment

The main finding of this study was that Alzheimer's disease can be diagnosed accurately during life by strictly applying the criteria of the National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association without the need for extensive investigation and resources. The rate of agreement between clinical and histological diagnoses of the disease varies from 50%² to over 95%,⁴ but studies in which agreement has been 90% or above have all used the criteria that we used here. This is the first study to attempt to validate the criteria for possible Alzheimer's disease; it shows that the disease may be diagnosed in patients with other physical illness (such as diabetes and hypertension).

Cortical Lewy body disease was found in six patients (12%), a prevalence similar to that found by Perry *et al*,⁵ which suggests that this disease is the second commonest neurodegenerative dementia in old age.

The ability of the clinical criteria that we used to diagnose Alzheimer's disease in 88% of patients confirms their validity. Such successful clinical prediction of disease is unusual in any branch of medicine.

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Relation between diagnosis of Alzheimer's disease (probable or possible) based on clinical criteria and neuropathological diagnosis, and ability of clinical criteria to predict neuropathological findings of Alzheimer's disease and exclude vascular disease

	Diagnosis of Alzheimer's disease from clinical criteria		Total (n=50)
	Probable (n=32)	Possible (n=18)	
Neuropathological diagnosis:			
Alzheimer's disease alone	24	10	34
Alzheimer's disease and vascular disease	2	3	5
Alzheimer's disease and cortical Lewy body disease	2	1	3
Vascular disease alone		2	2
Cortical Lewy body disease alone	3		3
No diagnosis	1	2	3
Ability of clinical criteria to predict pathological findings of Alzheimer's disease:			
Findings present	28	14	42
Findings absent	4	4	8
Ability of clinical criteria to exclude vascular disease:			
Vascular disease absent	30	13	43
Vascular disease present	2	5	7