PET/CT Artefacts

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For accurately quantifiable PET images necessitates optimal operation of PET hardware as well as the application of a range of software algorithms that correct for variable, missed and unwanted detected events. The PET/CT imaging has presented several challenges that affect the accuracy of PET quantification. These challenges are primarily rooted in the use of CT for the AC of the PET data and necessitate specialized image processing algorithms to mediate their effects on the resultant PET images. Examples of these challenges include the effects of high density material, such as oral and intravenous contrast media or metal implants, on CT numbers; truncation effects due to the mismatch between the CT and PET FOVs; and a temporal mismatch between the PET and CT data acquisition and its effect on the internal structures that are affected by involuntary motion. In addition to issues with the hardware and data processing, image artefacts may arise from suboptimal patient preparation and handling of activity prior to or during the examination. Proper patient instruction, preparation and handling prior to and during the examination are key to a diagnostically useful examination.

Further reading:

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3. Boellaard, R., et al., FDG PET and PET/CT: EANM procedure guidelines for tumour PET imaging: version 1.0, Eur. J. Nucl. Med. Mol. Imaging 2010; 37: 181–200.
4. Varrone, A., et al., EANM procedure guidelines for PET brain imaging using [18F] FDG, version 2, Eur. J. Nucl. Med. Mol. Imaging 2009; 36: 2103–2110.
5. IAEA. PET/CT atlas on quality control and image artefacts. – Vienna: International Atomic Energy Agency, 2014.