Category 1 :**Neuro critical care**

A48 - ***Bedside 3d contrast-enhanced ultrasound enables morphological imaging and spatial characterization of cerebral vasospasm in neuro-intensive care: the sculpt study (intermediate results).***

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Introduction:

In comatose and sedated patients, cerebral vasospasm (CVS) and delayed cerebral infarction (DCIn) after aneurysmal subarachnoid hemorrhage (SAH) are diagnosed and monitored using transcranial Doppler (TCD), angio- and perfusion-computed tomographies (CTA and CTP). Contrast-agent ultrasonography (CEUS) using microbubbles (Sonovue ®) uniquely allows irradiation-free repeated bedside measurement. The SCULPT study evaluates a 3D CEUS device dedicated to cerebral exploration. We report i) anatomical concordance between CEUS microvascular 3D reconstruction (MVI) and CTA, ii) ability of CEUS for spatially confined flow accelerations associated with CVS.

Methods:

SCULPT is a single-arm, monocentric, prospective study. It includes adult patients admitted to a French University Hospital neuro-ICU presenting with an indication for CTP. Patients benefit from routine CTP and TCD, and from additional bilateral 3D CEUS. The device produces 3D MVI reconstructions and Doppler maps.

Results:

18 patients have so far been included, totalizing 118 CEUS acquisitions. Success rate of bilateralCEUS was 84%. Mean CEUS exam duration was 11 min, comparing to 28 min for CTA/CTP and 5 minfor TCD. MVI reconstructions allow bilateral visualization of cerebral vasculature, with qualitatively goodanatomical concordance. When probe positioning was optimal (n=9), detection rate was 100% for middlecerebral artery (MCA) segments M1 and M2 and for basilary artery, 89% for anterior and posterior cerebralarteries, and 22% for the anterior communicating artery. In patients presenting with severe right MCA CVS,3D Doppler map allowed to detect focal acceleration in the M1 segment and to perform spectral quantificationon several anatomical points (maximal PSV 132 cm/s, versus 91 cm/s and 86 cm/s up and downstream). Nosevere secondary effect due to the device nor the Sonovue ®was noted.

Conclusion:

These intermediate results confirm bedside 3D CEUS feasability in a neuro-intensive care unit for MVI and Doppler monitoring.