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Institutionen för klinisk vetenskap, intervention och teknik (CLINTEC), Enheten för medicinsk bild, funktion och teknologi

Optimization of Intravenous Contrast Media at Computed Tomography

AKADEMISK AVHANDLING

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Abstract

The administration of intravenous contrast media (IV CM) is essential for detecting lesions at most computed tomography (CT) examinations. The overall aim of this thesis was to investigate different aspects of intravenous contrast media (CM) administration that may affect the quality of the CT examination.

In **Study I** a comparison was made between the low osmolar contrast media (LOCM) iomeprol and the iso osmolar contrast media (IOCM) iodixanol, focusing on how they may affect heart rate, heart rate variability, experienced patient heat sensation and image quality at coronary computed tomography angiography (CCTA) in 100 patients. No significant difference in terms of heart rate interfering with the imaging protocol was observed. However, a greater number of arrhythmic heart beats (hb) was observed with the use of LOCM than with IOCM ($P < 0.001$). There was no difference in subjective image quality between the two CM. The experienced heat sensation was stronger when receiving LOCM than with IOCM (visual analogue scale = 36 mm and 18 mm respectively, $P < 0.05$).

In **Study II** the enhancement of liver and aorta was related to different measures of body size and to the use of two different CM (LOCM iomeprol and IOCM iodixanol) in 100 patients undergoing thoraco-abdominal CT. Three parameters had a stronger correlation to the CM enhancement in liver and aorta; Body weight (BW, $r = -0.51$ and -0.64), body surface area (BSA, $r = -0.54$ and -0.65) and lean body mass (LBM, $r = -0.54$ and -0.59), but there was no statistically significant difference between those. The parameters body height (BH), body mass index (BMI) and ideal body weight (IBW) had weaker correlations to CM enhancement of liver and aorta. When adjusting for differences in weight, height, age and sex between the two groups there was a stronger liver enhancement after injection of the IOCM iodixanol than after injection of the LOCM iodixanol (mean difference 6 HU, $p < 0.01$).

Conclusion: The iso osmolar contrast media iodixanol causes less arrhythmic hb and less heat sensation than the low osmolar contrast media iomeprol, but this does not significantly influence the quality at CCTA. The CM enhancement is affected by body size. There is no statistically significant better parameter than BW to adjust for, why this parameter is recommended for dose adjustments. When performing hepatic imaging the IOCM iodixanol might be preferred to the LOCM iomeprol due to a stronger CM enhancement, but confirming studies are required.