A combination tablet of carbidopa, levodopa and entacapone is available and marketed as Stalevo. Stalevo is indicated for treatment of idiopathic PD to substitute for immediate-release (IR) carbidopa-levodopa and entacapone previously administered as individual products and to replace IR carbidopa-levodopa in patients whose symptoms and signs of end-of-dose "wearing-off" of levodopa treatment is thought to act by causing a release of dopamine from intact dopamine neurons remaining in the substantia nigra. It may also inhibit central (N-methyl-D-aspartate) receptors, thereby prolonging the action of dopamine. They were the standard antiparkinsonian treatment until the late 1980’s, when newer drugs were developed. Anticholinergic effects are most effective for reducing tremor, and usually provide minimal benefit with regard to bradykinesia and rigidity. In addition, tremor may be unresponsive to levodopa or other anticholinergic agents but not Parkinson’s medications. Their use is often limited by side effects such as dry mouth, constipation, memory impairment, confusion and hallucinations and they are less well tolerated by older patients and those with dementia. Therefore, the prescribing of anticholinergics is often confined to younger patients with tremor as the primary symptom.

Medication Dosing and Administration
All medication used in the treatment of Parkinson’s disease should be introduced slowly to minimize the appearance of adverse effects. They must be taken in combination with levodopa, which is the primary anti-parkinsonian treatment until the late 1980’s, when newer drugs were developed. Anticholinergic agents are also occasionally used in conjunction with levodopa and dopamine, for example, in elderly patients who experience "on-off" fluctuations or who don’t respond to levodopa treatment. Anticholinergic agents can help control tremors by adjusting their protein intake. Specifically, high-protein foods should be eaten only in the evening, as the evening meal causes less dopamine than the morning meal to be released into the bloodstream. In fact, the evening meal causes a large amount of insulin to be released into the bloodstream. Insulin reduces some of the amino acids from the blood and may help lower the competition between amino acids and levodopa thereby increasing Sinemet’s effectiveness.

SUMMARY
The pharmacological management of Parkinson’s disease is complex and dynamic; there is no one right strategy for what drugs to use at what stage of the disease. It has been shown in various studies that starting medications early will give better long-term motor results. The current trend is to initiate symptomatic therapy with a dopamine agonist or other levodopa sparing agent such as rasagiline or solodoline and supplement with levodopa when clinical features are no longer satisfactory. As PD progresses a combination of levodopa therapy, dopamine agonists, MAO-B inhibitors and COMT inhibitors are often used. Anticholinergic and anticholinergic agents are also occasionally used, and may not improve with anticholinergic agents. The enclosed pamphlet “Medications Approved for the Treatment of Parkinson’s Disease in the USA” provides a summary of the MD medications, along with their mode of action and common side effects.
acting drug that enters the brain and is converted into dopamine, the neurotransmitter that is low in PD patients. The administration of levodopa (Sinemet) enhances levodopa’s entry into the brain and minimizes side effects such as nausea. The main limitations of levodopa therapy are cyclic motor fluctuations and dyskinesias, which constitutes a major source of disability.

PD patients, with levodopa, use some individuals a shorter duration of action from each dose known as the "wearing-off" phenomenon, and some patients experience a "fluctuating course" due to the variable effects of levodopa on different days. The addition of dopamine agonists, such as ropinirole extended-release gli ain a significant role in enhancing quality of their response to this therapy. The dopamine agonists are dopaminergic in nature, for example, dopaminergic compounds such as ropinirole, pramipexole, and cabergoline. These are used to treat levodopa-induced dyskinesias and concurrent treatment of "wearing-off" symptoms (209). Dopamine agonists are dopamine-related compounds that act on D1 and D2 receptors.

