



CADTH Reference List

Weight-Based Dosing for IV Iodinated Contrast Media in CT Examinations

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Key Messages

- We found 1 randomized controlled trial and 4 nonrandomized studies about the clinical effectiveness of using weight-based dosing for IV iodinated contrast media for patients requiring a CT scan.
- We did not find any evidence-based guidelines for the use of weight-based dosing for IV iodinated contrast media for patients requiring a CT scan.

Research Questions

1. What is the clinical effectiveness of using weight-based dosing for IV iodinated contrast media for patients requiring a CT scan?
2. What are the evidence-based guidelines for the use of weight-based dosing for IV iodinated contrast media for patients requiring a CT scan?

Methods

Literature Search Methods

An information specialist conducted a literature search on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the International HTA Database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search approach was customized to retrieve a limited set of results, balancing comprehensiveness with relevancy. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. Search concepts were developed based on the elements of the research questions and selection criteria. The main search concepts were weight-based dosing and contrast media. An additional search was run with the concepts of dosing and contrast media, with [CADTH-developed search filters](#) applied to limit retrieval to guidelines. The search was completed on May 1, 2023, and limited to English-language documents published since January 1, 2018. Internet links were provided, where available.

Selection Criteria

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in [Table 1](#). Full texts of study publications were not reviewed. Open access full-text versions of evidence-based guidelines were reviewed when available.

Table 1: Selection Criteria

Criteria	Description
Population	Patients (any age) requiring a CT scan
Intervention	Weight-based dosing for IV iodinated contrast media for CT scans
Comparator	Q1: Fixed iodinated contrast dosing, unenhanced CT scan, lower tube voltage, no comparator Q2: Not applicable
Outcomes	Q1: Clinical effectiveness (e.g., image enhancement [Hounsfield measurement], diagnostic accuracy, patient time to treatment, patient quality of life, hospital length of stay, safety, and adverse events) Q2: Recommendations regarding the best use of weight-based dosing for IV iodinated contrast media for CT scans (e.g., appropriate methods of delivery, power injector vs. hand injection, central venous catheter administration, intraosseous catheter administration)
Study designs	Health technology assessments, systematic reviews, randomized controlled trials, nonrandomized studies, evidence-based guidelines

Results

One randomized controlled trial¹ and 4 nonrandomized studies²⁻⁵ were identified regarding the clinical effectiveness of using weight-based dosing for IV iodinated contrast media for patients requiring a CT scan. No evidence-based guidelines were identified regarding the use of weight-based dosing for IV iodinated contrast media for patients requiring a CT scan. No relevant health technology assessments or systematic reviews were identified.

Additional references of potential interest that did not meet the inclusion criteria are provided in [Appendix 1](#).

References

Health Technology Assessments

No literature identified.

Systematic Reviews

No literature identified.

Randomized Controlled Trials

Unclear Population Age

1. Caruso D, Rosati E, Panvini N, et al. Optimization of contrast medium volume for abdominal CT in oncologic patients: prospective comparison between fixed and lean body weight-adapted dosing protocols. *Insights imaging*. 2021;12(1):40. [PubMed](#)

Non-Randomized Studies

Unclear Population Age

2. Muroga K, Minochi Y, Fukuzawa A. Improvement in arterial enhancement using diluted injection of contrast medium in CT angiography. *Acta Radiol*. 2023;64(2):489-495. [PubMed](#)
3. Jensen CT, Blair KJ, Wagner-Bartak NA, et al. Comparison of Abdominal Computed Tomographic Enhancement and Organ Lesion Depiction Between Weight-Based Scanner Software Contrast Dosing and a Fixed-Dose Protocol in a Tertiary Care Oncologic Center. *J Comput Assist Tomogr*. 2019;43(1):155-162. [PubMed](#)
4. Martens B, Hendriks BMF, Eijvoogel NG, Wildberger JE, Muhl C. Individually Body Weight-Adapted Contrast Media Application in Computed Tomography Imaging of the Liver at 90 kVp. *Invest Radiol*. 2019 03;54(3):177-182. [PubMed](#)
5. Perrin E, Jackson M, Grant R, Lloyd C, Chinaka F, Goh V. Weight-adapted iodinated contrast media administration in abdomino-pelvic CT: Can image quality be maintained? *Radiography*. 2018 02;24(1):22-27. [PubMed](#)

Guidelines and Recommendations

No literature identified.

Appendix 1: References of Potential Interest

Randomized Controlled Trials

Lean Body Weight–Based Dosing vs. Total Body Weight–Based Dosing

Costa AF, Peet K, Abdolell M. Dosing Iodinated Contrast Media According to Lean Versus Total Body Weight at Abdominal CT: A Stratified Randomized Controlled Trial. *Acad Radiol*. 2020 06;27(6):833-840. [PubMed](#)

Zanardo, M., Doniselli, F.M., Esseridou, A. et al. Lean body weight versus total body weight to calculate the iodinated contrast media volume in abdominal CT: a randomised controlled trial. *Insights Imaging* 11, 132 (2020). <https://insightsimaging.springeropen.com/articles/10.1186/s13244-020-00920-4> Accessed 2023 May 03. [PubMed](#)

Matsumoto Y, Masuda T, Sato T, et al. Contrast Material Injection Protocol With the Dose Determined According to Lean Body Weight at Hepatic Dynamic Computed Tomography: Comparison Among Patients With Different Body Mass Indices. *J Comput Assist Tomogr*. 2019 Sep/Oct;43(5):736-740. [PubMed](#)

Alternative Comparator — Body Surface Area–Based Dosing

Yin WH, Yu YT, Zhang Y, et al. Contrast medium injection protocols for coronary CT angiography: should contrast medium volumes be tailored to body weight or body surface area? *Clin Radiol*. 2020 05;75(5):395.e317-395.e324. [PubMed](#)

Non–Randomized Studies

Mixed Intervention — Weight–Adjusted Contrast Dose With Increased Administration Rate

Ratnakanthan PJ, Kavnoudias H, Paul E, Clements WJ. Weight-Adjusted Contrast Administration in the Computed Tomography Evaluation of Pulmonary Embolism. *J Med Imaging Radiat Sci*. 2020 09;51(3):451-461. [PubMed](#)

Lean Body Weight–Based Dosing vs. Total Body Weight–Based Dosing

Chandrasekharan R, Kulkarni CB, Pullara SK, Moorthy S. Does contrast dose based in lean body weight allow lesser volumes on high BMI patients for CT angiography? *J Clin Imaging Sci* 2021;11:38 Accessed 2023 May 03. [PubMed](#)

Mixed Intervention — Weight–Based Dosing and Radiation Reduction

Chen Y, Liu Z, Li M, et al. Reducing both radiation and contrast doses in coronary CT angiography in lean patients on a 16-cm wide-detector CT using 70 kVp and ASiR-V algorithm, in comparison with the conventional 100-kVp protocol. *Eur Radiol*. 2019 Jun;29(6):3036-3043. [PubMed](#)