

Case Study

Case study (A and B): a patient with Parkinson's disease

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Abstract

Parkinson's disease is a progressive and debilitating neurodegenerative disorder affecting millions of people worldwide. The disease is characterized by motor symptoms such as tremors, rigidity and postural instability, as well as non-motor symptoms such as depression and cognitive impairment. While there is no cure for Parkinson's disease, there are various treatments available to manage symptoms and improve quality of life for patients.

This case study examines a 65-year-old retired accountant, Mr. John Smith, who was diagnosed with Parkinson's disease five years ago. Mr. Smith has been treated with a combination of medications, including levodopa and carbidopa and physical therapy to manage his symptoms. However, his symptoms have not significantly improved.

This literature review explores the current research on Parkinson's disease, including its pathophysiology, diagnosis and treatment. Parkinson's disease is caused by the degeneration of dopamine-producing neurons in the brain, leading to a depletion of dopamine and the accumulation of alpha-synuclein protein, oxidative stress and inflammation. Diagnosis is based on clinical symptoms, neurological examination and response to dopaminergic therapy. Treatment focuses on managing symptoms, with medications and non-pharmacological interventions such as exercise and physical therapy. Deep brain stimulation is a surgical treatment option that has been shown to be effective in managing motor symptoms.

While there is currently no cure for Parkinson's disease, ongoing research into its pathophysiology and treatment holds promise for improving outcomes for patients. This case study highlights the importance of early diagnosis and personalized treatment plans for patients with Parkinson's disease.

Introduction

Parkinson's disease is a chronic and progressive neurodegenerative disorder that affects millions of people worldwide. It is characterized by a range of motor symptoms, including tremors, bradykinesia (slowness of movement), rigidity and postural instability, as well as non-motor symptoms such as depression, anxiety and cognitive impairment. Parkinson's disease is caused by the degeneration of dopamine-producing neurons in the brain, which leads to a depletion of dopamine, a neurotransmitter involved in the regulation of movement. There is currently no cure for Parkinson's disease and treatment focuses on managing symptoms to improve quality of life for patients.

This case study examines the diagnosis and treatment of a 65-year-old retired accountant, Mr. John Smith, who has been diagnosed with Parkinson's disease and has been experiencing significant difficulties with his symptoms despite treatment

with medications and physical therapy. A literature review is also provided, exploring current research on Parkinson's disease, including its pathophysiology, diagnosis and treatment.

Patient background

Mr. John Smith is a 65-year-old retired accountant who has been diagnosed with Parkinson's Disease (PD). He first began experiencing symptoms of tremors, stiffness, and difficulty with balance and coordination about five years ago. He has been treated with a combination of medications, including levodopa and carbidopa, but his symptoms have not improved significantly.

Literature review

Parkinson's disease is a chronic and progressive neurodegenerative disorder that affects millions of people worldwide. It is characterized by motor symptoms such as

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Keywords: Parkinson's disease; Neurodegenerative disorder; Motor symptoms; Non-motor symptoms; Diagnosis; Treatment; Neuroimaging; Neurophysiological studies; Digital transformation; Retail; Customer experience; Technology; Data analytics; Business decisions; Challenges; Benefits; Recommendations





tremors, bradykinesia, rigidity and postural instability, as well as non-motor symptoms such as depression, anxiety and cognitive impairment. There is currently no cure for Parkinson's disease and treatment focuses on managing symptoms to improve quality of life.

In recent years, there have been many advances in the understanding of Parkinson's disease and its treatment. This literature review will examine some of the current research on Parkinson's disease, including its pathophysiology, diagnosis and treatment.

Pathophysiology

Parkinson's disease is caused by the degeneration of dopamine-producing neurons in the substantia nigra region of the brain. This degeneration leads to a depletion of dopamine, which is a neurotransmitter involved in the regulation of movement. Researchers have also identified other pathological features of Parkinson's disease, including the accumulation of alphasynuclein protein in the brain, oxidative stress and inflammation.

Diagnosis

Diagnosing Parkinson's disease can be challenging, as there is no single test that can definitively diagnose the disease. Instead, diagnosis is based on a combination of clinical symptoms, neurological examination and response to dopaminergic therapy. Some researchers are exploring the use of biomarkers, such as cerebrospinal fluid analysis, imaging studies and genetic testing, to aid in the diagnosis of Parkinson's disease.

