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Clinical Topics

Parkinson's disease in a Scottish city

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Abstract

In a detailed community study the total prevalence of idiopathic Parkinson's disease in Aberdeen was 164·2/10^5 of the population. The age and sex specific prevalence rose to 2657·8/10^5 (2·7%) of men and 2071·0/10^5 (2·0%) of women aged over 84. The mean age at onset, irrespective of sex, was 65·3 years (SD 12·6) and varied little compared with similar studies over the past 25 years. Half of patients were independent but 78/225 (34·7%) were considerably disabled and 23/225 (10·2%) were confined to bed or a wheelchair. Disability increased with age and also with a low minimental state questionnaire score. The score was ≤7/10 (graded 0-10) in 93/252 (37%) of patients and <5/10 in 28/252 (11%).

Parkinson's disease remains a common and disabling condition in the community.

Introduction

More than 20 years have passed since the last major community study of Parkinson's disease in the United Kingdom.[1] During this time the cohort theory of Poskanzer and Schwab has had time to express itself,[2] patients have benefited from levodopa, and not only has the population of Britain grown older but the elderly have received greater enlightened medical interest.

This study in Aberdeen aimed at determining the current prevalence of the disease and its impact on all patients in a community.

Patients and methods

Aberdeen is an ideal centre for such studies. The 1981 census population of 151 616 living within the old city boundary—that is, before Scottish local government reorganisation in 1975—was stable, with an age structure similar to that of the United Kingdom as a whole[3] and with all social classes being represented. Primary care facilities are well organised, and there is a close liaison between hospital doctors and general practitioners. Hospital records are of a high standard, and patient diagnoses have been computerised since 1970.

Total ascertainment of cases of idiopathic Parkinson's disease was attempted. All doctors in hospitals and general practitioners were asked to refer known or new cases between June 1983 and May 1984. They were asked not to refer known drug induced cases or patients with established dementia who had later bent over and started to shuffle. A printout of inpatients with a diagnosis of Parkinson's disease or extra pyramidal disease was obtained from the Grampian Health Board computer file from 1970 onwards and from the computerised records of patients attending the department of therapeutics and pharmacology, Aberdeen University. The Aberdeen neurology clinic records were examined, and we were advised of new patients attending either general medical or neurology clinics. Cases were also obtained from those general practices that had records of drugs on computer, the Aberdeen psychiatric case register, the membership of the local branch of the Parkinson's Disease Society, and by visits to all private and local authority homes for the elderly. Lists of patients identified in these ways were tabulated and sent to their general practitioners with a request for further cases that they or their district nurses or health visitors knew of.

Surgeries were then visited to discuss known patient lists with general practitioners, and practice receptionists were provided with a list of anti-Parkinsonian drugs and asked to notify any patients using these. None the less, we probably did not achieve full ascertainment, and the prevalence figures are probably minimum estimates. The point prevalence was estimated from those patients alive on 31 May 1984 who had lived in Aberdeen for the preceding year.

After informed consent all patients were interviewed and examined in their own homes by one of us (WJM), and one month later by an occupational therapist. Information was supplemented when necessary by a relative or main carer and by general practitioner and hospital notes. Disability was graded according to the scale of Hoehn and Yahr.[4] Dementia was assessed using the Aberdeen minimental state questionnaire[5] and clinical judgment. Patients were asked 10 questions designed to elicit deficits in orientation, time and place, memory, and general knowledge. Dementia was regarded as present and mild when the patient scored seven or less correct answers and as severe when he scored less than five correct answers. The latter score indicates patients who have great difficulty in coping in the community on their own.

The diagnosis was based on the finding of two or more of the principal signs: tremor, rigidity, bradykinesia, and impaired postural reflexes.[4] Arteriosclerotic parkinsonism was not accepted as an aetiological subgroup.[6,7] Patients with a history of stepwise deterioration in neurological function, who had widespread pyramidal signs, with bilaterally brisk reflexes, upgoing plantars, pseudobulbar palsy associated with rigidity and shuffling gait, and often some degree of brain failure, were rejected.

Patients who had been taking a phenothiazine or butyrophenone or metoclopramide during the six months before assessment and had no history of parkinsonism before this were regarded as probably having drug induced parkinsonism and so rejected. Those with a history of brain failure were also rejected. Postencephalitic Parkinson's disease was diagnosed when there was a documented history of encephalitis or oculogyric crises.[8] When any diagnosis remained in doubt the patient was also seen by a neurologist.

