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A Pilot Study on Prescribing Pattern of Anti-Parkinsonism Drugs in a Tertiary Care Hospital

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ABSTRACT

Background: We examined the Prescribing pattern of antiparkinsonism agents in a tertiary care hospital, with particular emphasis on patients with PD in stages in HY scale. Parkinson's disease is a neurological disorder in which there is a gradual loss of brain cells that make and store dopamine. *Methods:* It is a prospective observational study, Data collected from antiparkinsonism prescriptions, including levodopa, dopamine agonists (DAs), amantadine, selegiline, entacapone, and anticholinergics, were in Neurology department of tertiary care Hospital. *Results:* There were 36 patients who were fulfilling the study criteria for PD were included in the Analysis. Levodopa monotherapy comprised approximately 36.1 % of prescriptions in the study period, followed by Rasagiline and Amantadine both comprised 2.7 % of prescriptions. Combination therapy including levodopa with either DA or other antiparkinsonian medications was 52.77 % and 5% MAO-B inhibitor and anticholinergic combination in the study period. *Conclusion:* our results showed that levodopa, either as monotherapy or combination therapy, is the mainstay treatment for patients with Parkinsonism disease. Combination therapy was used more in the treatment of Parkinsonism disease. Amantidine, Rasagiline, Trihexyphenidyl were more used as antiparkinsonism drug after levodopa.

INTRODUCTION

Parkinsonism is a neurodegenerative disease characterized by motor manifestations (bradykinesia, rigidity, resting tremor, and postural instability), autonomic and neurological disorders and sensorial symptoms. Parkinson's disease is a neurological disorder in which there is a gradual loss of brain cells that make and store dopamine [1]. Dopamine is a chemical in the brain, known as a neurotransmitter, which sends messages that control movement. As Parkinson's disease progresses, more dopamine neurons in the brain are lost [2]. There are currently no available treatments to slow the progression of Parkinson's over time, but available drugs and therapies can effectively treat symptoms often for years. Because Parkinson's disease is highly variable, what works for one patient may not work for another [3]. Since many symptoms of Parkinson's are due to a lack of dopamine in the brain, dopaminergic drugs act to temporarily increase dopamine levels in the brain through different approaches [5]. The increase in dopamine provided by these treatment approaches can result in improved motor function control. Mainly used antiparkinsonism drugs include dopamine receptor agonists, catechol-o-methyl transferase inhibitors (COMTIs), monoamine oxidase B inhibitors (MAOIs), anticholinergics, and amantadine.[6] Carbidopa/levodopa : Levodopa helps to restore levels of dopamine, a chemical messenger in the brain responsible for smooth coordinated movement and other motor functions. Carbidopa works to prevent levodopa from being broken down before it reaches the brain and to prevent nausea. Dopamine agonists: These drugs mimic the function of dopamine in the brain. MAO-B inhibitors: These drugs inhibit a process that breaks down levodopa, thus extending its action. COMT inhibitors: These drugs are used in combination with levodopa to allow more levodopa to enter the brain. Anticholinergics: These drugs block a different neurotransmitter (acetylcholine) that also regulates movement.[4]

The most accepted staging system for severity of Parkinsonism disease is the Hoehn and Yahr (HY) scale. There are 6 stages in the HY scale with increasing patient's condition.[9] The aim of this study was to investigate the Prescribing pattern of antiparkinsonism agents in a tertiary care hospital, with particular emphasis on patients with PD in stages in HY scale.

2. METHODS

2.1. Data Source. It's a prospective observational study. All relevant information regarding the study collected from case records and direct interview with the caretakers. Data from

patients or caretaker collected by using a specially designed proforma. Pharmacotherapy data (indication, dose, posology, scheduling, and reports on the access to medicines) were collected from the medical prescription, patient diary and all medicines (over-the-counter and prescription medicines) brought by the patient to the appointment with the physician. The Research Ethics Committee of Cosmopolitan Hospital, Thiruvananthapuram, approved our study.

2.2. Study Population: Patients taken from the Neurology department of Cosmopolitan Hospital. Patients with already diagnosed Parkinsonism were included in this study in a period of 6 months.

