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Evaluation of CyberKnife frameless real-time image-guided stereotactic radiosurgery for spinal lesions.

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BACKGROUND: This study evaluated the CyberKnife frameless image-guided radiosurgery system for the treatment of spinal lesions.

METHODS: This system utilizes the coupling of an orthogonal pair of X-ray cameras to a dynamically manipulated robot-mounted linear accelerator that guides the therapy beam to the intended target without the use of frame-based fixation. Cervical spine lesions are located and tracked relative to skull bony landmarks; lower spinal lesions are tracked relative to fiducial markers. 125 spinal lesions in 115 consecutive patients were treated with a single-fraction radiosurgery technique.

RESULTS: Tumor volume ranged from 0.3 to 232 ml (mean 27.8 ml). Tumor radiation dose was maintained at 12-20 Gy to the 80% isodose line (mean 14 Gy); the spinal cord or canal volume receiving greater than 8 Gy ranged from 0.0 to 1.7 ml (mean 0.2 ml). No acute radiation toxicity or new neurological deficits occurred during the follow-up period (3-24 months).

CONCLUSIONS: The CyberKnife system was found to be feasible, safe and effective. The major potential benefits of radiosurgical ablation of spinal lesions are short treatment time in an outpatient setting with rapid recovery and good response. Copyright 2003 S. Karger AG, Basel

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