# AbstractID: 4817 Title: Evaluation of Time Sampling and Its Interpolation Effect Based on Deconvolution Technique for Quantification of Cerebral Perfusion by Dynamic Contrast Enhanced CT

**Purpose:** To investigate time sampling and its interpolation effect on cerebral perfusion measurements for proving the possibility of low-radiation-dose CT examination than usual.

**Method and Materials:** Immediately after non-enhanced transverse scanning of a patient's brain, contrast material-enhanced scanning was performed every 1 second for 40 seconds at a single-slice level. Uniform time sampling was executed from 1/2 to 1/7 rate of total time series, respectively. Thirty tissue concentration time-course data were collected, and arterial input curve data were fitted by gamma-variate function. The sinc function was introduced for interpolation. Deconvolution analysis based on singular value decomposition was performed for quantification of CBF. The lowest singular value corresponding to the minimum difference between residue and its exponential curve-fitted function was considered as the optimal threshold value. The CBF values were calculated from the maximum of the scaled residue function. The perfusion values through time sampling and interpolation were compared with the original perfusion values by independent samples t-test.

**Results:** The CBF values without interpolation were underestimated with a decrease of sampling rate, and with interpolation had a tendency fluctuated around the original CBF values. The CBV values through time sampling were not statistically different from the original CBV values regardless of the existence of interpolation. The MTT values without interpolation were overestimated with a decrease of sampling rate, and with interpolation had a tendency fluctuated inversely to CBF change around the original MTT. Time sampling without interpolation was statistically possible up to 1/2 sampling rate, and with interpolation up to 1/5 sampling rate.

**Conclusion:** The perfusion values through time sampling with interpolation are acceptable up to some less sampling rate, and more accurate than without interpolation. This study will help in selecting reasonable image acquisition time interval for low-radiation-dose CT examination.

**Conflict of Interest (only if applicable):** Young Investigator Competition