2.3. Antiparkinsonism drug Prescribing assessment: We identified Parkinsonism patients with patients who had received prescriptions for antiparkinsonism drugs including Levodopa, Carbidopa, Bromocriptine, Amantadine, Selegiline, Anticholinergics, Ropinirole, or Pramipexole. Many patients may have changes of medications throughout the year by the physician depends upon their progression of disease conditions, efficacy, side effects, concurrent illness, etc. We observed antiparkinsonism prescriptions. Each prescription was classified as either monotherapy or combination therapy.

2.4 Statistical Analysis. We calculated the proportion of prescriptions belonging to each particular antiparkinsonism therapy category and also whether it was a monotherapy or a combination therapy.

RESULTS

36 patients were fulfilling the study criteria for PD were included in the Analysis. Among the 17 (47.2%) were men. The average age at admission was 69.14 years (standard deviation, 7.6), and they had been carrying the diagnosis of Parkinsonism for an average of 5.7 years (SD 0.55).

Levodopa was the mainstay as monotherapy or in combination with other antiparkinsonian medications. Levodopa monotherapy comprised approximately 36.1 % of prescriptions in the study period, followed by Rasagiline and Amantadine both comprised 2.7 % of prescriptions. Combination therapy including levodopa with either DA or other antiparkinsonian medications was 52.77 % in the study period.

Among the combination therapies, levodopa + other antiparkinsonian medications (other than DA) was the most commonly prescribed regimen and comprised 38.86% of prescriptions in the study. Table 1 and Figure 2. However, combinations of levodopa + DA and MAO-B Inhibitors+ Anticholinergics medications comprised 8.3% and 2.7% respectively.

Table 1: Proportion of prescriptions with particular antiparkinsonism therapy category

	Number of prescriptions	Total percentage (%)
Total number of prescriptions	36	
Monotherapy	16	44.4
Levodopa	14	38.8
Rasagiline	1	2.7
Amantadine	1	2.7
Combination therapy	20	55.6
Levodopa[a] + dopamine agonist	3	8.3
Levodopa[a] + others[b]	14	38.8
MAO-B Inhibitors[c]+ Anticholinergics[d]	1	2.7
Levodopa[a] + dopamine agonist + others[b]	2	5.4

aLevodopa alone and combination of levodopa and dopa-decarboxylase inhibitors.

bOthers include amantadine, selegiline, rasagiline, and entacapone. Trihexyphenidyl

