information

DESCRIPTION, INCIDENCE AND THEORIES OF CAUSATION

Parkinson's is a progressive neurological condition, which is characterised by both motor (movement) and non-motor symptoms.

The condition was first described by Dr James Parkinson in his Essay on the Shaking Palsy (1817) in which he reported in detail the symptoms of six patients. His description of the motor symptoms remains accurate and unchallenged.

Parkinson's is a global phenomenon being recognised in all cultures and is estimated to affect approximately 6.3 million people worldwide. It is the second most common neurodegenerative disorder – an Australian report (2011) estimates that 1 in 350 Australians now have the condition, and more than 30 people are diagnosed daily.

Increasing age is unequivocally associated with an increased risk of Parkinson's. Incidence is reported as 1:1000 for people over 65 and 1:100 over 75. Although the condition is age related, it is distinct from the natural aging process.

The average age of diagnosis is 55 - 65 years. The term 'young onset' is attributed to those diagnosed between 21 - 40 and prior to this the term 'juvenile onset' is used. Parkinson's is slightly more common in males than females (ratio 5:4).

Parkinson's may affect anyone at any time. Well known identities diagnosed with the condition include Muhammad Ali, Michael J Fox, Janet Reno, Billy Graham, Bob Hoskins and the late Pope John Paul II and Donald Chipp. There is a theory that Adolf Hitler may have had Parkinson's.

The underlying cause in approximately 95% of those diagnosed remains unknown, hence the term Idiopathic Parkinson's Disease.

In the 1960s it was discovered that the symptoms are primarily related to a lack of a neurotransmitter (dopamine) as a result of degeneration of dopamine producing neurons within the substantia nigra in the basal ganglia in the mid-brain.

Approximately 70% of the dopamine producing neurons are lost prior to the time of diagnosis therefore most people affected by the condition can retrospectively describe a gradual development of symptoms.

More recently a naturally occurring protein (alpha-synuclein) has been identified as misfolding and aggregating in the form of Lewy bodies found at post mortem in cases of Parkinson's.

The cause of Parkinson's is a longstanding topic for worldwide research and many theories exist. The most commonly explored are:

- Environmental
- Oxidative stress
- Genes
- Multi-factorial

Environmental

Some medications are responsible for causing symptoms resembling Parkinson's - these include some neuroleptics and antiemetics. In, addition long term exposure to environmental toxins such as pesticides, herbicides and insecticides has been associated as a risk factor. This may explain the higher incidence found in rural areas.

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Oxidative Stress

As the symptoms of Parkinson's are similar to the signs of aging and dopamine production is markedly reduced, it is hypothesized that Parkinson's may be an accelerated aging process. Oxidative processes are part of natural aging and occur at a mitochondrial level. Free radicals are produced as part of this process and may be toxic to cells and the membranes of neurons.

Genes

A family history of Parkinson's is reported in approximately 15 percent of cases. In 1996 a genetic mutation in the coding for alpha-synuclein was identified as Park1 in an Italian American family (Contursi kindred). Although this is a rare genetic mutation, it is significant because it linked alpha-synuclein and genes.

Many more Parkinson's related genes have been identified including Park1-13, LRRK2, and GBA genetic mutation in Ashkenazi Jews.

The onset of genetic Parkinson's is often at a younger age than the sporadic idiopathic form of the condition.

Multi-Factorial Theory

Recent findings indicate that three of the recessive Parkinson's genes are linked to mitochondrial function. This would support the long held theory of a genetic predisposition and environmental exposure leading to the development of the condition.

Post mortem findings of Lewy bodies (abnormal deposits of the protein alpha-synuclein) which are thought to disrupt the brain's normal functioning, combined with a loss of dopamine producing neurons within the basal ganglia indicate that a correct diagnosis had been made in life.

Currently, research is focusing on biomarkers which will improve the diagnostic process by providing a definitive test.

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