

The Profile of Hospitalised Patients with Parkinson's Disease

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Abstract

The objective of this study was to provide a profile of patients with Parkinson's disease (PD) who required admission to hospital. We reviewed retrospectively all patients with PD who were admitted to our hospital in 1995. In our study, there were 260 admissions involving 173 PD patients. The average age was 74.7 years. Of these patients, 93 were males and 80 were females. There were 150 Chinese, 12 Indians, 9 Malays, and 2 of other races. The average duration of hospitalisation was 11.7 days. The main reasons for admissions were: 1) chest infections (22%), 2) falls (13%), 3) control of PD symptoms (10%), 4) general medical problems (9%) and 5) urinary dysfunction (8%). Nine per cent were classified as Hoehn and Yahr stage 2, 31% as stage 3, 31% as stage 4 and 24% as stage 5. Twenty-one per cent of our patients were first diagnosed with PD during their hospitalisation. Upon discharge, 26% required transfer to either a community hospital or nursing home.

The current in-patient load of PD patients is expected to rise with the ageing population. A significant number of people within the community may have undiagnosed PD. These patients suffer multiple medical problems and need a multi-disciplinary team approach to management. Greater resources will be required to support these patients in the community.

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Introduction

Prevalence studies in various parts of the world have shown that Parkinson's disease (PD) is relatively common among the aged in all countries. Crude prevalence rates range from 10 to 450 per 100 000 population.¹ The prevalence of this disease is likely to rise in countries faced with an ageing population. Singapore is one such country with a projected increase in the number of those aged 65 years and above, from 209 700 or 6.9% of the population in 1996 to 789 600 or 18.4% by the year 2030.² With this rise, the number of elderly aged 60 and above who are semi-dependent or totally dependent is also expected to increase by almost five times from 15 000 in 1990 to 72 000 by 2030.³ The burden of those with PD requiring hospitalisation will become more significant in the years to come. We present a retrospective review of all patients with PD who were admitted in 1995 to the Tan Tock Seng Hospital, a major urban general hospital in Singapore. This study attempts to provide a profile of patients with PD who required hospitalisation. It aims to understand the reasons for their admissions, medical problems they faced, severity of their disease, medications used, and outcome of their stay. The authors be-

lieve this paper to be one of the few in the literature to analyse and obtain a profile of hospitalised patients with PD.

Materials and Methods

All patients admitted to Tan Tock Seng Hospital in 1995 with a diagnosis of PD were reviewed retrospectively. This was done by tracing the medical records of patients with a primary or secondary discharge diagnosis of PD [International Classification of Disease (ICD) - 9 code 332.0]. Patients with drug-induced parkinsonism or parkinson-plus syndromes were excluded from the study.

The severity of PD was classified according to the Hoehn and Yahr (H&Y) staging scale.⁴ In stage 1, there is unilateral disease only. In stage 2, there is bilateral involvement with no postural abnormalities. In stage 3, there is bilateral involvement with mild postural abnormalities but the patient is able to lead an independent life. In stage 4, there is bilateral involvement with postural instability and the patient requires substantial help in daily activities. In stage 5, the patient is confined to bed or chair.

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Results

Demographics

There were 260 admissions involving 173 PD patients in our study. Eleven patients with drug-induced parkinsonism and 4 with parkinson-plus syndromes were excluded from the study. The average age was 74.7 years. Of our 173 patients, 93 were males and 80 were females. There were 150 (87%) Chinese, 12 (7%) Indians, 9 (5%) Malays, 1 Eurasian and 1 Filipino.

Ninety-two (35%) of the admissions were to the geriatrics department, 64 (25%) to general medicine, 50 (19%) to neurology, 18 (7%) to general surgery, 18 (7%) to orthopaedics, 8 (3%) to neurosurgery, 5 (2%) to cardiovascular medicine, 3 (1%) to psychiatry and 2 (1%) to rehabilitation medicine. The average duration of hospitalisation was 11.7 days.