cMAO-B inhibitors include selegiline, rasagiline

d Anticholinergics include Trihexyphenidyl

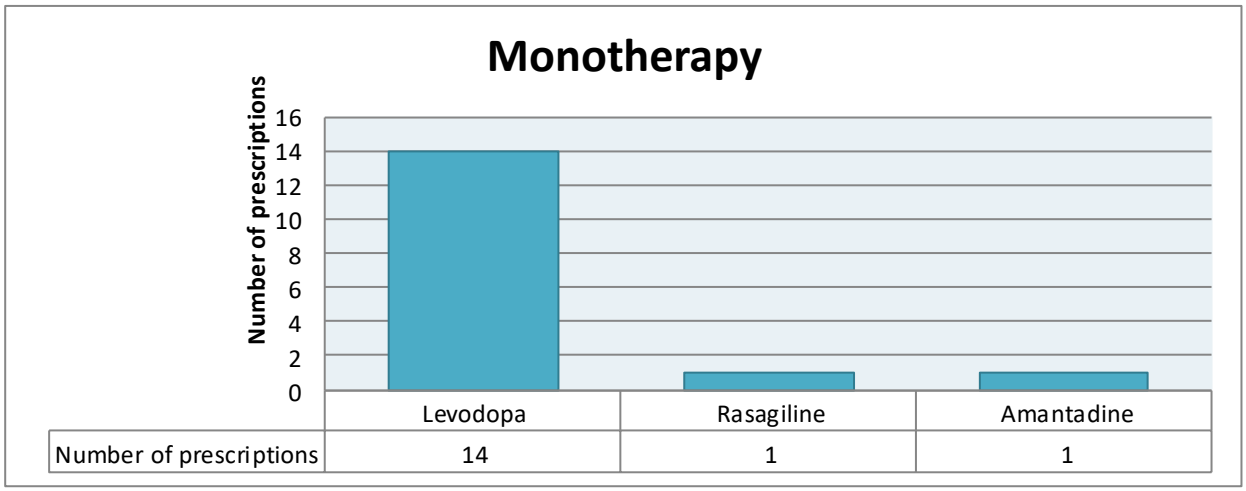

FIGURE 1: PROPORTION OF MONOTHERAPY

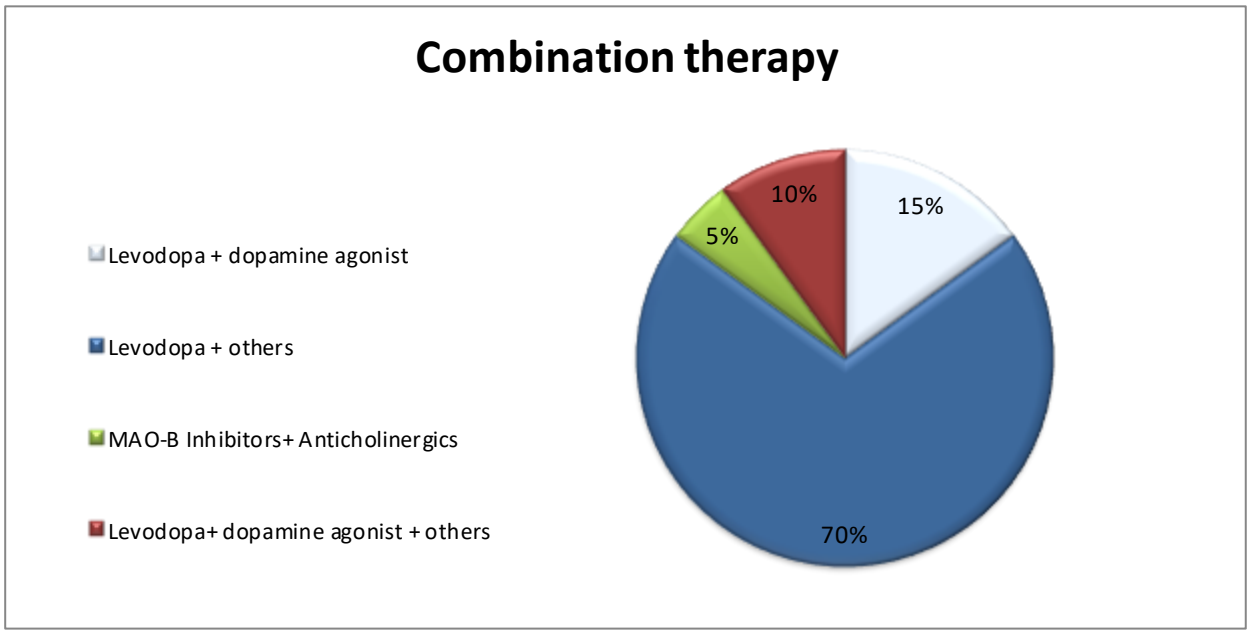

FIGURE 2: PROPORTION OF COMBINATION THERAPY

DISCUSSION

In this study, we examined trends of antiparkinsonism drugs prescribed to parkinsonism diseased patients in a tertiary care hospital, Trivandrum,kerala, India at a period of 2018 - 2019. We found that Levodopa (combination with carbidopa) was mostly prescribed antiparkinsonism drugs about 38.8 % as monotherapy and 52.7 % as in combination therapy in the 36 patients. An increased duration of the treatment and intensity of the disease, resulting in higher daily doses of levodopa prescribed. In 36 prescriptions 7 contains

dopamine facilitator drug Amantadine.and 6 of each prescription contained Rasagiline (MAO-B Inhibitor) and Trihexyphenidyl (Anticholinergic).5 patients were treated with Dopamine agonists in that 3 were by Pramipexole and remaining by bromocriptine and ropinirole.Entacapone was on two prescriptions given with a combination of levodopa and carbidopa. Tolcapone also gave to one patient along with levodopa.

There are 36 patients included in the study. Among them, 6 were assessed as in stage 1 as per Hoehn and Yahr staging of Parkinsonism. All of 6 were treated with monotherapy.4 were with levodopa and the remaining two were with Rasagiline and amantadine respectively.

15 patients belonged in stage 2 of Hoehn and Yahr Parkinsonism stage and 6 were treated as monotherapy with levodopa.8 patients treated with two antiparkinsonism drug combination mainly Levodopa with other antiparkinsonism drugs(except dopamine agonists) comprised 75 %. One was treated with Levodopa with dopamine agonists (Pramipexole) and others were with MAO-B Inhibitor (Rasagiline) and Anticholinergic(Trihexyphenidyl).

