



Karen Laugel, MD, CEO

Pre-Settlement Services We Offer Personal Injury Firms:

- Medical summary reports
- Medical opinions on pre-existing conditions, causation, functional losses, prognosis, future medical needs
- IME rebuttal reports
- Answers to your specific medical questions
- Liaison with treating physicians
- Deposition preparation

www.MedicalSettle.com
doctor@medicalsettle.com
888.302.5411

QUESTION: *White matter lesions: What do they mean?*

Medical Settle, LLC Response:

A 52-year-old man with hypertension was involved in a MVC when his vehicle was rear ended, causing him to strike his head against the steering wheel and then on the back headrest. He had a head CT in the emergency department, and then a brain MRI, both of which showed “nonspecific white matter lesions (WML)” with a subsequent list of possible causes, including “traumatic brain edema” and “small vessel disease.” * He did not have pre-injury neuroimaging for comparison.

The client subsequently reported problems with memory and learning skills—over the following three years he had difficulty performing his job functions as a CPA, made repeated math errors, and could not conceptualize or execute new projects. He had not experienced these job-related problems during his twenty-five-year career prior to his MVC. Neuropsychological testing confirmed impairments in

memory, learning, and clerical speed and accuracy.

Were the white matter lesions definitive evidence of his TBI, and more specifically, of his cognitive impairments?

Short answer: No.

White matter lesions (WML) are identified by hypo- or hyperintensities depending on the type of CT or MRI study that is performed. They are indicative of age-related accumulation of small vessel disease that contributes to vascular insult in the brain (which can then lead to nerve fiber degradation and scarring).

Although WML increase in patients with a history of traumatic brain injury (TBI) relative to controls, they are not specific for TBI. WML have been shown to increase with age, small vessel disease (as seen in hypertension, migraine, diabetes), vasculitis (e.g., Lupus), and demyelinating

diseases (e.g., multiple sclerosis). Studies have reported WML in healthy individuals (i.e., those with no coexisting medical disorders) including children, with an incidence of 7% in those age 7-20 and $\geq 30\%$ in those age 60 or older. * In addition, 20% of patients with TBI have no WML on MRI, and 80% will have at least one WML. *

Recent studies have found no relationship between focal WML and cognition in patients with a history of mild to severe TBI. * However, research shows that other types of MRI techniques, like diffusion tensor imaging (DTI), which can identify more diffuse axonal injury, may be more sensitive for identifying biomarkers of cognitive injury. The DTI measures the motion of water molecules along the axons. In conjunction with statistical software, it can recognize significant deviations in water diffusion due to traumatic injury. It can thus identify disruption to the long white matter tracks which connect in networks that provide specific cognitive functions. Indeed, current studies have shown that DTI can detect significant white matter abnormalities following traumatic brain injury even when the conventional MRI is normal and has demonstrated a relationship between diffuse white matter track abnormalities and specific cognitive impairments (e.g., memory and executive function) following TBI. *

Although DTI can detect white matter damage not seen using the standard MRI techniques, it is not yet available for clinical use. More research is needed to correlate specific white matter tracks with particular cognitive functions, as well as to identify the optimal software for DTI metrics.

In summary, WML on conventional CT or MRI are indicative of vascular disruption and are non-specific markers. They can be due to a multitude of disorders, including ‘normal aging,’ and have been found in healthy individuals as young as 7 years old. WML are present in some individuals with TBI, but there are others with significant TBI who have no WML. Moreover, medical research shows that WML are not related to cognitive impairment following a TBI. * Our 52-year-old client has other possible explanations in addition to his TBI for the presence of focal WML (e.g., hypertension, age). In addition, his WML are not indicative of his cognitive changes after injury. Documentation of pre-injury vs. post-injury work skills and neuropsychological tests will be necessary to demonstrate a change in our client’s cognitive abilities.

*Citations from the medical literature are provided in Medical Settle’s formal Medical Opinion Reports.



Contact us for a free 30-minute consultation about your client’s case.

www.MedicalSettle.com doctor@medicalsettle.com 888-302-5411