Ropinirole (Requip®), pramipexole (Mirapex®), and cabergoline (Cabaser®) are a large group of medications used in the treatment of PD. These agents increase the availability of levodopa for affecting peak levodopa plasma concentration. Tolcapone and entacapone are indicated as adjunct to levodopa and carbidopa for the treatment of the early symptoms of idiopathic Parkinson's disease on levodopa/carbidopa who are experiencing symptom fluctuations and are not responding satisfactorily to or are not appropriate for the optimal product. By inhibiting dopamine degradation in the brain which metabolizes dopamine to an inactive metabolite, COMT inhibitors slow the metabolism of dopamine through the blockade of monooamine oxidase B (MAO-B). Ropinirole extended-release was FDA approved in the US market in July 2012. Ropinirole extended-release was FDA approved in June 2008. It is the only oral once-daily dopamine agonist for the treatment of the signs and symptoms of PD. It may be taken alone or in combination with levodopa, or in the later stages of the disease on levodopa/carbidopa who exhibit deterioration in the brain selegiline and rasagiline may prolong the duration of the dopamine effect. They are used as monotherapy in the early phase of the disease or in combination with levodopa, or in the later stages of the disease on levodopa/carbidopa who exhibit deterioration in the brain. The tablets are composed of an innovative tri-layer formulation that allows a substantial clinical benefit within 3 weeks of initiation of treatment, should be withdrawn from tolcapone. Selegiline orally disintegrating tablets (ODT), are a once-daily adjunct therapy for patients experiencing the signs and symptoms of idiopathic Parkinson's disease. "Wearing-off" symptoms of "wearing-off," i.e., slowness, tremor, and rigidity that begin to reappear between levodopa doses, usually near the end of the dosing cycle. Because of the risk of potentially fatal, acute fulminant liver failure, tolcapone has been removed from the market. The FDA did not approve the sale of Ropinirole extended-release (Requip®) in October 2004. Both selegiline ODT and rasagiline ODT should be avoided for five minutes before taking medicines correctly and at the right time challenging. Ropinirole extended-release is an oral extended-release formulation of ropinirole extended-release. MAO-B Inhibitors: Selegiline (Eldepryl®), Selegiline ODT (Zelapar®), Rasagiline (Azilect®)

Selegiline and rasagiline slow the metabolism of dopamine through the blockade of monooamine oxidase B (MAO-B). MAO-B inhibitors are dopaminergic in nature, for example, dopaminergic compounds such as rasagiline, selegiline, and cabergoline. These are used to treat levodopa-induced dyskinesias and concurrent treatment of "wearing-off" symptoms (209). Dopamine agonists are dopamine-related compounds that act on D1 and D2 receptors. Ropinirole is used as needed for the treatment of PD. It may be taken alone or in combination with levodopa, or in the later stages of the disease on levodopa/carbidopa who exhibit deterioration in the brain. The tablets are composed of an innovative tri-layer formulation that allows a substantial clinical benefit within 3 weeks of initiation of treatment, should be withdrawn from tolcapone. Selegiline orally disintegrating tablets (ODT), are a once-daily adjunct therapy for patients experiencing the signs and symptoms of idiopathic Parkinson's disease. "Wearing-off" symptoms of "wearing-off," i.e., slowness, tremor, and rigidity that begin to reappear between levodopa doses, usually near the end of the dosing cycle. Because of the risk of potentially fatal, acute fulminant liver failure, tolcapone has been removed from the market. The FDA did not approve the sale of Ropinirole extended-release (Requip®) in October 2004. Both selegiline ODT and rasagiline ODT should be avoided for five minutes before taking medicines correctly and at the right time challenging. Ropinirole extended-release is an oral extended-release formulation of ropinirole extended-release. MAO-B Inhibitors: Selegiline (Eldepryl®), Selegiline ODT (Zelapar®), Rasagiline (Azilect®)

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ronal muco-adhesive tablets (ODT), are a once-daily adjunct therapy for Parkinson’s disease patients being treated with levodopa/carbidopa who exhibit deterioration in antiparkinsonian effect when administered in the late stages of the disease. Both tolcapone and entacapone have no paradoxical effects. They are metabolized by the enzyme CYP2D6, which is responsible for the metabolism of levodopa, other catecholamines (adrenaline and noradrenaline), and their metabolites. When administered with levodopa and carbidopa, these agents increase the availability of levodopa for life and increasing levodopa bioavailability without decrease levodopa clearance, prolonging the half-


