Introduction Refinement of intracranial aneurysm rupture risk estimations may improve patient selection for preventive treatment. Dynamical scans may highlight reduced stability of the vessel wall.

Aim of Study The magnitude of pulsations is unknown, but are thought to be smaller than the CT resolution. Noise and artefacts impede reliable measurement. The aim of this study is to quantify the cardiac cycle-related pulsations of intracranial vessels and aneurysms, and to compare patterns of different cardiac cycles.

Methods 4D CTA scans (Aquilion One PRISM Edition, Canon Medical Systems Corporation, Otawara, Japan) of three consecutive heartbeats were obtained in 15 patients harboring an intracranial aneurysm (rotation time = 0.275s, tube current = 340 mA, tube voltage = 100kV). Reconstructions of every 5% of the R-R interval were obtained using retrospective cardiac gating. A reference mesh was created per subject to compare segmentations of different cardiac phases. A periodogram was created for the mean pulsatile pattern of a vessel and an aneurysm segment.

Results 15 patients with 19 unruptured and untreated aneurysms with a mean diameter of 5.8 ± 6.3 mm (mean ± std) were scanned, resulting in a mean CTDIvol of 76 [64 94] mGy (mean [min max]). Frequency analysis revealed an artefact with a frequency similar to the gantry rotation frequency. Furthermore, pulsations with frequencies similar to the heart rate were found in the vessel and aneurysm segments.

Conclusions The role of inter-cardiac cycles comparison and frequency analysis is essential for the differentiation between real pulsations and pulsations induced by noise or artefacts on dynamic CTA.

Disclosure Nothing to disclose