



PP-126

A new safe radiotherapy induced microvascular fibrosis animal model

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Introduction: Neoadjuvant radiotherapy treatment of soft tissue sarcomas is associated with higher peroperative complication rates possibly due to fibrotic changes in local tissue microvasculature.

Objective: Create a new safe experimental model of neurovascular fibrosis induced by radiotherapy with reduced morbidity and mortality compared to previous models.

Methods: Animal model: 72 Sprague-Dawley rats of 350-400 g. Group I: control group, 24 rats clinically evaluated during six weeks. Group II: evaluation of acute side effects, 24 rats irradiated (20 Gy) clinically evaluated for two weeks. Group III: Evaluation of subacute side effects, 24 rats irradiated (20 Gy) evaluated clinically for six weeks. The variables evaluated include clinical assessment, weight, vascular permeability (arterial and venous), survival / mortality and histological studies.

Results: No statistically significant differences between groups in clinical assessment, weight and vascular permeability. Statistically significant differences between groups (I vs. II-III) in survival and histological changes.

Discussion: The designed model induces selective fibrosis by radiotherapy in the neurovascular bundle without histological changes affecting the surrounding tissues. Rat body weight showed a progressive increase in all groups and the mortality rate of the presented model is 10.4% compared to 30-40% of the previous models.

Conclusions: The model designed induces selective fibrosis by radiotherapy in the neurovascular bundle without histological changes affecting the surrounding tissues decreasing morbidity and mortality rates. This model will allow conducting new therapeutic experimental studies on the effects of radiotherapy in cervical neurovascular bundle.

Keywords: Experimental rat model; Radiotherapy; Microvascular; Fibrosis

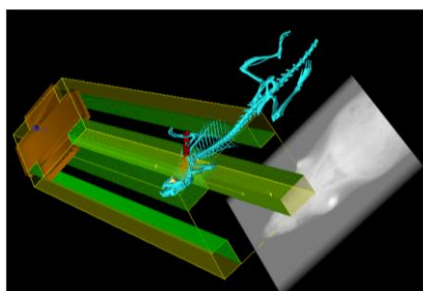


Figure 1.