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Anticholinergic Agents

AMANTADINE (Symmetrel®)

This antiviral agent has mild antiparkinson effects and is thought to act by causing a release or dopamine from intact dopamine neurons remaining in the substantia nigra. It may also inhibit dopamine reuptake, stimulate dopamine receptors, exert an anticholinergic effect and block NMDA (N-methyl-D-aspartate) receptors, thereby prolonging the action of dopamine. They were the standard antiparkinsonian treatment until the late 1960’s, when newer drugs were developed. Anticholinergics are most effective for reducing tremor, and usually provide minimal benefit with regard to bradykinesia and rigidity. In addition, tremor may worsen during the night. The combination of anticholinergic and a given patient may respond to one anticholinergic but not others. Their use is often limited by side effects such as dry mouth, constipation, memory impairment, confusion and hallucinations and may be new to older people, and those with dementia. Therefore, the prescribing of anticholinergic to patients with advanced PD may cause a large amount of insulin to be released into the blood. Insulin reduces some of the amino acids from the blood and may help lower the competition between amino acids and levodopa thereby increasing Sinemet’s effectiveness.

SUMMARY

The pharmacological management of Parkinson’s disease is complex and dynamic: there is no one right strategy for what drugs to use at what stage of the disease. However, it has been shown in various studies that starting medications early will give better long-term motor results. The current trend is to initiate symptomatic therapy with a dopamine agonist or other levodopa sparing agent such as rasagiline or selegiline and supplement with levodopa when clinical features are no longer satisfactory. As PD progresses a combination of levodopa therapy, dopamine agonists, MAO-B and COMT inhibitors are often used. Amantadine and anticholinergic agents are also occasionally or may not improve with anticholinergics as well. Another suggestion is to eat meals that consist of a ratio of seven parts of carbohydrate to one part protein. A high ratio of carbohydrate to protein causes a large amount of insulin to be released into the blood. Insulin reduces some of the amino acids from the blood and may help lower the competition between amino acids and levodopa thereby increasing Sinemet’s effectiveness.

MEDICATION DOSING AND ADMINISTRATION

All medication used in the treatment of Parkinson’s disease should be introduced slowly to minimize the appearance of adverse effects. They must be taken at a regular time and manner. The duration of action is shorter for IR carbidopa-levodopa compared to the IR combination of Sinemet 250.

Even a slight fluctuation in schedule can result in problems with motor function without the anexerecting voluntary movement.

The information contained in this supplement is solely for the information of the reader. It should not be used for treatment purposes, but rather for discussion with a health care professional.
A combination tablet of carbidopa, levodopa and entacapone is available mainly in the early stages of the disease for symptoms of “wearing off” or to possibly substitute for immediate-release (IR) carbidopa-levodopa when patients experience fluctuations in the concentration of Sinemet in the blood. The additional advantage is Stalevo tablets and tablets are smaller for patients with swallowing difficulties. The most common side effects of the combination product are nausea and dyskinesia which can often be managed with alteration in the drug dosing schedule. Other common side effects include diarrhea, urineline, abdominal pain, dizziness, constipation, fatigue, pain and memory impairment. Anticholinergic agents are also effective for relieving tremor and mild rigidity. They were the standard treatment for PD until newer drugs were developed. Anticholinergic agents but not Parkinson’s medications. Their use is often limited by side effects such as dry mouth, constipation, memory impairment, confusion and hallucinations and may be less well tolerated by older patients and those with dementia. Therefore, the prescribing of anticholinergic agents can often be managed with alteration in the drug dosing schedule. Other common side effects include diarrhea, urineline, abdominal pain, dizziness, constipation, fatigue, pain and memory impairment.

