Commentary

In this issue of the journal, Menon B[1] described a case of crossed cerebellar diaschisis (CCD) and atrophy. Diaschisis is the inhibition of function produced by focal disturbances in a portion of the brain at a distance from original site of injury.[2,3] The concept was first introduced by Constantin von Monakow (November 4, 1853 - October 19, 1930), who described diaschisis corticospinalis (progression of functional depression of the spinal cord following an injury to the motor cortex); diaschisis commisuralis (functional depression of the contralateral cerebral cortex after injury to cortex of one hemisphere); and diaschisis associativa (depression of function in intact cortical areas adjacent to the site of a cortical injury).[3-5] Crossed cerebellar diaschisis (CCD) is the cerebellar hypometabolism attributed to functional disconnection and transneural metabolic depression due to an acute injury to contra-lateral cerebral cortex that interrupt many corticopontine-cerebellar tract fibers. Baron in 1980 using PET imaging demonstrated matched reduction in cerebral blood flow and oxygen extraction fraction in the contralateral cerebellum in patients with supratentorial ischemic stroke. The finding has been subsequently seen with perfusion imaging in many settings including: Internal capsule/basal ganglion infract, brain tumor, spinocerebellar degeneration, Alzheimer's disease, Wada test in epilepsy, and progressive supranuclear palsy.[4,5] Contrary to the original concept of reversible dysfunction in diaschisis, distant areas may undergo irreversible degeneration depending upon the nature of the primary process. Progressive crossed cerebellar atrophy has been mainly reported with conditions associated with chronic focal

seizures,[2] presumably related to additional antegrade transneuronal excitotoxic damage.[6] Interestingly, CCD can present itself as a different form (ipsilateral or contralateral) depending upon the age of cerebral insult. Cerebral insults at early age are likely to produce ipsilateral cerebellar diaschisis and at the later age to produce a crossed (contralateral) cerebellar diaschisis.[7]

Although old, the concepts behind CCD are still relevant in neurology and neuroscience. *Connectome* is the new term coined for comprehensive map of neural connections in the brain and used primarily in scientific efforts to map and understand the organization of neural interactions within the brain.[8] This is an area of active research and the concept is being used to explain phenomena like cognition or consciousness.[8] Crossed cerebellar diaschisis and subsequent crossed cerebellar atrophy represents the best evidence of transneuronal depression in humans and highlight how human brains are intricately linked, through multiple levels and modes of brain connectivity. Therefore, the profound legacy of von Monakow on how we think about the dynamics of the nervous system continues.

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