Several studies have investigated the changes in CSF metabolomics that occur after aSAH. These studies have identified alterations in various metabolites and metabolic pathways, including those involved in energy metabolism, amino acid metabolism, and lipid metabolism.

One study found that levels of lactate, a marker of anaerobic metabolism, were significantly increased in the CSF of aSAH patients compared to controls. This suggests that there is a shift towards anaerobic metabolism in the brain following aSAH, possibly due to decreased oxygen delivery and increased metabolic demand.

Other studies have reported alterations in amino acid metabolism, particularly involving glutamate and gamma-aminobutyric acid (GABA). Glutamate is an excitatory neurotransmitter that can lead to neuronal damage when present in excess, while GABA is an inhibitory neurotransmitter that can protect against excitotoxicity. Studies have shown that CSF levels of glutamate are increased and GABA levels are decreased in aSAH patients, which may contribute to the pathophysiology of the disease.

Alterations in lipid metabolism have also been reported in aSAH patients, with decreased levels of sphingomyelins and phosphatidylcholines in the CSF. These lipids play important roles in cellular membrane structure and function, and their depletion may contribute to neuronal damage and inflammation.

Overall, the findings of metabolomics studies suggest that aSAH leads to widespread metabolic alterations in the brain, involving multiple metabolic pathways. These alterations may contribute to the pathophysiology of the disease and represent potential targets for therapeutic intervention.

There is increasing evidence suggesting that biomarkers can give insight into the aneurysmal subarachnoid hemorrhage pathogenesis and can serve as an outcome predictor ¹⁾

1)

Ho WM, Schmidt FA, Thomé C, Petr O. CSF metabolomics alterations after aneurysmal subarachnoid hemorrhage: what do we know? Acta Neurol Belg. 2023 Apr 30. doi: 10.1007/s13760-023-02266-2. Epub ahead of print. PMID: 37121932.

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