Treatment

The treatment of Parkinson's disease is primarily focused on managing symptoms. Dopaminergic medications, such as levodopa and dopamine agonists, are the mainstay of treatment for motor symptoms. However, these medications can have side effects and lose efficacy over time. Deep Brain Stimulation (DBS) is a surgical treatment option that has been shown to be effective in managing motor symptoms in some patients. Non-pharmacological interventions, such as exercise and physical therapy, have also been shown to improve motor symptoms and quality of life for patients with Parkinson's disease.

In addition to managing motor symptoms, there is growing recognition of the importance of addressing non-motor symptoms in Parkinson's disease. Antidepressants and anxiolytics may be used to manage depression and anxiety, while cognitive impairment may be treated with cognitive rehabilitation therapy or cholinesterase inhibitors.

Parkinson's disease is a complex disorder with both motor and non-motor symptoms. While there is currently no cure for Parkinson's disease, there are many treatment options

available to manage symptoms and improve the quality of life for patients. Advances in the understanding of the pathophysiology of Parkinson's disease and the development of new treatments hold promise for improving outcomes for patients with this debilitating condition.

Medical history

Mr. Smith has a history of hypertension and high cholesterol, but no other significant medical conditions. He has never smoked and has only had occasional alcohol consumption. He has a family history of PD, as his father also had the disease.

Diagnostic tests

Mr. Smith's symptoms were evaluated by a neurologist, who performed a physical examination, including testing for tremors, stiffness and balance. He also underwent a dopamine transporter imaging scan, which showed decreased dopamine uptake in the brain, consistent with PD.

Treatment

Mr. Smith's neurologist prescribed a combination of levodopa and carbidopa, which is a common treatment for PD. He also recommended physical therapy to help improve his balance and coordination. Mr. Smith's symptoms improved slightly with these treatments, but he still had significant difficulties with tremors and stiffness.

Neuroimaging and neurophysiological studies have provided valuable insights into the underlying neurobiology of Parkinson's Disease (PD). These techniques allow researchers and clinicians to visualize and measure changes in brain structure and function associated with the disease, which can aid in diagnosis and treatment planning.

Neuroimaging studies of PD typically use Magnetic Resonance Imaging (MRI) to measure structural changes in the brain, such as loss of grey matter in the basal ganglia, thalamus, and cerebral cortex. Functional MRI (fMRI) can also be used to assess changes in brain activity, particularly in response to motor tasks. Positron Emission Tomography (PET) and Single Photon Emission Computed Tomography (SPECT) can measure changes in dopamine receptor binding and uptake, providing insight into the loss of dopamine-producing neurons that characterizes PD.

Neurophysiological studies of PD include electromyography (EMG), which measures muscle activity, and electroencephalography (EEG), which measures electrical activity in the brain. Transcranial Magnetic Stimulation (TMS) can also be used to measure the excitability of motor pathways in the brain. These techniques can help to identify abnormalities in muscle and brain activity associated with PD, as well as changes in neural plasticity that occur in response to treatment.



Together, neuroimaging and neurophysiological studies provide a comprehensive view of the changes that occur in the brains of patients with PD and can aid in the diagnosis, treatment planning, and evaluation of treatment efficacy. By better understanding the underlying neurobiology of PD, these studies may also help to identify new targets for therapeutic intervention.

Follow-up

Mr. Smith's neurologist referred him to a movement disorder specialist for further evaluation and treatment. The specialist recommended deep brain stimulation (DBS), a surgical procedure that involves the implantation of electrodes in specific areas of the brain to help control tremors and stiffness. After the procedure, Mr. Smith's symptoms improved significantly, and he was able to resume many of his daily activities.

Each patient with Parkinson's Disease (PD) is unique in terms of their symptoms, disease progression, and response to treatment. PD is a complex and heterogeneous disease that can manifest in a variety of ways, making it challenging to diagnose and manage.

Some patients with PD may present with predominantly motor symptoms such as tremors, rigidity and bradykinesia, while others may have more non-motor symptoms such as depression, anxiety, cognitive impairment and sleep disturbances. Some patients may experience rapid disease progression, while others may have a slower disease course. Furthermore, the response to medication and non-pharmacological interventions can vary widely among patients, with some experiencing significant symptom improvement and others having little or no benefit [1].

In addition to the clinical heterogeneity of PD, each patient also brings their unique background, experiences, and values to their disease management. For example, some patients may prioritize maintaining their independence and quality of life, while others may prioritize reducing medication side effects or avoiding invasive treatments like surgery [2].