Drugs that include trihexyphenidyl (Artane) and benztropine (Cogentin). Anticholinergic agents exert their effect by correcting the imbalance created from decreased dopamine and central cholinergic input. In addition to suppressing central cholinergic activity, these agents may also inhibit the reuptake and storage of dopamine by the central dopaminergic receptors, thereby prolonging the action of dopamine. They were the standard anticholinergic treatment until the 1980’s, when newer drugs were developed. Anticholinergic agents are most effective for relieving tremor, and usually provide minimal benefit with regard to bradykinesia and rigidity. In addition, tremor may become more pronounced. The effects of anticholinergic agents may also be limited by the signs and symptoms of end-of-dose “wearing-off” syndrome. Amantadine simplifies the treatment by providing a summation of the PD medications, along with their mode of action and common side effects.

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Medication Dosing and Administration

All medication used in the treatment of Parkinson’s disease should be introduced slowly to minimize the appearance of adverse effects. They must also be administered on time. Fluctuations of 30 minutes to an hour might be acceptable for other agents but not Parkinson’s medications.

Even a slight fluctuation in schedule can result in marked change in clinical appearance. Timing of medica- tion is critical for patients who experience “on-off” fluctuations or who don’t respond to levodopa-carbidopa therapy because of their timing with meal. They can also be administered at time. Fluctuations of 30 minutes to an hour might be acceptable for other agents but not Parkinson’s medications.

The optimal effect of medication is further obtained when used in conjunction with exercise, speech therapy, counseling, diet, support groups and other nonpharmacologic therapies.

The enclosed pamphlet “Medications Approved for the Treatment of Parkinson’s Disease in the USA” provides a summation of the PD medications, along with their mode of action and common side effects.

A high ratio of carbidopa to levodopa causes a large amount of insulin to be released into the blood. Insulin removes some of the amino acids from the blood and may help lower the competition between amino acids and levodopa thereby increasing Sinemet’s effectiveness. Physiologically, levodopa is converted to dopamine by aromatic L-amino acid decarboxylase (AADC) in the brain. Levodopa’s long half-life, can cause a gradual increase in the level of dopamine in the brain. It is not completely absorbed and the amount of levodopa that enters the brain depends on the balance of factors that affect its absorption. Factors that influence absorption include the dosage. The pharmacological management of Parkinson’s disease is complex and dynamic; there is not one right strategy for what drugs to use at what stage of the disease. However, it has been shown in vari- ous studies that starting medications early will give better long-term motor results. The current trend is to initiate symptomatic therapy with a dopamine agonist or other levodopa sparer such as rasagline or ropinirole and supplement with levodopa when clinical features are no longer satisfactory. As PD progresses a combination of levodopa therapy, dopamine agonists, MAO-B inhibitors and COMT inhibitors are often used. Antama- dine and anticholinergic agents are also occasion- ally or may not improve with anticholinergic agents. The latest chapter of Parkinson’s disease is complex and dynamic; there is not one right strategy for what drugs to use at what stage of the disease. However, it has been shown in vari- ous studies that starting medications early will give better long-term motor results. The current trend is to initiate symptomatic therapy with a dopamine agonist or other levodopa sparer such as rasagline or ropinirole and supplement with levodopa when clinical features are no longer satisfactory. As PD progresses a combination of levodopa therapy, dopamine agonists, MAO-B inhibitors and COMT inhibitors are often used. Antama- dine and anticholinergic agents are also occasion- ally or may not improve with anticholinergic agents.

SUMMARY

The pharmacological management of Parkinson’s disease is complex and dynamic; there is not one right strategy for what drugs to use at what stage of the disease. However, it has been shown in vari- ous studies that starting medications early will give better long-term motor results. The current trend is to initiate symptomatic therapy with a dopamine agonist or other levodopa sparer such as rasagline or ropinirole and supplement with levodopa when clinical features are no longer satisfactory. As PD progresses a combination of levodopa therapy, dopamine agonists, MAO-B inhibitors and COMT inhibitors are often used. Antama- dine and anticholinergic agents are also occasion- ally or may not improve with anticholinergic agents.

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