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COMMENTARY RADIATION PROTECTION

From Variability to Accountability: Rethinking Radiation Exposure in Pediatric Osteoid Osteoma Ablation

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Introduction

Interventional radiology has rightfully claimed osteoid osteoma (OO) ablation as a success story. Minimally invasive, highly effective, and reproducible, CT-guided thermal ablation has largely replaced surgery as the standard of care. Yet, in pediatric patients, this success is accompanied by a persistent and important concern: the management of ionizing radiation exposure.

Despite increasing awareness, radiation dose in pediatric interventional radiology continues to show considerable variability, with limited standardization and few meaningful benchmarks. In this context, the multicenter registry analysis by Wintergerst et al. [1] provides a timely and relevant contribution by systematically evaluating radiation exposure, procedural outcomes, and practice patterns in CT-guided OO ablation.

The authors report excellent technical success (99.4%) and a low complication rate (1.81%) in a cohort of 166 pediatric patients, reaffirming the safety and effectiveness of CT-guided thermal ablation [1]. These findings are consistent with existing literature and confirm the robustness of minimally invasive treatment strategies [2, 3]. However, the real value of this study lies less in confirming what is already well established, but rather in its attempt to quantify and contextualize radiation exposure through the proposal of age- and anatomy-specific benchmarks based on dose-length product (DLP).

The introduction of percentile-based benchmark ranges is both pragmatic and clinically relevant for quality assurance. By stratifying radiation dose according to anatomical region and age, the authors highlight meaningful differences, with higher exposure associated with interventions in the axial skeleton compared to the extremities [1]. This distinction underscores the necessity of tailored imaging protocols and provides a framework for internal clinical audit and dose optimization.

At the same time, these benchmarks must be interpreted with caution. As derived from retrospective registry data, they primarily reflect existing practice rather than defining optimal standards. The observed variability in radiation dose suggests that procedural exposure remains highly dependent on local protocols, operator technique, and institutional experience [1]. In daily clinical practice, such variability is readily apparent and often reflects differences in local workflow and operator preference rather than patient-related factors.

In the absence of standardized acquisition parameters and detailed patient-specific data, these values are better interpreted as reference points rather than definitive benchmarks.

Furthermore, limitations inherent to registry-based studies are evident in the reporting of clinical outcomes. The relatively low rate of early clinical success, accompanied by a substantial proportion of non-assessable cases, most likely reflects incomplete follow-up rather than reduced treatment efficacy [1]. This highlights the need for standardized outcome definitions and systematic longitudinal data collection to ensure that radiation exposure can be appropriately contextualized against clinical benefit.

An additional consideration is the evolving technological landscape. While conventional CT remains widely available

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and continues to serve as the primary guidance modality, alternative approaches such as cone-beam CT and navigation-assisted techniques offer promising avenues for dose reduction [4, 5]. The absence of comparative analysis limits the ability to place these benchmarks within the broader context of evolving imaging technologies.

Despite these limitations, the study represents an important step toward improving transparency in radiation exposure. By aggregating multicenter data and proposing practical reference ranges, the authors contribute to the development of a more structured and accountable approach to dose management in pediatric interventional radiology.

In conclusion, this work shifts the focus from procedural success alone to the quality and safety of its execution. The proposed benchmarks should be viewed not as fixed targets, but rather as a starting point for further refinement. The challenge moving forward is to translate observational data into standardized protocols and evidence-based guidelines, ensuring that the effectiveness of pediatric OO ablation is matched by a continued commitment to minimizing radiation exposure.

Ultimately, technical success alone is no longer sufficient; it must be matched by a consistent and deliberate effort to minimize radiation exposure in every patient.

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Declarations

Conflict of interest The author declares that there is no conflict of interest.

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