

# Radical radiotherapy in bladder cancer

Prognostic variables for survival, morbidity,  
and target volume definitions

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## ABSTRACT

This PhD dissertation consists of four published articles focusing on different aspects of radical radiotherapy for urinary bladder cancer.

In the first article, outcome of radical radiotherapy in 292 patients irradiated for bladder cancer in our institution between 1994 and 2002 was analysed. The local control rate was 52%. The overall 3- and 5-year survival rates were 31% and 21%, respectively. These results resemble the results from other retrospective studies on negatively selected patients. Performance status ( $P<0.01$ ), TURB ( $P<0.01$ ), hydronephrosis ( $P=0.01$ ), T-stage ( $P=0.02$ ), and creatinine ( $P=0.03$ ) were found to be independent prognostic factors for survival.

In the second article, late morbidity was assessed in patients with at least 18 months of follow-up by use of a structured telephone interview. About 14% of the patients reported moderate to severe impact on the bladder function, and 29% of the patients reported moderate to severe bowel dysfunction following radiotherapy. Among the male patients, 25% reported moderate to severe impact of radiation on their present sexual functions.

In the third article, dose volume histograms were analysed in relation to late morbidity. Several significant relations between parameters from the dose-volume-histograms from the rectum and anal canal volume and late effects were found. This indicates that the rectum anal canal volume should be considered critical normal tissues during irradiation of pelvic tumors.

In the fourth article, organ motions of the bladder owing to changes in filling of the bladder and rectum were analysed. Filling of the bladder and rectum resulted in bladder deviations in especially anterior and cranial directions. This justifies the introduction of an anisotropic margin for organ motions. Thus, the results have been used to update the internal margins for organ motions during radiotherapy for bladder cancer in our department.