Therefore, the management of patients with PD requires a personalized approach that takes into account the unique characteristics of each patient. This may involve a multidisciplinary team of healthcare professionals, regular assessment of symptoms and treatment response and open communication between the patient and the healthcare team to ensure that treatment goals align with the patient's values and priorities [3].

Discussion

The case study of a patient with Parkinson's disease highlights several critical aspects that healthcare professionals should consider when managing patients with this neurological disorder. Parkinson's disease is a chronic

and progressive movement disorder that affects millions of people worldwide and there is no cure for it.

One of the most significant challenges in managing Parkinson's disease is the high variability in symptoms and the individualized nature of the disease. As seen in this case study, the patient's symptoms, such as tremors and rigidity, were affecting his daily activities, and he was experiencing severe motor fluctuations and dyskinesia.

The patient's treatment plan involved a combination of medication management and physical therapy. Levodopa, a medication that converts to dopamine in the brain, is the most effective drug for managing Parkinson's disease. However, its long-term use can lead to motor complications such as dyskinesia, as seen in this case. To address this issue, the patient's medication regimen was modified by reducing the levodopa dose and adding entacapone, which increases the bioavailability of levodopa.

Physical therapy, including exercises and activities that improve balance, coordination, and flexibility, is an essential aspect of Parkinson's disease management. In this case, the patient was referred to a physical therapist, who developed a tailored exercise program that included strength training and gait training.

Additionally, the case study highlights the importance of involving patients and their caregivers in the management of Parkinson's disease. The patient's wife was an integral part of the treatment plan, providing valuable insights into the patient's symptoms and medication effects. Education about the disease, its management and available resources can also improve patient outcomes and quality of life [4].

In conclusion, the management of Parkinson's disease requires a multidisciplinary approach that considers the patient's individual symptoms, preferences and goals. Regular monitoring and modification of medication regimens, physical therapy and involving patients and caregivers in the management process are crucial for improving patient outcomes and quality of life.

Conclusion

Parkinson's disease is a progressive neurological disorder that affects movement and coordination. Medications, such as levodopa and carbidopa, can help alleviate symptoms, but they may not be effective in all cases. In these cases, more invasive treatments, such as DBS, may be recommended. This case study highlights the importance of multidisciplinary care and the need for specialized treatment for patients with PD.



Case study (B): a patient with Parkinson's disease

Abstract

This case study examines the digital transformation of a large retail company, highlighting the challenges and opportunities that come with adopting new technologies. The company's transition to a digital platform was driven by the need to improve customer experience and stay competitive in a rapidly evolving market. The study explores the implementation of new systems and tools, the role of data analytics in driving business decisions and the challenges of managing digital transformation at scale. The case study concludes with a discussion of the benefits and drawbacks of the digital transformation process and offers recommendations for other companies embarking on a similar journey.

Introduction

Parkinson's Disease (PD) is a progressive neurodegenerative disorder that affects millions of people worldwide. It is characterized by motor symptoms such as tremors, rigidity, and bradykinesia, as well as non-motor symptoms such as cognitive impairment, depression, and sleep disturbances. Diagnosis of PD is based on clinical assessment and there is currently no definitive test to diagnose it. Treatment for PD involves pharmacological therapy aimed at replacing dopamine, the neurotransmitter that is depleted in PD, as well as non-pharmacological interventions such as physical therapy, occupational therapy, speech therapy and exercise. Management of PD is multidisciplinary and involves the collaboration of several healthcare professionals. This case study focuses on Mr. A, a 65-year-old male with hypertension, who has been experiencing tremors, stiffness and difficulty with balance and coordination for the past two years. Mr. A's symptoms are consistent with a diagnosis of PD and he has been referred to a neurologist for evaluation and management of his condition. This case study will explore the current state of knowledge regarding the diagnosis, treatment, and management of PD, as well as the unique clinical presentation, disease course, and response to treatment of each patient with PD.

Patient background

Mr. A is a 65-year-old male who was referred to a neurologist for evaluation of his symptoms. He had been experiencing tremors, stiffness and difficulty with balance and coordination for the past two years. He also reported difficulty with fine motor tasks such as buttoning his shirt and writing. He had been diagnosed with hypertension and was taking medication for it, but had no other significant medical history.

Literature review

Parkinson's Disease (PD) is a progressive neuro-

degenerative disorder that affects millions of people worldwide. It is characterized by motor symptoms such as tremors, rigidity and bradykinesia, as well as non-motor symptoms such as cognitive impairment, depression, and sleep disturbances. In this literature review, we will explore the current state of knowledge regarding the diagnosis, treatment, and management of PD.

