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Stereotactic body radiotherapy (SBRT) for early stage I lung cancer : An effective and new standard of treatment

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Introduction

Traditionally, patients with medically inoperable early stage non-small-cell lung cancer (NSCLC) were treated with conventional radiotherapy of 60 Gray (Gy) over 6 weeks. Reported local control and survival was inferior to surgery. Stereotactic body radiotherapy (SBRT) is a new approach which delivers a much higher biologically effective dose to tumor thus producing comparable results as surgery.

Objectives

To evaluate the clinical outcomes of stage I NSCLC patients after SBRT, including 1-year and 3-year local control, overall survival and cancer-specific survival rates.

Methodology

Patients with stage I NSCLC (tumor size ≤ 5 cm), ECOG performance status ≤ 2 , who were not surgical candidates (either inoperable or patient refusal) were treated by SBRT in our hospital since 2012. Tumor motions with respiratory cycles were accounted for by using four-dimensional computerized tomography. A margin of 5mm (1cm superior-inferior) was used to generate the planning target volume. A total dose of 50 or 60 Gy in 5 fractions over 2 weeks was given, depending on the location of tumors. Survival plots were produced by Kaplan-Meier estimate.

Result

A total of 31 patients were included (male=18, 58%; female=13, 42%). Median age was 74 (range: 51-85). About half (48%, n=15) had stage Ia disease. Median gross tumor volume and planning target volume were 13.70cm³ (range:2.70-50.30cm³) and 49.1cm³ (range:17.10-117.70cm³) respectively. No concomitant systemic therapies were used. After a median follow-up of 19.4 months (range:2-35 months), twelve patients died (4 were non-cancer related). Median overall survival (OS) was 31.4 months (range:3.5-54.8 months). The 1-year and 3-year OS was 96.8% and 47%, while the cancer-specific survival was 95.7% and 56.3% respectively. Only five (16%) had local progressions, giving rise to the 1-year and 3-year local control rate of 93.1% and 80.4%. Acute and late toxicities occurred in 39% (n=11) and 23% (n=7) of patients but all are mild. In conclusion, SBRT in early stage I NSCLC achieves

high local control rate and overall survival comparable to radical surgery. Comparing to conventional radiotherapy, SBRT is better tolerated and reduces the treatment period from 6 to 2 weeks. SBRT should be the preferred treatment for early stage NSCLC when radical surgery is not to be considered.