14 Patients were in Hoehn and Yahr stage 3 classes. Among them, 4 were treated with levodopa monotherapy with higher daily doses and increased frequency (in interval 4 hours between each dose). 8 they were treated with combination therapy of two antiparkinsonism drugs containing levodopa and remaining 2 were treated with three drug combination include Levodopa+Rasagiline (MAO-B Inhibitor)+Pramipoexole (dopamine agonists) and Levodopa+Entacapone+Trihexyphenydyl (Anticholinergic) respectively.

Only one patient with young onset parkinsonism included in stage 4 of Hehm and Yahr satge were treated with 4 drug combination therapy include Levodopa+Entacapone+ Pramipoexole (dopamine agonists)+Amantidine.

Table 2: Proportion of prescriptions with particular antiparkinsonism therapy category with Hoehn and Yahr stage of Parkinsonism

	HY Stage 1	HY Stage 2	HY Stage 3	HY Stage 4
Total number of prescriptions	6	15	14	1
Monotherapy	6	7	4	-
Levodopa	4	7	4	-
Rasagiline	1	-	-	-
Amantadine	1	-	-	-
Combination therapy	-	8	10	1
Levodopa[a] + dopamine agonist	-	1	-	-
Levodopa[a] + others[b]	-	6	9	-
MAO-B Inhibitors[c]+ Anticholinergics[d]	-	1	-	-
Levodopa[a] + dopamine agonist + others[b]	-	0	1	1

aLevodopa alone and combination of levodopa and dopa-decarboxylase inhibitors.

bOthers include amantadine, selegiline, rasagiline, and entacapone. Trihexyphenidyl

cMAO-B inhibitors include selegiline, rasagiline

d Anticholinergics include Trihexyphenidyl

Our study provides a descriptive overview of how the use of antiparkinsonian agents in a tertiary care hospital in Kerala. It will be pertinent to investigate if the upward trends in use of levodopa, amantadine, entacapone, and ropinirole continue in the future and how such

trends might be influenced by the introduction of new medications into the market. More population data required a pilot study for a complete overview of actual prescribing trends of anti-parkinsonism drugs.

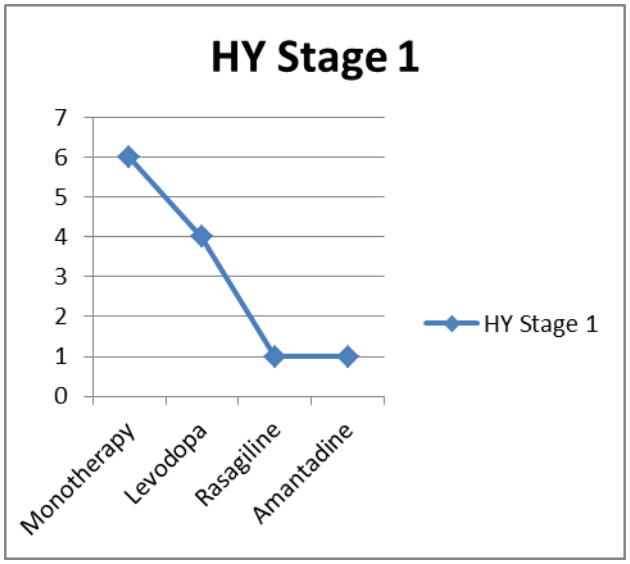

Figure 3: Proportion of prescriptions with particular antiparkinsonism therapy category in Hoehn and Yahr stage 1 patients

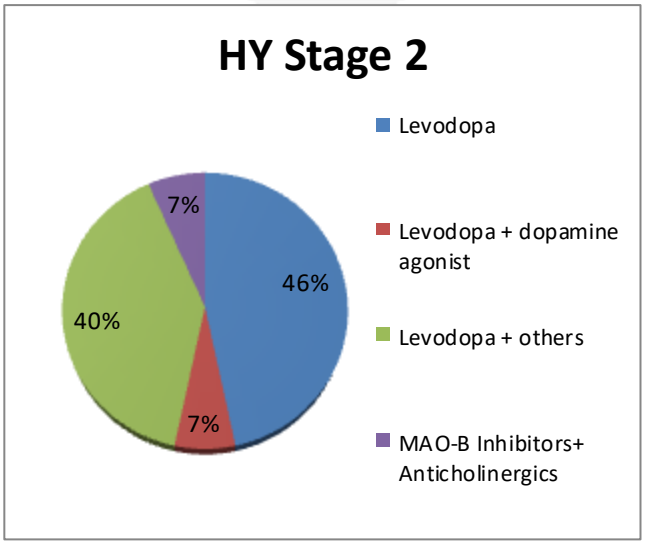

Figure 4: Proportion of prescriptions with particular antiparkinsonism therapy category in Hoehn and Yahr stage 2 patients