Results

From all sources 1325 patients were considered but 835 died or moved away. Having started with the original general practice referrals, neurology clinic records, and the Grampian Health Board computer file, we already knew of 92 patients who were subsequently considered from later sources.

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Only five patients refused to be seen but from their records they all fulfilled the criteria for idiopathic Parkinson's disease.

Of the 393 patients seen personally, 57 (14·5%) did not have Parkinson's disease. Most of these patients had benign essential tremor, dementia, or cerebrovascular disease; 71 (18·1%) had drug induced disease; and three had postencephalitic Parkinson's disease.

Including the five patients who refused to be seen, 267 patients were defined as "idiopathic" during the study, but 18 died, and when the prevalence was assessed 109 men and 140 women had idiopathic Parkinson's disease. These 249 patients formed the basis of the prevalence data; all other tables used the maximum amount of reliable data available.

Of 267 patients, 204 were living in their own or a relative's home—five of these in sheltered housing and 51 alone—28 in a residential home for the elderly, and 35 in hospital. The ages ranged from 40 to 92 years, median 75·3 years (72·0 for men and 77·5 for women), and 222 (83%) were aged over 65. Of 265 patients, 94 (35·5%) were diagnosed by their general practitioner, but only 73 (27·5%) of 263 patients were started by them on drug treatment. The general practitioners and neurologists diagnosed 67 (24·9%) and 63 (23·4%), respectively, and started drug treatment in 51 (19·2%) and 84 (31·3%) of all patients. The geriatrician was responsible for diagnosis in only 38 (14·3%) patients and started treatment in 30 (11·3%) of the study group; five (1·9%) were diagnosed by a psychiatrist or surgeon; and 28 (10·6%) patients had never received treatment with drugs. A levodopa preparation with decarboxylase inhibitor was the commonest treatment in use (150 cases). A levodopa preparation plus an anticholinergic drug was used by 43 (16·2%), eight (3%) used bromocriptine plus a levodopa preparation, and 10 (3·8%) an anticholinergic only. At this time only two patients were taking selegiline and three amantadine. Forty seven (17·7%) patients received no current drug treatment.

The total prevalence of idiopathic Parkinson's disease regardless of age and sex was 164·2/10^5 of the population. When considered by age and sex the prevalence rose considerably with age, to seven men and five women aged over 84 (table I).

TABLE I—*Prevalence of idiopathic Parkinson's disease by age and sex (31 May 1984)*

Age group (years)	Men		Women		Total	
	No of patients	Prevalence (rate/10^5)	No of patients	Prevalence (rate/10^5)	No of patients	Prevalence (rate/10^5)
40-44	1	26·5			1	12·5
45-49	6	140·2	1	20·4	7	76·1
50-54	6	132·6	2	38·8	8	82·6
55-59	3	67·3	4	77·2	7	72·6
60-64	14	374·4	6	130·4	20	239·8
65-69	12	346·4	10	211·4	22	268·5
70-74	24	855·9	27	612·9	51	707·4
75-79	27	1558·9	27	757·6	54	1019·6
80-84	8	1041·7	42	2077·2	50	1792·1
85 and over	8	2657·8	21	2071·0	29	2205·3
All ages	109		140		249	164·2

Of 242 patients, 71/137 (52%) women and 33/105 (31%) men were aged over 69 at onset. The modal ages at onset were the seventh decade for men and the eighth decade for women. Within the age groups <70 years, 70-79 years, and 80 plus years, however, there was no significant difference in mean age at onset between men and women (table II). To allow comparison with previous studies a mean age at onset, irrespective of sex, of 65·3 (SD 12·6) was calculated.

TABLE II—*Mean age at onset by sex. (Figures are mean (SD) No of patients)*

Age group (years)	Men (n=105)	Women (n=137)
0-69	52·3 (9·9)	52·6 (9·3)
70-79	66·1 (7·7)	66·7 (8·2)
80 and over	72·5 (15·4)	77·0 (6·8)

Among 242 patients the median duration of Parkinson's disease for men was 7·4 years and 7·0 years for women. Thirty seven (35%) men and 37 (27%) women had the disease for more than 10 years. There were no significant differences in the mean duration of disease for men and women and for those with differing degrees of disability.

