Comprehensive Clinical Implementation of AI-Assisted Contouring in Radiotherapy: Evaluating Risk, Quality Assurance, and Workflow Integration

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Introduction

Radformation's AutoContour is an AI-driven tool designed to automate anatomical contouring for radiotherapy planning. While AI has demonstrated accuracy in medical image segmentation [1], limited research addresses its full clinical integration, particularly in risk assessment and quality management [2,3]. This study evaluates the end-to-end implementation of AutoContour at Barwon Health, assessing not just time savings and accuracy but also risk mitigation and quality assurance (QA) protocols.

Methods

During a 120-day trial, radiation therapists performed contouring using two approaches: traditional manual methods and AI-assisted contouring, where AutoContour-generated contours were used as a baseline and edited as necessary. The time required to produce clinically acceptable contours was recorded for each method. Quantitative assessment tools, including the Dice Similarity Coefficient (DICE), were employed to evaluate the accuracy of the AI-generated contours compared to manual delineations. Additional aspects of the trial included a structured risk assessment, the development of ongoing QA protocols, and the approval process through Barwon Health's new technology adoption framework.

Results

AutoContour reduced contouring time by an average of 17 minutes (48%) per case, with site-specific variability. While efficiency gains were significant, the clinical integration process highlighted key risks, including anatomical inconsistencies and workflow disruptions. A tailored QA strategy was developed, incorporating manual checks to ensure reliability [4,5].

Conclusion

Beyond time savings, this study demonstrates that safe AI implementation in radiotherapy requires rigorous risk assessment and ongoing QA. AutoContour was deemed clinically viable, but structured oversight remains essential to ensure its safe and efficient use.

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