PARKINSON'S DISEASE

Case Study

Paul Mims
04/6/2015

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Introduction

Parkinson's disease is one of the most common neurodegenerative diseases in the world (1). It is second to Alzheimer's disease (1). Parkinson's disease affects about a million people in the United States, mainly people in their elder years (2). Parkinson's disease is a chronic progressive disorder that affects motor control (2). This is due to the disease worsening over time and with age. The disease also causes the destruction of neurons in the brain that produce dopamine (2). Dopamine is a chemical compound that is released from the brain to signal the body to move (2). With decreased dopamine, it is harder for people with Parkinson's disease to move effectively and have full control over their movements.

There are many signs and symptoms affiliated with Parkinson's disease. They can differ from person to person. There are four signs and symptoms that are the most common. They include muscle rigidity, tremor, Bradykinesia, and gait (3). Muscle rigidity involves your muscles not relaxing and becoming stiff (3). Therefore, limbs become tense or still for people with the disease. Tremors or shaking occurs as well. They can be seen in the left hand, arms, jaw, or feet (3). Tremors resemble shivering and is caused by uncontrolled movements. Bradykinesia is the process of movements slowing down and the inability to act or move spontaneously (3). This is due to a decreased amount of dopamine that signals normal movements (3). Gait is the inability to balance oneself while walking (3). This causes unexpected falls.

There is no specific cause to Parkinson's disease. However, there are numerous elements that are considered risk factors for obtaining the disease. For example, it is a complex disorder that involves multiple genetic and environmental factors (4). Genetic

predisposition happens to be one of the most known risk factors (4). One possibility is the involvement of several genes responsible for dopamine metabolism and transportation (4). However, many of the findings concerning these genes are inconclusive due to the disease involving different genes and their effects (4).

Currently there is no cure for Parkinson's disease. There are medications and treatments that help manage symptoms. The most common drug with early-onset Parkinson's is Sinemet, which is a mixture of levodopa and carbidopa (3). Levodopa is converted into dopamine, while carbidopa increases the effectiveness (3). The drug manages rigidity, tremor, and stiffness (3). Dopamine agonists are also very common. They are considered an artificial form of dopamine in the brain (3). Other treatments such as Deep brain stimulation (DBS) directly manage brain function with electrical impulses (3). DBS is a surgical procedure in which a device is implanted in the chest, as wires are connected to the brain for electrical impulses (3). The device is quite similar to a pacemaker for the human heart.

Nutritional factors are also affiliated with Parkinson's disease. Symptoms from Parkinson's can affect dietary habits and choices. Jaw tremors can affect swallowing, chewing or other oral movements (2). Weight loss can be a result to early-onset Parkinson's disease due to its manifestation (5). Weight gain is an also a result after diagnosis. This can happen in regards to medications managing symptoms, allowing facilitated food intake (5). Certain vitamins and minerals are affected by the disease. For example, patients with the disease tend to be vitamin D deficient (6). It also known to deplete neurons and decrease dopamine (6).

The subject chosen for the study will be a diagnosed Parkinson's disease patient. The subject will be interviewed and evaluated. The subject will also be asked to keep a 3-day food record for nutrition analysis. Once the answers stem from the interview, there will be a review and analysis of the subject in regards to the disease. This will convey how the disease affects eating habits and how the eating habits may affect the disease.

Methods

The information required for the study was done in an interview session. The interview was formulated on paper with the interviewers asking the questions. The interview was also done in a phone call setting. The interviewers consisted of two people with one interviewee. The interview included ten questions. The questions were closed and open ended. The questions included Age, sex, ethnicity, weight, and height, time of diagnosis, any genetic predisposition, condition issues, symptoms, and medications. A 3-day food record was also asked to be completed by the subject. The 3-day food record was communicated through electronic means. The record was communicated by email. The 3-day food record in included in Table 1. All of the foods listed in the 3-day food record were entered into the nutrition analysis program called Super Tracker. After the foods were entered into the database, a nutrient report was formulated for analysis. The answers provided from the interview allowed further anthropometric calculations and comparative standards. This includes ideal body weight, percent ideal body weight, BMI, calorie needs, fluid needs, and protein needs.

Table 1.

