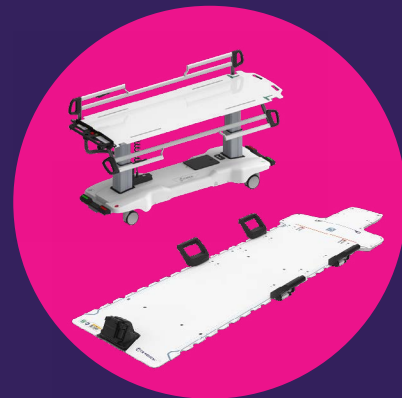


PATIENT TRANSFER

CLINICAL PUBLICATION BRIEF

Clinical Workflow of Cone Beam Computer Tomography-Based Daily Online Adaptive Radiotherapy with Offline Magnetic Resonance Guidance: The Modular Adaptive Radiotherapy System (MARS)



FULL ARTICLE

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OBJECTIVE

Evaluate a novel workflow combining the Ethos™ CBCT-based online adaptive radiotherapy (oART) with shuttle-based patient transport (CQ Medical's **Symphony® AirDrive™ Trolley** and **Alta™ AirShuttle™**), enabling offline MR guidance to enhance treatment precision and potentially reduce side effects.

SUMMARY

This study reports on 31 patients with various primary tumors treated using Ethos oART. Weekly offline MRI imaging was facilitated via the Symphony AirDrive patient transport system to integrate MRI soft-tissue data into adaptive planning.

- The workflow comprised initial CT/MRI for planning, weekly MRI to update anatomy, CBCT-based daily adaptation, and automated plan generation/QA using Ethos.
- 118 MRI scans were acquired in treatment position; 737 adaptive fractions were delivered.
- Weekly MRI acquired in treatment position preserves geometry between MRI and CBCT/linac, facilitating consistency across treatment.

CLINICAL IMPACTS

- The Symphony Patient Transfer system makes integrated MRI + CBCT workflows practical.
- Median treatment time (without MRI) was comparable to prior CBCT-only workflows, meaning MRI integration does not significantly extend linac treatment slots.
- The shuttle-based system enables use of standard MRI units for image guidance, without the need for dedicated MR-Linac infrastructure.

KEY TAKEAWAYS

- ✓ **FEASIBILITY** Shuttle transport successfully enabled CBCT-based oART with weekly offline 3T MRI in 31 patients over 737 fractions.
- 🕒 **EFFICIENCY** Median MRI acquisition time including shuttle transport: 53.6 min.
- 💰 **VALUE-ADD** 97.7% of adaptive fractions used the adapted plan, showing high clinical utility of MRI-informed adaptation.