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**Computed tomography imaging for the characterization of drugs using radiation density measurements and Hounsfield units-Spectroscopy**Andreas Christe<sup>1,2</sup> and Ali Rahman<sup>1,2</sup><sup>1</sup>Tiefenauspital, Switzerland<sup>2</sup>Bern University, Switzerland

**Aim of the Study:** We intend to investigate the computed tomography (CT) density of frequently administered medications for the better characterization of substances on abdominal CT, for radiologists to narrow the differential of hyperdense material in the bowel and to provide forensic doctors with a tool to identify the gastric content before an autopsy.

**Material & Method:** From the list of the local hospital pharmacy, the 50 most frequently used medications were identified and scanned twice with a 128 row CT-scanner (Acquillion, Toshiba, Tokyo, Japan). The protocol comprised two tube voltages of 100 kVp and 120 kVp with a tube current of 100 mAs, a collimation of 0.5 mm and a slice thickness of 0.5 mm. Two readers were asked to measure the density (in Hounsfield Units) and the noise (standard deviation of the Hounsfield Units) of each pill in the two scans (100/120 kVp). After a break of 4 weeks, both readers repeated the same measurements to test the repeatability (intra-rater agreement).

**Results:** The most dense pill was Cordarone (7265 HU) and the lowest attenuating pill was Perenterol (-529 HU), with an attenuation that was lower than fat-density (<-120 HU). The standard deviation of pixel density (noise) equals the inhomogeneity of the pharmacological product, varying from 9 to 1592 HU among the different pills (at 120 kVp). The absolute average HU increase per pill when changing to lower voltage was 78±253 HU, leading to a linear fitting line with a slope of 0.21 as a constant variable in the density spectroscopy. The intra- and inter-rater agreements for all measurements were nearly perfect with a correlation coefficient (r) of ≥0.99 (p<0.0001).

**Conclusion:** Our data suggest that measuring the attenuation of drugs on CT images, including the homogeneity and applying the CT spectroscopy allows the identification of the most frequent medications. Other clinicians and forensic doctors can perform this easy pill measurement as the intra-reader and inter-reader variability is very small.

**Biography**

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