Reasons for Admission

Fifty-six (22%) of the admissions were for chest infections, 34 (13%) for falls, 27 (10%) for control of symptoms of PD, 24 (9%) for general medical problems, 20 (8%) for urinary dysfunction, 16 (6%) for other neurological disorders, 16 (6%) for surgical problems, 14 (5%) for management of various malignancies, 13 (5%) for cardiovascular problems, 10 (4%) for side-effects of anti-parkinson's drugs, 9 (3%) as newly diagnosed cases, 8 (3%) for constipation, 8 (3%) for depression, 3 (1%) for dysphagia, 1 for dementia and 1 for social reasons.

Medical Problems

In addition to the presenting complaint, each patient may have also suffered several other medical conditions. A summary of these medical problems is shown in Table I. Twenty-one per cent of our patients were first diagnosed to have PD during their hospitalisation.

In this study, the general medical problems encompassed diseases such as diabetes mellitus, hypertension, gout, infections other than pneumonias or urinary tract infections, and other general medical conditions not covered by the list in Table I. Surgical problems included all conditions that required management by the general surgeons, urologists, orthopaedic surgeons and neurosurgeons. Neurological disorders referred to neurological conditions other than PD such as cerebrovascular accidents and epilepsy. Urinary dysfunction included problems of incontinence, retention of urine and urinary tract infections. Cardiovascular problems referred to conditions such as ischaemic heart disease, congestive cardiac failure and arrhythmias.

Thirty-nine patients hospitalised had problems with falls. Of these, 9 (23%) sustained fractures of the upper limb, 6 (15%) sustained head injuries, 2 (5%) had fractures of the hip and 1 (3%) suffered compression fracture of the spine. Of the 9 patients with fractures of the upper

TABLE I: SUMMARY OF MEDICAL PROBLEMS FACED BY PATIENTS WITH PD WHO REQUIRED HOSPITALISATION

Medical problems (each patient may suffer more than 1 condition)	Number (n = 173)	%*
1. Uncontrolled PD symptoms	27	16
2. Chest infection	59	34
3. Urinary dysfunction	49	28
4. Constipation	29	17
5. Falls	39	23
6. Dementia	41	24
7. Depression	27	16
8. Dysphagia	5	3
9. Side effects of anti-parkinsonian drugs	13	8
10. General medical problems	90	52
11. Surgical problems	43	25
12. Cardiovascular problems	41	24
13. Neurological disorders	51	30
14. Malignancies	9	5

* reflects percentage of patients suffering from the conditions listed

PD: Parkinson's disease

limb, 5 involved the humerus, 1 the elbow, 2 the wrist and 1 sustained fractures of both the humerus and wrist. None of those with head injuries had intracranial haemorrhages. When the 39 patients were studied, 1 was classified as H&Y stage 1, 2 were in stage 2, 8 in stage 3, 19 in stage 4, 7 in stage 5 and 2 were undefined.

There were 9 PD patients who required hospitalisation for management of various malignancies. Four of these suffered from carcinoma of the lung, 4 suffered gastrointestinal malignancies and 1 had carcinoma of the breast.

Severity of PD

Of the 173 patients, 1 patient was classified as stage 1 on the Hoehn and Yahr Staging Scale, 16 (9%) patients were stage 2, 54 (31%) were stage 3, 54 (31%) were stage 4 and 41 (24%) were stage 5. Seven of the patients could not be staged because the staging was not recorded in the case notes. The average duration of their PD was 4.0 years (range 0 to 28 years).

Medications

Two hundred and five (79%) patients were on levodopa, 49 (19%) on selegiline, 2 (0.8%) on amantadine, 9 (3%) on bromocriptine, 1 (0.4%) on pergolide and 22 (8%) on artane (trihexyphenidyl). Fifty-one (20%) patients were not on any anti-parkinsonian drugs during the period of hospitalisation.

Of the 13 patients who suffered side-effects of anti-parkinsonian drugs, 12 were attributed to levodopa. Of these 12, 8 of them experienced dyskinesias, 3 postural hypotension, 2 motor fluctuations and 1 nausea and

vomiting. One patient developed confusion which was attributed to trihexyphenidyl (artane).

