

STANDARDIZING WEIGHT-BASED CONTRAST VOLUME PER BODY REGION FOR CONTRAST-ENHANCED CT EXAMS

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INTRODUCTION

In our experience, there is a lack of consensus regarding the appropriate contrast volume to administer for CT exams per body region across institutions. The irregularity, in contrast, dosing has the potential to cause inconsistent image quality and suboptimal diagnostic accuracy. Therefore, establishing a standardized approach for determining weight-based contrast volume per body region is crucial for improving the quality and reliability of contrast-enhanced CT exams.

METHOD

A cross-sectional analysis of contrast-enhanced CT exams was conducted on 164 patients using a 128-slice GE machine over a two-month period. Patients of varying weights underwent CT scans of different body regions, with the contrast dose calculated based on individual body weight. Iohexol 350 mg I/mL was used, with an average flow rate of 3.5 ml/sec. Volume estimates ranged from 30 ml to 150 ml for adults and a single injection dose for pediatric patients, calculated using 1.25 mL/kg of body weight (range: 1 mL/kg to 1.5 mL/kg). Image quality analysis was recorded, and contrast volumes administered for each body region were analyzed and correlated with patient weight.

RESULTS

In our study of 164 patients (44% female, median age 50 [IQR: 33-62], median weight 65 [IQR: 55-75]), 48.8% of images were rated as very good based on subjective image quality analysis. We observed a clear correlation between patient weight and the required contrast volume for different body regions in CT exams for weights between 60 and 80 Kgs. Extremity angiographic studies tended to require larger contrast volumes for optimal enhancement. However, contrast volume showed little variability for Brain, Neck, and soft tissue CT exams. The development of the look-up table was based on these observations.

Look up table by body region

	ABDOMINO PELVIC/ ABDOMEN	ABDOMINOP ELVICANGIO	CHEST ANGIO	CHEST WITH CONTRAST	AORTO GRAM	NECK WITH CONTRAST	NECK ANGIO	BRAIN WITH CONTRAST	BRAIN ANGIO	EXTREMITY SOFT TISSUE	EXTREMITY ANGIO
WL	CONTRAST VOLUME										
<30	50	50	50	50	50	50	50	30	50	60	70
30-39	60	60	60	60	60	50	60	30	60	60	90
40-49	60	70	60	60	60	50	70	30	70	60	90
50-59	70	70	70	70	70	50	70	30	70	60	100
60-69	85	85	85	85	85	50	85	40	85	70	115
70-79	95	95	95	95	95	50	95	40	95	70	125
80-89	105	105	105	100	105	50	100	40	100	70	135
90-99	115	115	115	100	115	50	100	40	100	70	145
100-109	120	120	120	100	120	50	100	40	100	70	150
110-120	120	120	120	100	120	50	100	40	100	70	150
>120	125	125	125	100	125	50	100	40	100	70	155

CONCLUSIONS

These findings highlight the importance of individualized contrast dosing based on patient weight and the specific body region being examined. Incorporating a look-up table based on patient weight and body region could provide a standardized and optimized approach to contrast dosing, potentially enhancing image quality and reducing variability in contrast volume administration.

REFERENCES

1. Kessler R, Hegenscheid K, Fleck S, Khaw A, Kirsch M, et al. (2014) Patient Body Weight Tailored Contrast Medium Injection Protocol for the Craniocervical Vessels: A Prospective Computed Tomography Study. PLoS ONE 9(2): e88867. doi:10.1371/journal.pone.0088867
2. Benbow, R.K. Bull/Clinical Radiology 66(2011)940e944 Simple weight-based contrast dosing for standardization of portal phase CT liver enhancement doi:https://doi.org/10.1016/j.crad.2010.12.022

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