

Parkinson's Disease and Mercury

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The British physician James Parkinson reported in a publication in 1817 the clinical symptomatology in paralysis agitans or shaking palsy. The name of this disorder today is Parkinson's disease (PD).

Parkinsonism is characterized by hypokinesia, rigidity, tremor, symptoms from the vegetative nervous system, and in some cases dementia.¹ Tremor is the most characteristic, and often the first symptom in Parkinson's disease.² A still more incapacitating symptom is akinesia, which for the patients with the disorder results in augmenting difficulties at every movement.²

The etiology is known in 25% of the cases of Parkinson's disease (medicaments, poisonings, cerebrospinal meningitis, etc.), and in 75% of the cases the etiology is unknown.¹ Cases of unknown etiology are named idiopathic Parkinson's disease.

Parkinson's disease has probably a multifactorial etiology involving genetic, environmental, trauma and possibly other factors.³

The shortage of neuro-transmitters, such as mono-amines, is well established in the etiology of Parkinson's disease.² Studies of Parkinson patients have demonstrated low levels of monoamine transmitters encountered in the basal ganglia, decreased values of HVA and 5-HIFAA in the cerebrospinal fluid, and loss of the dark melanin pigment in the dopaminergic substantia nigra (ergon = work, niger = black) of the basal ganglia.² A failure of the neurons in the substantia nigra result in decreased production of dopamine and leads secondarily to a loss of function in the corpus striatum.² The consequence of this process is the clinical picture of Parkinson's disease.

Heavy metals, like mercury and copper, can produce lesions of the basal ganglia, with symptoms like hyperkinesia.² According to Komulainen and Tuomisto⁴ copper has a significant action on adrenergic neurons.

Researchers at the Henry Ford Hospital in Detroit, Michigan have studied Parkinson's disease with respect to heavy metal exposure.⁵ They have calculated mortality rates for Parkinson's disease in Michigan counties for 1986-1988 with respect to potential heavy metal exposure (iron, zinc, copper, mercury, magnesium, and manganese) from industry based on recent census data. The death rates are statistically significantly higher in counties with an industry in the chemical, paper, iron or copper related-industrial categories (ICs) ($p < 0.05$) than counties without these industries.⁵ The authors concluded: "These ecologic findings suggest a geographic association between PD mortality and the industrial use of heavy metals."

Ngim and Devathanan⁶ have done a case-control study among the multiethnic population of Singapore. They tested the hypothesis that a high level of body burden mercury is associated with an increased risk of Parkinson's disease. In 54 cases of idiopathic Parkinson's disease and 95 hospital-based controls, detailed interviews were completed.⁶ The two groups were matched for age, sex and ethnicity, between July 1985 and July 1987. The researchers found that there was a clear monotonic dose-response association between blood mercury levels and Parkinson's disease. The result was adjusted for potential confounding factors, including dietary fish intake, medications, smoking and alcohol consumption.⁶ Scalp hair mercury was shown to be a poor predictor of the risk of Parkinson's disease after adjustment.

Ngim and Devathanan⁶ listed the following factors that could contribute to the body burden of mercury: dietary fish intake, ethnic over-the-counter medications, occupational exposures and dental amalgam fillings.⁶

Tremor is a classical symptom among victims of inorganic mercury poisoning, as well as among methyl mercury poisoning victims. "Tremor Mercurialis" has been known since antiquity.² The tremor of methyl mercury poisoning is different from physiologi-

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cal tremor and other pathological tremors in frequency and amplitude.⁷

According to Störtebecker a possible exposure to mercury should be considered in the etiology of "Shaking Palsy" (Parkinson's disease).² He asks: "... why shouldn't a daily release of small amounts of mercury from dental amalgam fillings be capable of producing similar neurological symptoms."

Dental amalgams are the predominant source of inorganic mercury and mercury vapour in the general population.⁸ There is found a direct correlation between the number and surfaces of dental amalgam fillings and the amount of mercury in the brain.⁹ Mercury vapour has no toxic threshold.¹⁰ No exposure to mercury can therefore be considered totally harmless.

In light of these facts, the possible role of dental mercury in etiology of Parkinson's disease should be further studied.

References

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