

AbstractID:9642Title:Dose-response parameters for thoracic and cervical myelopathy after resective radiotherapy

Purpose: The aim of this study is to determine the parameters that describe the dose-response relations of spinal cord regarding the endpoints of radiation myelopathy in the thoracic and cervical parts. This can be critical information since spinal cord is known for its serial behaviour.

Material and Methods: In the present study, the clinical data of 43 patients treated for lung carcinoma and 248 patients treated for head and neck cancer are analyzed. The two datasets were fitted by the relative seriality model regarding thoracic and cervical spinal cord radiation myelitis. The respective best estimates of the model parameters were determined together with their 68% confidence intervals by applying the maximum likelihood method to fit the clinical data.

Results: The parameter values of $D_{50} = 75.5 \text{ Gy}$, $\gamma = 1.13$, $s = 3.60$, describe the dose-response relation of thoracic myelopathy, whereas the dose-response relation of cervical myelopathy can be adequately described by the parameters $D_{50} = 55.9 \text{ Gy}$, $\gamma = 6.88$, $s = 0.13$. Regarding the cervical radiation myelopathy, 10 of the 12 responders had received a uniform dose in the whole circumference of their irradiated vertebrae (83.3%). Furthermore, only 18 of the 248 patients had received a uniform dose in the anterior and posterior parts of their irradiated vertebrae. 10 of these 18 patients (55.6%) showed complications.

Conclusions: The high relative seriality, a value of the thoracic part and the quite low s value of the cervical part are the major findings of the present analysis. According to our observations, when a larger portion of cervical spinal cord was irradiated, considerably more patients showed cervical myelopathy. This indicates that the manifestation of radiation myelitis is clearly related with a dose cutoff and volume effect in the cervical part of spinal cord.