likely that they were free of such a noticeable cortical involvement. Other causes, such as the dopaminergic loss from the caudate²⁴ or Lewy body disease²⁵ may be the source of the cognitive impairment as well. The emergence of observable lateral functional asymmetries with progression of the disease will be assessed through a follow up study of these patients, which is currently in progress in our laboratory.

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- Huber SJ, Freidenberg DL, Shuttleworth EC, Paulson GW, Clapp LE. Neuropsychological similarities in lateralised parkinsonism. *Cortex* 1989;25:461-70.
- Blonder LX, Gur RE, Gur RC, Saykin AJ, Hurtig HI. Neuropsychological functioning in hemiparkinsonism. *Brain and Cognition* 1989;9:244-57.
- Spicer KB, Roberts RJ, LeWitt PA. Neuropsychological performance in lateralised parkinsonism. *Arch Neurol* 1988;45:429-32.
- Starkstein S, Leiguarda R, Gershanik O, Berthier M. Neuropsychological disturbances in hemiparkinson's disease. *Neurology* 1987;37:1762-4.
- Direnfeld LK, Albert ML, Volicer L, Langlais PJ, Marquis J, Kaplan E. Parkinson's disease. The possible relationship of laterality to dementia and neurochemical findings. *Arch Neurol* 1984;41:935-41.
- Bentin S, Silverberg R, Gordon HW. Asymmetrical cognitive deterioration in demented and parkinson patients. *Cortex* 1981;17:533-44.
- Oyeboode JR, Barker WA, Blessed G, Dick DJ, Britton PG. Cognitive functioning in Parkinson's disease: In relation to prevalence of dementia and psychiatric diagnosis. *Brit J Psychiatry* 1986;149:720-5.
- Boller F, Passafiume D, Keefe NC, Rogers K, Morrow L, Kim Y. Visuospatial impairment in parkinson's disease. Role of perceptual and motor factors. *Arch Neurol* 1984; 41:485-90.
- Leenders K, Wolfson L, Gibbs J, Wise R, Jones T, Legg N. Regional cerebral blood flow and oxygen metabolism in Parkinson's disease and their response to L-Dopa. *J Cereb Blood Flow Metabol* 1983;3:suppl:S488-9.
- Rutgers AWF, Lakke JPWF, Paans AMJ, Vaalburg W, Korf J. Tracing of dopamine receptors in hemiparkinsonism with positron emission tomography (PET). *J Neurol Sci* 1987;80:237-48.
- Garnett ES, Nahmias C, Firnau G. Central dopaminergic pathways in hemiparkinsonism examined by positron emission tomography. *Can J Neurol Sci* 1984;11:174-9.
- Henriksen L, Boas J. Regional cerebral blood flow in hemiparkinsonian patients. Emission computerised tomography of inhaled 133 Xenon before and after levodopa. *Acta Neurol Scand* 1985;71:257-66.
- Perlmutter JS, Raichle ME. Regional cerebral blood flow in hemiparkinsonism. *Neurology* 1985;35:1127-34.
- Hoehn MM, Yahr MD. Parkinsonism: onset, progression, and mortality. *Neurology* 1967;17:427-42.
- Fahn S, Elton R, and the members of the UPDRS Development Committee. Unified Parkinson's disease rating scale. In: S Fahn, D Marsden, D Calne, et al. eds. *Recent developments in Parkinson's disease*, vol 2. Florham Park, New Jersey: McMillan Health Information, 1987:153-63.
- Rascol O, Montastruc JL, Senard JM, Demonet JF, Simonetta M, Rascol A. Two weeks of treatment with deprenyl (selegiline) does not prolong L-dopa effect in parkinsonian patients: A double-blind cross-over placebo-controlled trial. *Neurology* 1988;38:1387-91.
- Celsis P, Goldman T, Henriksen L, Lassen NA. A method for calculating regional cerebral blood flow from emission computed tomography of inert gas concentrations. *J Comput Assist Tomogr* 1981;5:641-5.
- Celsis P, Agniel A, Puel M, Rascol A, Marc-Vergnes JP. Focal cerebral hypoperfusion and selective cognitive deficit in dementia of the Alzheimer type. *J Neurol Neurosurg Psychiatry* 1987;50:1602-12.
- Montastruc JL, Celsis P, Agniel A, et al. Levodopa-induced regional cerebral blood flow changes in normal volunteers and patients with Parkinson's disease. Lack of correlation with clinical or neuropsychological improvements. *Movement Disorders* 1987;4:279-89.
- Celsis P, Agniel A, Puel M, et al. Lateral asymmetries in primary degenerative dementia of the Alzheimer type. A correlative study of cognitive, haemodynamic and EEG data, in relation with severity, age at onset and sex. *Cortex* 1990;26:585-96.
- Lees AJ, Smith E. Cognitive deficits in the early stages of Parkinson's disease. *Brain* 1983;106:257-70.
- Boller F, Mizutani T, Roessman U, Gambetti P. Parkinson disease, dementia and Alzheimer disease: clinicopathological correlation. *Ann Neurol* 1980;7:329-35.
- Dubois B, Hauw JJ, Ruberg M, Serdaru M, Javoy-Agid F, Agid Y. Démence et maladie de Parkinson: corrélations biochimiques et anatomo-cliniques. *Rev Neurol* 1985; 141:184-93.
- Brown RG, Marsden CD. Cognitive function in Parkinson's disease: from description to theory. *TINS* 1990;13:21-9.
- Hansen L, Salmon D, Galasko D, et al. The Lewy body variant of Alzheimer's disease: A clinical and pathologic entity. *Neurology* 1990;40:1-8.

Neurological stamp

Leonardo da Vinci 1452-1519

Leonardo, famous as an artist, was also a scientist, architect, engineer and geologist. He shares with Avicenna and Fracastoro (two doctors in this series) the distinction of recognising the true origin of fossils. He designed flying machines, a turbine engine, a steamboat, and drew plans for a military tank and a submarine. Although not a physician, he was a master anatomist who predated Vesalius.

His chalk drawings remained buried for over 200 years until discovered by William Hunter in 1784. Da Vinci had shown the human body in more than 750 anatomical illustrations. This included sketches of muscles, bones, the cerebrum, blood vessels and viscera. He dissected more than 30 bodies, discovered the frontal and maxillary sinuses and described in detail the structure and function of heart valves. He was the first to show anatomy in cross section and applied this to the brain, and was also the first to make a crude diagram of the cranial nerves, optic chiasm and brachial and lumbar plexuses. His contribution to neurological anatomy included wax casts of the four ventricles. This was the first known attempt at anatomical injection. Da Vinci also showed the mechanism of action of antagonistic groups of muscles.

He found that sectioning a digital nerve produced anaesthesia so that "the finger no longer has sensation even when placed in a fire". He recognised the function of the spinal cord as a conductor and that a frog could die

suddenly following perforation of its medulla oblongata. He located the soul at the top of the spinal cord. In a drawing of his wax casts of the ventricular system, he followed the old medieval scheme allocating sensation, cognition and memory to the lateral, third and fourth ventricles, respectively.

France honoured him with a stamp issued in 1952 on the 500th anniversary of his birth (Stanley Gibbons No 1150, Scott No 682).

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