Lung

The HILUS-Trial-a Prospective Nordic Multicenter Phase II Study of Ultracentral Lung Tumours Treated With Stereotactic Body Radiotherapy.

Lindberg K, Grozman V, Karlsson K, Lindberg S, Lax I, Wersäll P, Persson GF, Josipovic M, Khalil AA, Moeller DS, Nyman J, Drugge N, Bergström P, Olofsson J, Rogg LV, Ramberg C, Kristiansen C, Jeppesen SS, Nielsen TB, Lödén B, Rosenbrand HO, Engelholm S, Haraldsson A, Billiet C, Lewensohn R.

J Thorac Oncol. 2021 Jul;16(7):1200-1210.

INTRODUCTION

Stereotactic body radiation therapy of thoracic tumours close to the central airways implies risk of severe toxicity. We report a prospective multicenter phase II trial for tumours located less than or equal to 1 cm from the proximal bronchial tree with primary end point of local control and secondary end point of toxicity.

METHODS

Stereotactic body radiation therapy with 7.0 Gy × 8.0 was prescribed to the 67% isodose encompassing the planning target volume. The patients were stratified to group A (tumours ≤ 1.0 cm from the main bronchi and trachea) or group B (all other tumours). Risk factors for treatment-related death were tested in univariate analysis, and a logistic regression model was developed for fatal bronchopulmonary bleeding versus dose to the main bronchi and trachea.

RESULTS

A total of 65 patients (group A/group B, n = 39/26) were evaluated. The median distance between the tumour and the proximal bronchial tree was 0 mm (0-10 mm). The two-year local control was 83%. Grade 3.0 to 5.0 toxicity was noted in 22 patients, including 10 cases of treatment-related death (bronchopulmonary haemorrhage, n = 8; pneumonitis, n = 1; fistula, n = 1). Dose to the combined structure main bronchi and trachea and tumour distance to the main bronchi were important risk factors. Dose modelling revealed minimum dose to the "hottest" 0.2 cc to the structure main bronchi and trachea as the strongest predictor for lethal bronchopulmonary haemorrhage.

CONCLUSIONS

On the basis of the presented data, 7.0 Gy × 8.0, prescribed to the planning target volume-encompassing isodose, should not be used for tumours located within 1 cm from the main bronchi and trachea. Group B-type tumours may be considered for the treatment on the basis of an individual risk-benefit assessment and a maximum dose to the main bronchi and trachea in the order of 70 to 80 Gy (equivalent dose in 2.0 Gy fractions).