Short report

The relation of essential tremor to Parkinson's disease

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SUMMARY To test the alleged genetic linkage between essential tremor and Parkinson's disease, the relatives of patients with essential tremor were examined to see whether Parkinson's disease occurred more frequently than expected. There was no increase of Parkinson's disease in the essential tremor families. It is concluded that essential tremor and Parkinson's disease are genetically independent diseases.

Essential tremor and Parkinson's disease occur in a single patient frequently enough to raise the suspicion that the two disorders might be related, either pathogenetically or genetically.^{1–3} Indeed, Barbeau and Pourcher⁴ found a high incidence of essential tremor cases among the first degree relatives of patients with tremor-onset Parkinson's disease appearing before the age of 40 years. This was thought to indicate that essential tremor families are genetically susceptible to Parkinson's disease. Since earlier experiences^{5,6} had not suggested anything but a chance association between essential tremor and Parkinson's disease, we re-examined the possible genetic linkage of these disorders by investigating whether essential tremor patients have relatives with Parkinson's disease more frequently than would be expected.

Patients and controls

The study groups included (1) 194 patients with essential tremor, found in an epidemiological study of tremors in a Finnish rural population aged over 40 years,⁷ (2) age- and sex-matched control sample of 125 persons taken from the same population, and (3) an additional group of 115 patients with essential tremor who were referred to our department. The age structures of the epidemiological essential tremor patients and their controls were matched. The mean age of the patients was 65 ± 1 (SE) years, range 42–91, and the controls 63 ± 1 years, range 42–84. The hospital essential tremor group was younger with a mean age of 55 ± 1 years, range 19–80.

All the patients and controls were personally interviewed about the occurrence of essential tremor, Parkinson's disease or other neurological diseases in their families

(parents, siblings and children) and in other relatives. The data were further clarified by discussion with other family members or by studying medical records, when necessary.

An adequate family history was obtained from 173 patients in the epidemiological series, from 105 of the controls, and from 108 patients in the hospital series.

The family sizes were comparable in all study groups; the median numbers of siblings (the probands excluded) and children were in the epidemiological essential tremor families four and two, in the control families four and two, and in the hospital essential tremor families five and two.

Results

In both essential tremor groups, the number of patients having cases of Parkinson's disease in the family or in other relatives was small, and did not differ from that among controls (table). There was high incidence of essential tremor in the families of both epidemiological and hospital essential tremor series, and 10.5% of the controls had family members with probable essential tremor.

Discussion

We found no increased incidence of Parkinson's disease in the relatives of essential tremor patients. This suggests that the members of essential tremor families have a similar risk of developing Parkinson's disease as the general population. Our finding is in accord with the results of studies in which the problem has been investigated from the point of view of Parkinson's disease. Such studies have shown that similar proportions of Parkinson's disease patients and controls have relatives with essential tremor.^{5,6} We therefore suggest that essential tremor and Parkinson's disease are genetically independent diseases, with their own particular distributions in the population.

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Table Number of essential tremor patients and controls having relatives with Parkinson's disease or essential tremor

	Essential tremor		Controls n = 105
	Epidemiological series n = 173	Hospital series n = 108	
Parkinson's disease in family* in relatives†	2 (1.2%) 4 (2.3%)	0 3 (2.8%)	1 (0.9%) 4 (3.8%)
Essential tremor in family in relatives	121 (69.9%) 135 (78.0%)	58 (53.7%) 74 (68.5%)	11 (10.5%) 18 (17.1%)

*parents, siblings, children
†family included

In Finland, the minimum prevalence of essential tremor is 55 per 1000 population aged over 40 years, and of Parkinson's disease 2.9.^{7,8} Essential tremor is thus some twenty times more prevalent, which also explains why more controls had family members with essential tremor (10.5%) than with Parkinson's disease (0.9%).

Applying the Finnish morbidity figures of essential tremor and Parkinson's disease, and assuming that there is a random distribution of both disorders, 0.3% of essential tremor patients may be expected to have also Parkinson's disease, and 5% of Parkinson's disease patients to have also essential tremor. To put it in another way, one would expect patients with both Parkinson's disease and essential tremor to occur with a prevalence of 0.16 per 1000 population over 40 years of age. Thus, the coincidental occurrence of these two disorders in a single patient is not rare. Since the comparative epidemiology of essential tremor and Parkinson's disease is unknown in most populations, the frequency of their chance associations may well be different in other populations than in the Finnish one. Furthermore, to our knowledge, the simultaneous occurrence of essential tremor and Parkinson's disease has not been specifically investigated in unselected patient groups, but two studies, however, furnish limited support for the above estimations. Out of 218 patients with Parkinson's disease, Rondot and Bathien⁹ found five cases (2.3%) in which postural tremor had preceded by several decades the appearance of Parkinson's disease; in a second study 5–10% of a group of patients with Parkinson's disease were found to have an additional tremor of the essential tremor type.^{10,11}

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