Of 252 patients, 93/252 (37%) had a minimental state questionnaire score of ≤7/10 and 28/252 (11%) of <5/10. There was no difference between men and women but the number of patients with a score of ≤7/10 increased with age from 14/62 (23%) of those aged under 70 to 27/98 (28%) of those aged 70-79 years and 29/54 (54%) of those over 79 years.

Most patients were aged over 65 and subject to multiple disorders. They had a mean of 3·8 medically recognised conditions, including idiopathic Parkinson's disease. Not all of these were seriously disabled, but in 40 patients we could not determine how much their disability was due to Parkinson's disease or other medical conditions and they were therefore excluded. Of 214 patients, 31 (14·1%) and 30 (13·3%) had Hoehn and Yahr grades I and II (mild), respectively; 52 (23%) had grade III (moderate); and 73 (35%) and 22 (10%) had grades IV and V (severe), respectively. The proportion of patients with severe disability increased with age from 22 (35%) of those <70 years to 31 (57%) of those >79. Disability also increased with lower scores by the minimental state questionnaire. A mean Hoehn and Yahr's score for groups of patients defined by age group and minimental state questionnaire was calculated (table III). Within these age groups the mean disability level was higher for those with a minimental state questionnaire score of ≤7/10.

TABLE III—*Minimental state questionnaire and mean disability scores by age groups*

Minimental state questionnaire score (grades 0-10)	Hoehn and Yahr's mean disability score (grades 1-5)		
	Patients aged <70 years	Patients aged 70-79 years	Patients aged 80 and over
≤7	3·9 (n=14)	3·6 (n=27)	4·0 (n=29)
≥8	2·4 (n=48)	3·0 (n=71)	2·9 (n=25)
0-10	2·7	3·2	3·5

Excludes 11 patients who could not be adequately examined because of serious intercurrent illness.

Discussion

Over the past 25 years several worldwide community surveys of Parkinson's disease have taken place.[9-17] In 1960 in Göteborg, Sweden,[17] the prevalence of Parkinson's disease was 61/10^5; in 1962 in Wellington, New Zealand,[9] 97/10^5; in 1965 in Rochester, USA,[11] 121/10^5; in 1966 in Gippsland, Australia,[12] 78/10^5; in 1967 in Iceland,[10] 162/10^5; in 1971 in Arhus, Denmark,[14] 79/10^5; in 1971 in Turku, Finland,[7] 114/10^5; in 1972 in Sardinia,[15] 65/10^5; and in 1984 in Aberdeen, 164/10^5. A prevalence of 112·5/10^5 was found in Carlisle in 1961, but there was no clear indication that postencephalitic and drug induced cases were excluded from this figure. We used basically the same strict diagnostic criteria as the Scandinavian studies, and all but 5/267 (2%) of our patients were personally examined, thereby avoiding the problems of diagnosis from old records and pooled diagnostic data. Fifty seven out of 393 (14·5%) of our referrals were found not to have Parkinson's disease compared with 5·3%,[18] 11·3%,[9] and 31·3%[17] of cases in previous studies.

Martilla and Rinne,[7] Dupont,[14] and Rosati *et al*[15] commented on and excluded drug induced disease. Seventy one (18·1%) of our referrals had drug induced disease and had they not been detected the prevalence of idiopathic Parkinson's disease would have falsely risen to 211·1/10^5.

Because of the different methods used in previous studies and the problems inherent in looking at different populations at different times there are limits to conclusions drawn from comparing age specific prevalence. None the less, in comparing our prevalence figures with those of previous studies, there is a trend towards a similar or marginally lower prevalence in younger age groups but a higher one in the very old (table IV). The high prevalence in very old women has some support from the small Glasgow study of Broe *et al*.[19]

In keeping with previous studies the prevalence increased with age in both sexes. Rather than reaching a plateau or falling away above the eighth decade, however, as in several of these studies,[1 7 10 14 15] it continued to a maximum in the ninth decade as in the studies of Rochester[11] and Yonago.[16]

In Aberdeen the age specific prevalence was higher in men until

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TABLE IV—*Age specific prevalence/10⁵ of population*

