

A study of Vasculature Change in MELAS with Electron Microscopy

電子顕微鏡による MELAS における血管構造の変化の検討

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[Back ground] MELAS (Mitochondrial encephalomyopathy, lactic acidosis and stroke-like episodes) is one of mitochondrial disease characterized by atypical repeated brain infarctions. The mechanism remains unknown, while mitochondrial angiopathy and neuropathy have been nominated. Vascular endothelial dysfunction in MELAS has been recently published. However, morphological evaluation of vasculature has not been well understood. Herein, we evaluated vasculature changes of MELAS with electron microscopy.

[An autopsy case of a thirteen year old girl with MELAS] The patient had easy fatigue, body weight loss and muscle weakness at the age of three. At the age of five, she became hard to walk and was diagnosed as MELAS with A3243G mutation of mtDNA in our department. While she had been treated with vitamin B1 & B2 and cytochrome c, she had repeated stroke-like episodes since six years of age. Her symptoms aggravated to bed lying and cortical blindness due to repeating multiple infarctions and progression of brain atrophy. She had been complicated with nephrosis treated with prednisone since eleven years of age. She died at the age of thirteen.

[Subjects and Methods] The subjects were the autopsy samples of the brain and the biopsy samples of muscles in the case. For electron microscopy, some specimens were dissected in 2.5% glutaraldehyde and immersion fixed in the same fixative. Then specimens were postfixated in a 4% OsO₄. Specimens were dehydrated an ascending series of ethanol and embedded in EPON812. Ultrathin sections were cut with Ultramicrotome, stained with uranyl acetate and lead citrate, and observed with a HITACHI H7650 or H-7000.

[Results] It is confirmed that the vessels of the brain revealed swelling of endothelium with proliferation of mitochondria and that the tight junction of the vessels were loosening in the patients with MELAS.

[Conclusion and Discussion] Morphological abnormality of the endothelium including loosening tight junction may the cause of inducing vasogenic edema of the brain in stroke-like episodes with MELAS. We are now preceding another autopsy and biopsy case with MELAS.

[Key words] angiopathy, MELAS, electron Microscopy, endothelium, tight junction