The importance of thoracic radiotherapy and radiation dose on the prognosis of extensive stage small-cell lung cancer

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Abstract

Background and Purpose: For extensive stage SCLC (ES-SCLC), thoracic radiation therapy (TRT) has traditionally been used only to palliate some local symptoms, such as superior vena cava syndrome, caused by localized sites of disease. However, results from a recently published randomized clinical trial indicate that TRT to ES-SCLC patients who responded to chemotherapy lowered the rate of relapse and improved overall survival. Although a few studies have specifically addressed the role of TRT for the treatment of ES-SCLC, the prognostic importance of the dose of TRT has not been clearly defined in patients with ES-SCLC. This report, from a single institution in China, aims to further evaluate the role of radiotherapy and prognostic importance of radiation dose in ES-SCLC. **Patients and methods:** Three hundred and twenty-four patients with ES-SCLC were retrospectively reviewed. In the entire cohort of patients, 185 received hypo-fractionation radiotherapy(RT) (30-48Gy/3Gy/10-15f, n=40, BED=33.6-53.7 Gy) or conventional fractionation RT (50-60Gy/1.8-2.1Gy/ 25-30f, n=148, BED=46.0-55.1 Gy) after chemotherapy, and 136 only received chemotherapy. Overall survival and progression free survival were calculated from the beginning of treatment. Kaplan-meier method was used to calculate survival and log-rank text was used to compared differences in different groups. Cos regression analysis was used to analysis the prognostic factors. **Results:** Two hundred and fifty-three were men and 71 were women. Their age ranged from 18 to 85 years, with a median age of 59 years. One hundred and sixty-three of 185 patients (88.1%) in the ChT/TRT group and 117 of 136 patients (86.0%) in the ChT-alone group completed 4 cycles of ChT. The median follow-up time was 35.5 months (range, 3.4-69.2 months). For the entire group, the median survival was 11.3 months and the 2-year overall survival (OS) was 19.7%. The median survival and the 2-year OS rates were 13.2 months, and 28.0%, respectively, in the ChT/TRT group and 11.1 months, 8.5%, respectively, in the ChT group (P=0.000). The median progression-free survival (PFS) was 7.5 months and the 2-year PFS was 10.7%. The median survival and the 2-year PFS were 9.8 months, and 15.8%, respectively, in the ChT/TRTgroup and 5.6 months, 3.8%, respectively, in the ChT group (P=0.000). The median Local control (LC) and the 2-year LC rates were 19.2 months, and 46.1%, respectively, in the ChT/TRTgroup and 5.9 months, 5.7%, respectively, in the ChT group (P=0.000). Cox regression analysis showed that higher radiation dose has an favorable impact on OS (RR 0.944; rang, 0.919-0.970; P=0.000). In patients who received TRT dose more than BED 50Gy, the median survival time was 17.8 months and the 2 year OS was 34.7%; and they were 11 months and 20.9% in patients who received radiation dose <= BED 50Gy. The same situation was observed in LC (RR 0.966; rang, 0.933-1.000; P=0.049), which showed that the higher TRT dose predicted the superior LC. **Conclusion:** The addition of TRT to ChT improved the OS of patients with ED-SCLC. Furthermore, receiving higher dose of TRT were independent, favorable prognostic factors for OS and LC. The proper dose of TRT needs further investigation.