Cerebrospinal fluid cytology in subacute subarachnoid hemorrhage

Leonie Müller-Jensen, MD, Elie Diamandis, MD, Anja Osterloh, MD, Klemens Ruprecht, MD, and Christoph Leithner, MD

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Correspondence

Dr. Müller-Jensen
leonie.mueller-jensen@
charite.de

Figure 1 Subacute subarachnoid hemorrhage (SAH) causing vasospasm-induced ischemic stroke

(A) Brain CT: no SAH in basal cisterns, but hyperdense signal in left middle cerebral artery (MCA) territory sulcus (arrow). (B) Brain MRI: diffusion-weighted imaging shows acute stroke in left MCA territory. (C) Magnetic resonance angiography reveals bilateral vasospasms. (D) Digital subtraction angiography reveals left MCA aneurysms (asterisks) and vasospasms (arrowheads). (E) 3D reconstruction of left MCA aneurysm.

A previously healthy 42-year-old man had sudden-onset severe headache resolving within days. Two weeks later, he noted acute right-sided hemiparesis. Brain CT, MRI, and digital subtraction angiography showed acute left hemispheric ischemic stroke, bilateral middle cerebral artery vasospasms, and intracerebral aneurysms (figure 1, A–E). The following day, CSF was obtained and appeared clear and without xanthochromia (figure 2A). CSF cytology proved past subarachnoid hemorrhage (SAH) by demonstrating macrophages with ingested erythrocytes, hemosiderin, and hematoidin crystals (figure 2B). CSF may be clear, but CSF cytology can prove SAH 2 weeks after aneurysm rupture leading to vasospasm and stroke.^{1,2}

From the Departments of Neurology (L.M.-J., K.R., C.L.), Neuroradiology (E.D.), and Neuropathology (A.O.), Charité-Universitätsmedizin Berlin, Corporate Member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Germany.

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Figure 2 CSF cytology proving subarachnoid hemorrhage (SAH)

(A) Clear CSF without xanthochromia. (B) Cytology of May-Grünwald-Giemsa stained CSF cytopins showing macrophages with ingested erythrocytes (short arrows), hemosiderin (arrowheads), and hematoidin crystals (long arrow). Macrophages containing hemosiderin and hematoidin crystals appear ~3 and ~7 days, respectively, after SAH and can thereafter remain detectable for several months.

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Appendix Authors

Name	Location	Contribution
Leonie Müller-Jensen, MD	Department of Neurology, Charité Universitätsmedizin Berlin, Germany	Author
Elie Diamandis, MD	Department of Neuroradiology, Charité Universitätsmedizin Berlin, Germany	Coauthor

Appendix (continued)

Name	Location	Contribution
Anja Osterloh, MD	Department of Neuropathology, Charité Universitätsmedizin Berlin, Germany	Coauthor
Klemens Ruprecht, MD	Department of Neurology, Charité Universitätsmedizin Berlin, Germany	Coauthor
Christoph Leithner, MD	Department of Neurology, Charité Universitätsmedizin Berlin, Germany	Coauthor

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