Outcome

Two hundred and four of the admissions were from the patients' own homes. Fifty-two were from nursing homes and 4 from community hospitals. In 173 of the admissions, patients returned to their own homes upon discharge, 47 were discharged to nursing homes, 16 to community hospitals and 2 to other hospitals. There were 22 in-patient deaths. Sixteen of these were from pneumonia, 2 from acute myocardial infarction, and 1 each from carcinoma of the lung, urinary tract sepsis, sepsis from gangrene and congestive cardiac failure.

Discussion

In 1995, there were approximately 37 000 adult admissions to our hospital. Two hundred and sixty of these or 0.7% consisted of patients with PD. The majority of these patients were at stage 3, 4 and 5 of their disease. Their average hospital stay was 11.7 days compared to the average of 7.8 days for all adult hospitalisations. This is likely to be related to the increased need for in-patient rehabilitation amongst this group of patients. These factors together with the ageing population in Singapore are indicative that the in-patient load of PD patients, especially those in stage 3 to 5 disease, will rise in the years to come.

Previous population and hospital-based surveys have found the highest prevalence rate of PD for Caucasians in Europe and North America, intermediate rates for Asians in Japan and China and lowest rates for blacks in Africa.⁵ This study revealed a difference in the ethnic composition of our patients when compared with that of our country. Our patients consisted of 87% Chinese, 5% Malays, 7% Indians and 1% of other races while the national figures of our ethnic composition are 78%, 14%, 7% and 1% respectively. The significant difference was the marked under-representation of Malays in our study. This difference may be a cultural one with Malays preferring to seek alternative therapies such as traditional herbs, or out-patient based management as opposed to hospitalisation and in-patient care. This however has not been studied and community-based studies are needed to determine the prevalence of PD amongst the different ethnic groups in Singapore. Important aetiological and genetic clues may be uncovered should a real inter-ethnic difference in prevalence be found.

While 9 (5%) of our patients were admitted as newly diagnosed PD, an additional 28 (16%) patients were found to have features of PD after their admission for other complaints. Therefore, a significant number of patients (21%) were found to be suffering from PD only during their hospitalisation. This suggests that there is a

sizeable number of people within the community with undiagnosed PD. This high percentage of undiagnosed PD cases may explain the short average duration of the condition (4.0 years) which is out of proportion to the severity and complications of PD found in our patients.

Patients with PD suffered a wide range of other medical and surgical problems (Table I). Some of these are related to PD while others are age-related. Of significance are the problems of chest infection, urinary dysfunction, dementia and falls, each of which affected more than 20% of the patients admitted.

Chest infection was the chief problem in 22% of admissions and affected 34% of patients hospitalised. It also accounted for 73% of in-patient deaths. This is consistent with a previous finding⁶ that patients with PD were three to four times more likely to die from pneumonia or influenza. The frequent occurrence of chest infections amongst these patients was probably related to their immobility and poor swallowing mechanisms with consequent increased vulnerability to pneumonia. PD patients are known to have oral-pharyngeal dysfunction⁷ as well as laryngeal dysmotility⁸ and these contribute to the risk of developing aspiration pneumonia. Care-givers and physicians should therefore be vigilant in detecting early symptoms and signs of pneumonia in PD patients so as to enable early treatment.

Although urinary dysfunction accounted for 8% of admissions, 28% of our patients had some form of urinary complaint. These included symptoms of bladder irritability, obstruction and infection. Previous studies⁹⁻¹³ have demonstrated a high frequency of urological abnormalities in PD with detrusor hyperreflexia found in 60% to 90% of patients. Urethral obstruction has also been described and attributed to poor sphincter relaxation.⁹⁻¹¹ A recent urodynamic study¹⁴ comparing patients with and without PD however dispute these findings and suggests that these changes are age-associated and not disease-specific. The significant finding in this study appeared to be a small reduction of bladder capacity in PD patients. Further urodynamic studies on this group of patients in our local population are needed.