Place of study	Year	Aged 0-39		Aged 40-49		Aged 50-59		Aged 60-69		Aged 70-79		Aged 80 and over	
		Population	Prevalence	Population	Prevalence	Population	Prevalence	Population	Prevalence	Population	Prevalence	Population	Prevalence
Carlisle	1961	39968	0	9681	144·6	9268	161·8	7297	315·2	3738	613·7	1149	443·9
Iceland	1963	316843	0·6	19736	60·8	15958	162·9	12180	936·0	7448	1584·3	2443	1309·9
Turku, Finland*	1971	250000	0·8	51886	21·2	45416	107·8	41800	471·2	21594	768·7	6068	593·3
Aberdeen	1984	81966	0	17180	46·6	19325	77·6	16535	254·0	12505	839·6	4105	1924·5

*Calculated from data of Martilla and Rinne.[21]

the ninth decade, when it was higher in women (1496·7/10⁵ for men and 2075·1/10⁵ for women). Table I, however, shows that there was an unexpected drop in prevalence for men aged 80-84, which was possibly due to small numbers, as the prevalence rose sharply again thereafter. Certainly, Martilla and Rinne found the prevalence to be roughly equal in men and women until the eighth decade, when it was greater in women,[7] but Harada *et al* found a greater prevalence for men in the sixth and ninth decades,[16] and Rosati *et al* found a consistently greater prevalence in men in the sixth decade.[15] The prevalence is, therefore, probably at least equal in men and women and may be greater in men.

The mean age at onset in surveys in which patients with arteriosclerotic Parkinson's disease are not considered to be a separate group has varied little (61·6-64·3 years) in the past 15 years.[7 13 14 16] These surveys are similar to our own study. In Carlisle the median age at onset was 60-69 years. Thus for 25 years the age at onset does not seem to have risen, which is strong evidence against any continuing cohort phenomenon.

Brown and Marsden have calculated from previous studies, using the minimental state questionnaire to measure dementia in Parkinson's disease, that a mean of 35·1% of patients were demented,[20] which is similar to the proportion of our patients whom we considered to have dementia because their score was ≤7/10. The 28 (11%) of our patients with a score of <5/10, a level we have found to be associated with social incompetence and which most doctors would probably accept as being true dementia, is similar to that of Brown and Marsden's[20] and Lees's[21] estimates of what the true prevalence of dementia is in Parkinson's disease. We would therefore hope that despite using only a minimental state questionnaire our subdivision into a severe group with a score of <5/10 results in a realistic estimate of the prevalence of dementia in patients with Parkinson's disease in the community. Martilla and Rinne have already observed that dementia increases with the age of parkinsonian patients.[22] Our results suggest that not only does age affect both disability and dementia but when age is held constant dementia independently influences disability, which confirms the observations of Pollock and Hornabrook[9] and Martilla and Rinne[22] that dementia has serious implications for the functional abilities of patients with idiopathic Parkinson's disease.

The proportions of patients who were most severely disabled were higher than those Hoehn and Yahr[4] and Martilla and Rinne[22] had found previously. Mjönes[23] and Pollock and Hornabrook,[9] using different rating scales, also appeared to find less disability in their patients before levodopa was used. These were, however, all younger, and in Hoehn and Yahr's case were only patients who were able to come to a clinic. In addition, our patients were examined at home where locomotor difficulties, which are rightly a major determinant of disability according to Hoehn and Yahr, were more pronounced because negotiating the furniture and short distances in their own home denied them the opportunity to establish a rhythm in walking.

Treatment with levodopa might be expected to reduce the levels of disability, but the most severely disabled seemed no longer to be helped by treatment and 150 (56%) of our group had had Parkinson's disease for over five years and had probably begun to experience loss of effectiveness of the drug.[24] Also 45 (17%) of our patients were not receiving treatment, and 107 (40%) claimed to have no regular review. They may not have been achieving their maximum potential.

There is no indication that Parkinson's disease is decreasing in prevalence. Indeed it is increasingly common in our old people, and especially when drug induced cases are included.

Although each general practitioner may have fairly few patients, our survey shows that within a community it is a common and disabling condition, especially if dementia is also present. Most patients take a levodopa preparation, and over half have had the disease long enough to experience some of the later problems associated with the disease and its treatment. That many claim they have no regular review is therefore disturbing. While active research pursues a cause and more effective treatment, we must try to give today's many patients and the people who care for them effective support so that their quality of life is at an optimum.

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