

## AbstractID: 3756 Title: Tracking Prostate Motion and Isocenter Offset During Treatment Using the Calypos(tm) 4D Localization System

Purpose: To evaluate use of a real-time tracking system to determine intrafraction prostate motion and isocenter offset.

Method and Materials: Calypso® 4D Localization System (“Calypso System”, Calypso Medical, Seattle, WA) is a patient positioning device to be used as an adjunct for radiation therapy. Calypso System includes implanted markers (Beacon® transponders) and external electronics consisting of a movable console and electromagnetic array, user interface, infrared cameras, and tracking station. The external electronics continuously localize the implanted transponders using electromagnetic signals. Treatment target position offsets are computed based on transponder and isocenter coordinates from CT scans.

In a pilot study at two centers, 11 patients were tracked during an 8-minute session. In a follow-on study at five centers, tracking data will be acquired during radiation delivery in 30 patients. Patients enrolled on study are seeking radiation therapy for prostate cancer and have three transponders implanted into the prostate gland. Patients are set to skin marks and then adjusted using the Calypso System for final alignment for radiation delivery. Organ motion and isocenter offset will be tracked during treatment. If the isocenter offset exceeds a user-established limit during the fraction, the therapist will realign the patient using the Calypso System user interface.

Results: Tracking sessions were performed on 11 patients to date. Two of the 11 patients showed significant organ motion (>1 cm) over an 8-minute period. The longitudinal and vertical motion followed the same pattern of change, while no significant motion was detected in the lateral direction. The excursions persisted for over one minute.

Conclusion: Tracking of the prostate showed significant motion over time periods of interest in radiation therapy in some patients. Tracking of organ motion has the potential to play an important role in IMRT and other conformal radiation treatments.

Financial interest in Calypso Medical Technologies, Inc.