

NEUROLOGIST HANDOUT

Issues Specific to Myalgic Encephalomyelitis (ME) (per the ICC*)

ME is characterized by immune and neurological dysfunction with severe exacerbation of systemic illness following any exertion, and which is understood to be an inability to properly generate energy within cells, and which often prevents sufferers from working, studying, or otherwise living a normal and functional life.

Neurocognitive, sleep, autonomic and sensory disturbances, pain, headaches, and paresthesias are prominent neurological signs and symptoms. Cognitive impairments including slow processing of information, poor attention, word finding, and working memory are some of the most functionally disabling symptoms. 1, 2

UNDERLYING ISSUES

- **M.E. is the chronic stage of an encephalitic enteroviral infection of the central nervous system (CNS) similar, but less lethal than, that caused by polio enteroviruses 1, 2 and 3.** Dr. Hyde 39
- **Structural and functional abnormalities within the brain and spinal cord** are consistent with pathological dysfunction of the regulatory centers and communication networks of the brain, CNS and ANS, and are essential for effective ongoing self-organization. 3
- **Decreased absolute cortical blood flow and further reduction in cerebral blood flow** after exercise. Greater involvement of the brain correlates with greater severity 8, 9
- **In CFS T1wSE was elevated in sensorimotor WM and decreased in the brainstem.** 26
- **Connectivity within the brainstem is impaired in CFS** 38
- **Brain recruits wider regions to compensate for the lower information capacity of the BOLD responses in CFS.** 40
- **Reduced duration of uninterrupted sleep** may explain reported unrefreshed sleep, pain and overwhelming fatigue. Prolonged sleep onset latency. Increased alpha intrusion into delta sleep 7

WHITE MATTER & GRAY MATTER CHANGES

- **Increased plaque or hyperintensities in the white matter & tracts** is consistent with demyelination or inflammation & increase risk of cerebrovascular events 12, 13
- **Reduced regional gray and white matter volumes** are consistent with impaired memory and visual processing. 14, 15, 16
- **CFS is associated with IFOF WM deficits which continue to deteriorate at an abnormal rate** 34
- **Reduced brainstem gray matter volume** is consistent with insult to the midbrain at fatigue onset. Feedback control loops may suppress cerebral motor and cognitive activity, disrupt CNS homeostasis, and reset elements of the ANS. Brain stem injury and loss of homeostasis. Decreased gray matter volume in midbrain & pulse pressure suggest impaired cerebrovascular auto-regulation. Decreased white midbrain matter volume decreased with fatigue duration. 4, 29

NEUROINFLAMMATION

- **Neuroinflammation in Patients with CFS/ME: An ¹¹C-(R)-PK11195 PET Study.** 27
- **Neuroinflammation in the dorsal root ganglia,** (modulators of peripheral sensory information traveling to the brain) - Chaudhuri A. Abstract presentation at the Royal Society of Medicine Meeting 2009
- **How brain inflammation causes ME/CFS** (video) 37
- **Metabolite and temperature abnormalities in ME/CFS patients in widely distributed brain areas** 38

SLOWED PROCESSING

- **Greater source activity and more parts of the brain are utilized in cognitive processing,** which supports patients' perception of greater effort; Decreased cognitive functioning: prolonged reaction time 5, 6, 28, 11
- **Greater effort is required** - elevated source current & more regions of the brain are utilized in cognitive activity & fatiguing tasks: poor processing of auditory & spatial information, poor working memory. 1, 5, 6
- **Slower performance in visual imagery & motor tasks** - ventral anterior cingulate cortex was active when controls made an error but not in patients. 15
- **Reduced blood flow in temporal lobes** may contribute to memory and cognitive impairment & fatigue 18, 19

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DIAGNOSING/DIFFERENTIATING FROM OTHER DISEASES

- Diagnosing ME using qEEG instead of SPECT scan 33
- Decreased hypoperfusion in brainstem and metabolism in brain stem as well as EEG spectral coherence data differentiates ME from depression 8, 10, 30
- Decreased metabolism of glucose in the brain 17
- Elevated sensory signaling perceived by the brain as pain and fatigue. Musculoskeletal – (surface EEG scalp) CNS signals are altered when controlling voluntary muscle activities, especially when they are fatiguing. Poor and slower motor performance. 20, 21
- Abnormal spatial and temporal symmetry of gait. 22
- Cerebral spinal fluid - (spinal tap) increased opening pressure on lumbar puncture. Proteomes distinguish ME from post-treatment Lyme disease and controls. Spinal fluid increased lymphocytes and protein. 23, 24
- IL-10 increased with granulocyte-macrophage (GM), colony-stimulating factor (CSF) suppression 24
- Elevated lactate is consistent with reduced cortical blood flow, mitochondrial dysfunction & oxidative stress. Lateral ventricular: 297% vs. anxiety disorder & 348% vs. controls. 25
- FMRI shows Intra brainstem connectivity is impaired in CFS 32
- Brain studies indicate CFS and GWI are distinct conditions. 31

POSSIBLE TREATMENTS

Nimodipine – calcium channel blocker 36

Low Dose Naltrexone, Dextro-naltrexone, Minocycline, dextromethorphan, nalmefene, fluorocitrate, 3-hydroxymorphan, hydroxychloroquine, stinging nettle, reishi mushroom, and curcumin 41

DISEASES TO RULE OUT

Diagnosis of ME requires ruling out diseases/conditions that may be mistaken for ME.

For an easy to use questionnaire to guide with diagnosis for ICC go to www.MEadvocacy.org/resources.

- MS
- Parkinson's
- Spinal Stenosis
- Chiari malformation
- Tethered cord
- Cranial Cervical Instability
- CSF leak
- Myasthenia Gravis
- Post-polio syndrome

See more diseases/conditions here: <https://drive.google.com/file/d/14G8USQgupDBsINhCGAxKNI7CD176oWNT/view>

Note: Many science documents refer to this patient population having CFS. While CFS is a broad vague term, studies listed here are chosen as they appear to apply most closely to those who have ME as per the ICC.

See source citations on page 3 and 4.

More science information can be found at on the resources page at www.MEadvocacy.org

As with all support group files, this is prepared for informational purposes and is not to be considered medical advice. (12/10/2019)

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Resource citations

*Myalgic Encephalomyelitis International Consensus Primer for Medical Practitioners (Page 5)

http://sacfs.asn.au/download/me_international_consensus_primer_for_medical_practitioners.pdf

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