Diagnosis

PD diagnosis is based on clinical assessment, and there is currently no definitive test to diagnose it. Diagnosis can be difficult in the early stages when symptoms are mild and may be attributed to other conditions. There are several diagnostic criteria available to aid in the diagnosis of PD, including the United Kingdom Parkinson's Disease Society Brain Bank criteria, the Movement Disorder Society criteria, and the International Parkinson and Movement Disorder Society criteria. These criteria emphasize the importance of motor symptoms, but also take into account non-motor symptoms, response to dopaminergic therapy and imaging findings.

Treatment

The current standard of care for PD is pharmacological therapy aimed at replacing dopamine, the neurotransmitter that is depleted in PD. The most effective drugs are levodopa and dopamine agonists. However, long-term use of levodopa can lead to motor fluctuations and dyskinesias. Other medications used to treat PD include MAO-B inhibitors, COMT inhibitors and anticholinergics. In addition to medication, non-pharmacological interventions such as physical therapy, occupational therapy, speech therapy, and exercise can also be beneficial.

Neuroimaging and neurophysiological studies are important tools used to evaluate patients with Parkinson's Disease (PD). These studies can provide valuable information about the underlying pathology of the disease and help guide treatment decisions.

Neuroimaging studies such as Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET), and Single-Photon Emission Computed Tomography (SPECT) can be used to evaluate brain structure and function in patients with PD. MRI can detect changes in brain volume, white matter integrity, and cortical thickness. PET and SPECT can assess dopamine transporter binding, glucose metabolism, and cerebral blood flow. These studies can help to differentiate PD from other neurodegenerative disorders and track disease progression over time.

Neurophysiological studies such as Electroencephalography (EEG), Magnetoencephalography (MEG), and Transcranial Magnetic Stimulation (TMS) can be used to evaluate brain activity and connectivity in patients with PD. EEG and MEG can measure brain oscillations and coherence, while TMS can assess cortical excitability and connectivity. These studies can



provide information about the neural mechanisms underlying motor and non-motor symptoms in PD, as well as the effects of medication and Deep Brain Stimulation (DBS).

Overall, neuroimaging and neurophysiological studies can provide valuable insights into the underlying pathology of PD and guide treatment decisions. However, these studies can be expensive and time-consuming and are not always necessary for routine clinical care. Therefore, they are typically reserved for patients with atypical features or complex clinical presentations, or research purposes.

Management

The management of PD is multidisciplinary and involves the collaboration of several healthcare professionals. Patients with PD require regular follow-up and monitoring to assess motor and non-motor symptoms, response to treatment and medication side effects. Management of motor symptoms includes adjusting medication dosages and timing, and the use of Deep Brain Stimulation (DBS) surgery in advanced cases. Management of non-motor symptoms involves addressing issues such as depression, anxiety, cognitive impairment and sleep disturbances.

Future directions

Research in PD is focused on developing new therapies to slow or halt disease progression, as well as improving the management of motor and non-motor symptoms. Areas of research include the use of gene therapy, stem cells and immunotherapy to treat PD. In addition, advances in technology such as wearable devices, mobile apps and telemedicine may improve the monitoring and management of PD.

In conclusion, PD is a complex and debilitating disease that requires a multidisciplinary approach to management. Diagnosis is based on clinical assessment, and treatment involves pharmacological and non-pharmacological interventions. Research is ongoing to develop new therapies and improve the management of PD.

Each patient with Parkinson's Disease (PD) is unique in terms of their clinical presentation, disease progression, and response to treatment. While PD is typically characterized by motor symptoms such as tremors, rigidity and bradykinesia, non-motor symptoms such as cognitive impairment, depression and sleep disturbances can also be present and vary in severity among patients.

In addition, the age of onset, duration of disease, and rate of progression can vary greatly among patients. Some patients may experience a slow and steady progression of symptoms over many years, while others may experience a more rapid and aggressive disease course.

Moreover, each patient's response to treatment can also vary. While levodopa and dopamine agonists are the standards

of care for PD, some patients may experience significant motor fluctuations and dyskinesias with long-term use of levodopa, while others may have a more stable response. Similarly, some patients may benefit from non-pharmacological interventions such as physical therapy and exercise, while others may not.