Twenty-four per cent of our patients were diagnosed to have dementia. This compares with 20% to 40% quoted by other studies.¹⁵ Commonly described intellectual deficits include disturbances in visuospatial discrimination, and memory and language impairments. It has been shown that the decline or impairment of intellectual activity correlates with the extent of disability and severity of PD. While the cause of dementia in PD has not been firmly established, various hypotheses have been suggested. Some investigators believe dementia is related to the neuropathological findings consistent with Alzheimer's disease while others have

attributed it to degeneration within the basal ganglion.¹⁵

Falling is a common problem in the elderly and much more so in the elderly person with PD. It is associated with significant morbidity and mortality. Thirteen per cent of admissions were for falls and 23% of our patients had a problem with falls. A recent community study¹⁶ showed a prevalence rate of falls of 17.2% in elderly Singaporeans. Our study showed that of the PD patients who had problems with falls, 31% sustained fractures and 15% head injuries. Only 5% of our patients with falls (or 17% of patients who suffered fractures) suffered fractures of the hips although an earlier study¹⁷ showed a lower hip bone mineral density in elderly PD patients, hence predisposing them to fractures at this site. The majority of our patients (49%) who fell were H&Y stage 4. These patients are most vulnerable because of their postural instability and the need for substantial help to ambulate and continue their activities of daily living. As falls are a multifactorial problem, efforts should be made to correct patient and environmental factors that predispose one to falls. Patient factors include:

- 1) optimising drug usage and minimising side effects;
- 2) correcting abnormal visual, vestibular and proprioceptive function;
- 3) handling behavioural aspects of dementia, and
- 4) managing musculoskeletal disorders.

Environmental factors should also be assessed and corrected. These include the removal of environmental hazards to ease a patient's mobility and the use of appropriate clothing and footwear.

An earlier study⁶ showed that PD patients were approximately 1.5 times more likely to die from cerebrovascular accidents (CVA). While none of our patients died from CVA, 30% of them had other neurological disorders, the majority of which were CVA. This apparent association of CVA amongst PD patients may reflect the greater frequency with which these patients are seen by a neurologist and thus a greater likelihood of diagnosing other neurological conditions. The association of CVA with PD may therefore be spurious and reflect a detection bias. However the increased prevalence of CVA in PD patients may be real and could be related to one or more shared risk factors for the two conditions. Age and the male sex have been found to be risk factors common to both conditions.^{5,18} Studies of CVA risk factors such as diabetes mellitus, hypertension, atrial fibrillation and smoking have however not found them to be more prevalent in PD patients when compared to controls.^{19,20}

Approximately 80% of the patients admitted were on some form of levodopa treatment, with 19% on selegiline, 8% on trihexyphenidyl and 4% on dopamine agonist. This pattern of drug usage shows the importance of

levodopa in the management of PD. Of those with side-effects, the majority (77%) were related to long-term levodopa use. These complications of dyskinesias and motor fluctuations were of sufficient severity to warrant hospitalisation. Twenty per cent of our patients were not on any anti-parkinsonian medications when they were hospitalised. The reasons for this could be:

- 1) the side-effects of medication,
- 2) interference of medications with the management of other serious co-morbid conditions, or
- 3) the lack of levodopa responsiveness in patients with advanced PD.

Fifty-six (22%) of our patients were admitted from either a nursing home or community hospital. On discharge, 63 (26%) required transfer to one of these institutions. The relatively high number of our patients requiring institutional care reflects the difficulty which care-givers face in looking after patients at home. The problems of the availability of care-givers and the social problems which patients and their families face need to be addressed. These social problems have been identified²¹ and include the loss of social contact, behavioural problems, family members under stress and communication problems within the family. More patients could be managed in the community if sufficient support for families were available. In addition, special housing and the provision of rehabilitative care services will go a long way to keep PD patients active within the community.

There are limitations inherent in any retrospective study using discharge diagnosis codes as a data resource. Although discharge records are standard documents with specified rules for their completion, the accuracy of disease data may vary depending on both the physician's knowledge of the patient's neurological disorder and the relative prominence of that condition versus other diseases at the time of discharge. In addition, PD is a diagnosis made on clinical grounds alone. Previous clinico-pathological studies^{22,23} have assessed the accuracy of clinical diagnosis to be approximately 80%.

In summary, despite some limitations in this study, a profile of our patients with PD requiring hospitalisation has been provided. This data would be important as we prepare for an increased load of PD patients in the face of a greying population.

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