Days	Breakfast	Lunch	Dinner	Snacks

Day 1	• Oatmeal 2 packets (apples and cinnamon) • ½ C 2% Milk • 2 cups Coffee • Banana	• Wendy's Crispy chicken sandwich • Medium fries • Medium diet coke	• Baked potato • 1 T butter • Chicken breast (boneless skinless) 3oz • Piece of bread (wheat)	• Animal crackers (16) • 2 cups of coffee
Day 2	• Oatmeal 2 packets (apples and cinnamon) • ½ C 2% Milk • 2 cups Coffee • Banana	• Orange chicken (1 pint) • White rice 1 C • Chicken eggroll (1) • 20oz bottled water	• Chicken Noodle Soup 1 can • Half of turkey sandwich (1T mayo, cheese, wheat) • 2 cups of water	• Cookies (Chocolate chip) 2 • 2 ½ C of coffee
Day 3	• Oatmeal 2 packets (apples and cinnamon) • ½ C 2% Milk • 2 cups Coffee • Banana	• Chicken Noodle Soup 1 can • Half of turkey sandwich (1T mayo, cheese, wheat) • 2 cups of coffee	• Cubed potatoes 1 C • Chicken breast (boneless skinless) 3oz • Green beans ½ C	

Results

According to the interview, the following answers were given. The subject is a 46 year old Caucasian female. She is 5'3" and currently weighs 153 pounds. Her current BMI is

27 which is classified overweight. The subject's ideal body weight is 115 pounds, plus or minus 10%. The subject claims that her usual body weight is approximately 145 pounds. The subject was diagnosed with early on-set Parkinson's disease 2 years ago. Patient noticed uncontrollable tremors and movement and referred to family physician. She has a family history of the disease via her father. Her father has recently died due to Parkinson's disease complications. The subject currently experiences jaw tremor which causes speech difficulty. The subject claims that tremors usually progress over time and with prolonged stress. She currently takes the medication, Sinemet, daily for motor control and tremors. The Sinemet releases levodopa to the brain to help stimulate dopamine. She also takes a multi-vitamin supplement once a day.

The subject experiences a tremor of the jaw. The tremor of the jaw is quite quaint. It is reported to progress as stress increases. The tremor of the jaw also causes an interruption in speaking. There is a slight stutter with the subject. It is also reported that the tremor of the jaw does not alternate the subject's oral intake. The subject claims she continues to eat a normal diet. The tremor has no effect on her intake. However, it has been reported that the tremor causes eating times to be slightly longer. It is also mentioned that swallowing is not an issue in respect to the disease.

All of the foods that was listed in the 3-day food record was entered in the nutrition database, Super Tracker. Using the Mifflin St. Jeor formula, the subject's calorie needs is 1585 kilocalories per day based on height and weight. The subject's fluid needs is 2100cc per kilogram. Protein needs is 56g/kg per day. According to the nutrient report from Super Tracker, she consumed an average of 1600 calories per day which is 101% of calorie needs. The subject's average protein intake was 80g per day which is 143% of protein needs. On

average, 20% of total calories was from protein (adequate), 56% from carbohydrates (adequate), and 26% from fat (adequate). Calcium was under recommended allowance. Sodium was over allowance by 1047mg. Her iron intake was adequate with an average of 16mg per day. According to the nutrient report, the subject's vitamin intake was inadequate. This included vitamin A, vitamin B12, vitamin C, vitamin D, vitamin E, and vitamin K. An outline of the nutrient analysis is listed in Table 2.

Table 2.

	CH (%)	PRO (%)	FAT (%)	Ca (mg)	Na (mg)	Fe (mg)	VIT. A (µg)	VIT. B12 (µg)	VIT. C (mg)	VIT. D (µg)	VIT. E (mg)	VIT. K (µg)
RDA	45-65	10-35	20-35	1200	1500	8	700	2.4	75	15	15	90
Avg.	56	20	26	580	2547	16	665	1.5	31	2	3	62

Discussion

The subject used for the study clearly has a normal eating pattern. There weren't any changes or alterations to the diet of the patient. It was hypothesized that the disease would cause a change to the diet. It was concluded untrue with the food record given. However, the disease did cause a delay in eating time lengths. The subject reported lengthy eating times. The subject is still able to feed and perform normal feeding tasks. All macro nutrient intakes were within normal range. However, many essential nutrients were below the recommended amount. This includes calcium, vitamin K, vitamin B12, vitamin A, vitamin C, and vitamin D. Vitamin D has been studied to play a huge role in dopamine

function and quantity (6). Many with the disease are more likely to be deficient in that particular vitamin. According to the subject's nutrient report, the claim is evident. The lack of vitamin D can also cause problems in the future. With decreasing dopamine function and neurons, it can progress symptoms and stages of the disease. Also the subject reported Parkinson's disease present in the family prior to diagnosis. The father of the patient had the disease. Genetic predisposition was clearly present.

There were some limitations to the study. One limitation was the nature of the interview. The interview was given via phone call. That could have been a barrier to certain answers or observations of the subject. Another limitation was the lack of questioning. Questions about smoking and alcohol consumption weren't asked. This could have been possible factors associated with Parkinson's disease and its symptoms.

References

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