Topic : Liver

APPLICATION OF AI-BASED VOLUMETRY IN LIVER TRANSPLANTATION: ENHANCING ACCURACY AND SPEED IN CLINICAL PRACTICE

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Background : Accurate liver volumetry is critical for donor selection and surgical planning in transplantation. Traditional 2D methods are labor-intensive, time-consuming, and variable. Al-generated 3D volumetry automates the process, potentially improving accuracy and speed. This study evaluates the impact of Al-based volumetry on workflow efficiency and predictive accuracy compared to conventional methods.

Methods : A retrospective analysis compared liver transplant cases using conventional 2D volumetry (Jan 2023-Mar 2024) and AI-based 3D volumetry (Apr-Sep 2024). Metrics included time from request to report generation and the accuracy of predicted graft volumes versus actual weights. AI-generated 3D volumes were also compared to manually edited volumes to assess reliability.

Results : The AI-based volumetry demonstrated a significant reduction in the time required for volumetry report generation, with a mean retrieval time of 1.3 ± 1.4 days compared to 4.2 ± 3.6 days in the conventional group (p < 0.001), suggesting improved workflow efficiency. In terms of predictive accuracy, AI-based volumetry exhibited a stronger correlation with actual graft weights (R² = 0.801) compared to conventional 2D volumetry (R² = 0.668). Additionally, the comparison between AI-generated 3D volumetry and manually edited volumetry after AI processing shows a near-perfect correlation (R² = 0.992). This indicates that the AI-generated results are highly accurate and require minimal manual correction. These results confirm that AI improves workflow efficiency and prediction reliability, aiding donor selection.

Conclusions : Al-based 3D volumetry enhances liver transplant workflows by increasing speed and accuracy while minimizing manual input. Its integration demonstrates the potential to optimize clinical outcomes and streamline processes in organ transplantation.

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