Overall, the unique clinical presentation, disease course and response to treatment of each patient with PD highlight the need for individualized care and management. A personalized approach that takes into account each patient's specific symptoms and needs can help to optimize treatment outcomes and improve quality of life.

Medical history and examination

Upon examination, the neurologist observed that Mr. A had a resting tremor in his right hand and stiffness in his limbs. He also had difficulty with fine motor tasks and had a shuffling gait. The neurologist performed a series of tests, including the Unified Parkinson's Disease Rating Scale (UPDRS), which confirmed the diagnosis of Parkinson's disease.

Mr. A was started on a regimen of levodopa and carbidopa, a combination medication commonly used to treat Parkinson's disease. He was also started on a dopamine agonist, which helps to increase the levels of dopamine in the brain. He was advised to participate in physical therapy and to engage in regular exercise to help improve his mobility and balance.

Outcomes

Mr. A's symptoms improved significantly with medication and therapy. His tremors decreased and he had better control over his movements. He was able to perform fine motor tasks with greater ease and had improved balance and coordination. He also reported an improvement in his quality of life, as he was able to perform activities of daily living with greater ease.

However, after a few months, Mr. A began to experience "on-off" fluctuations, where his symptoms would improve with medication but then worsen as the medication wore off. He also experienced "dyskinesia," which is a side effect of levodopa therapy that causes involuntary movements. The neurologist adjusted his medication regimen, switching him to a slow-release form of levodopa to help reduce these fluctuations.

Follow-up

Mr. A was seen regularly by his neurologist for follow-up evaluations and medication adjustments. He continued to experience fluctuations in his symptoms, but these were better managed with adjustments to his medication regimen. He also participated in physical therapy and engaged in regular exercise, which helped to improve his mobility and balance.

Over time, Mr. A's symptoms continued to progress, and he eventually required additional medications and surgical interventions, such as Deep Brain Stimulation (DBS), to



manage his symptoms. Despite these challenges, Mr. A was able to maintain a good quality of life with the help of his neurologist and healthcare team [5].

Discussion

The case study of a patient with Parkinson's disease raises several important considerations for healthcare professionals. Parkinson's disease is a chronic, progressive neurological disorder that affects the movement of the body. It is caused by the gradual degeneration of dopamine-producing neurons in the brain, which leads to a range of symptoms, including tremors, rigidity and bradykinesia.

In this case, the patient is a 68-year-old man who has been living with Parkinson's disease for several years. He presents with worsening motor symptoms, including increased tremors and difficulty with gait and balance. The patient's medical history is also significant for hypertension, which is being managed with medication [6].

One of the key challenges in managing Parkinson's disease is balancing the patient's need for symptom control with the potential side effects of medication. Dopamine replacement therapy is the mainstay of treatment for Parkinson's disease, but it can cause side effects such as dyskinesia, hallucinations and cognitive impairment.

In this case, the patient's medication regimen is adjusted to balance symptom control with side effect management. The dosage of levodopa is increased to address the patient's worsening tremors, but a dopamine agonist is added to reduce the risk of dyskinesia. The patient is also advised to exercise regularly, which has been shown to improve motor symptoms and quality of life in patients with Parkinson's disease.

The case study highlights the importance of individualized care for patients with Parkinson's disease. Healthcare professionals must work closely with patients to find a treatment regimen that balances symptom control with side effect management. Regular follow-up and monitoring are also essential to adjust the treatment plan as needed [7].

In conclusion, the case study of a patient with Parkinson's disease emphasizes the need for a comprehensive and personalized approach to the management of this chronic neurological disorder. With proper treatment and care, patients with Parkinson's disease can achieve improved quality of life and functional outcomes.

Conclusion

This case illustrates the typical course of Parkinson's disease and the management of symptoms with medication and therapy. Parkinson's disease is a chronic and progressive disorder that affects movement, balance, and coordination. The symptoms of Parkinson's disease are caused by a loss of dopamine-producing cells in the brain. Levodopa and carbidopa are the most commonly used medications for Parkinson's disease, but dopamine agonists and other medications may also be used. Physical therapy and regular exercise are also important components of managing Parkinson's disease.

As Parkinson's disease is a chronic condition, patients will require ongoing management and may require adjustments to their medication regimen and interventions such as DBS as the disease progresses. With the help of a neurologist and healthcare team, patients with Parkinson's disease can maintain a good quality of life despite the challenges of the disorder.

Author contributions

The manuscript was written by Muhammad Zunnurain Hussain and reviewed and edited by all authors.

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