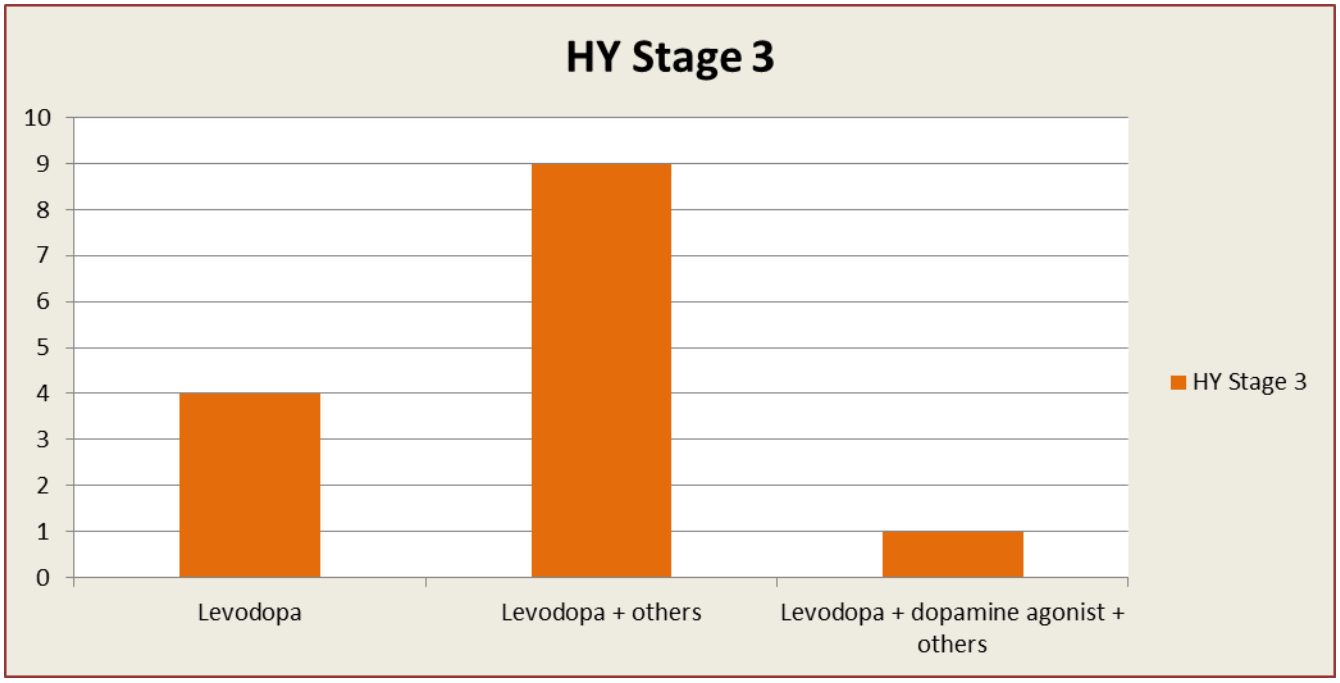

Figure 5: Proportion of prescriptions with particular antiparkinsonism therapy category in Hoehn and Yahr stage 3 patients

CONCLUSIONS

In conclusion, our results show that levodopa, either as monotherapy or combination therapy, is the mainstay treatment for patients with Parkinsonism disease in tertiary care hospitals, Kerala. Combination therapy was used more in the treatment of Parkinsonism disease. Amantidine, Rasagiline, Trihexyphenidyl were more used as antiparkinsonism drug after levodopa. Anticholinergics, Dopamine facilitator,MAO-B inhibitors, and Dopamine agonists were used nearly equal proportion.

Further studies are needed to evaluate whether this treatment pattern will lead to improved clinical outcomes in a cost-effective way.

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