A Case of Abscopal Effect in Metastatic Non-Small-Cell Lung Cancer treated with Radiation therapy and Oncothermia

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Introduction

During the last decade, there has been an amazing progress in cancer research and treatment in the world and also in Korea. Nevertheless, the overall 5 year survival rate of lung cancer patients in 2001 2005 period was still 15.6% in South Korea. This type of cancer is usually diagnosed in advanced stage, consequently the overall survival did not show noticeable improvement.
Poor performance status and/or multiple co morbidities limit the treatment options for elderly patients. Their poor prognosis is commonly accompanied with a common refusal of cytotoxic chemotherapies even though adequate chemotherapy would be available with acceptable expected tolerance. In such cases radiotherapy can be considered as curative or palliative treatment option . The abscopal effect proposed by R.H. Mole in 1953, is originally defined as the observational effect of radiation therapy at site distant to the treated field. Recently systemic effects of local radiotherapy including hyperthermia and immunotherapy have received attention as a new therapeutic modality. We report a case of abscopal effect observed in a patient with multiple metastatic non small cell lung cancer. Patient was treated with fractional radiotherapy, modulated electro hyperthermia (oncothermia) and granulocyte macrophage colony stimulating factor (GM CSF).

Case Report

A 72 ear old male patient was diagnosed with unclassifiable NSCLC by lung biopsy at other hospital in July 2009. The classification of the tumor at first diagnosis was cT2N2M0, stage IIIB (**Fig. 1**). Despite of the advanced case the patient refused any treatment. Five months later (December 2009), he visited outpatient department of complementary and alternative medicine with complaints of hemoptysis and dyspnea on exertion gradually worsened 4 weeks before. He was referred to medical oncology department and admitted for re evaluation. Staging work up including chest CT and PET scans showed 9.5cm sized cavitary mass at right middle lobe with multiple regional and metastatic l mph nodes. He had no co morbidities and no medical histor . However, he still refused chemotherapy and together with his family members requested other possible treatment options. In these circumstances we made radiotherapy in combination with oncothermia and GM CSF expecting to induce abscopal effect. Local field radiation therapy to lung mass was delivered at a dose of 1.7 Gy in 28 daily fractions for 5 6 treatments in a week (**Fig. 2**). It was followed by oncothermia after radiation 3 times a week. After 2 weeks of treatment, GM CSF (250 microgram, Leukine®, USA) was administered subcutaneously once a day for 10days. Treatments were provided without any complications. Patient presented no severe adverse effects except grade 1 fatigue at the end of treatment period. By follow up process, just after finishing radiation treatment series PET scan showed nearly complete remission in multiple metastatic lymph nodes, which were distantly away from radiotherapy field (**Fig. 3**) Patient was satisfied and discharged with successful response. The follow up of the patient is continuing.

Conclusion

Our case describes a successful abscopal effect with local radiotherapy in combination with oncothermia and GM CSF immune stimulation. This combination attempt seemed to be more effective in immune response than radiotherapy alone. Further studies on the abscopal effect are necessary to evaluate action mechanism and the significance of cancer treatment option.

References

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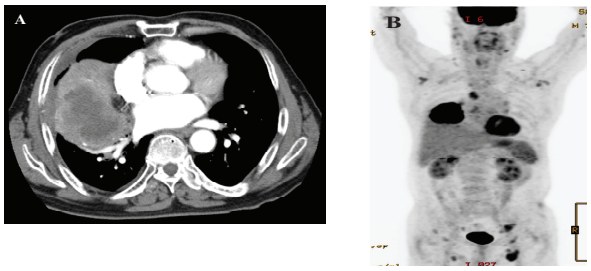

Fig. 1. CT chest scan (A) and whole body FDG PET scan (B) of the patient. About 9.5 cm sized huge lung mass with central necrosis was detected in right lower lobe and the mass had a hypermetabolic walled cavity. Multiple metastatic lesions were also showed in both of neck, axillas, inguinal regions and mediastinum including right hilum.

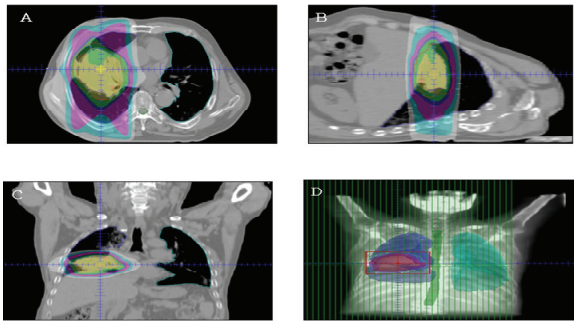

Fig. 2. Multi leaf collimator (MLC) shaping surrounding target and radiation dose distribution in 3 directions for a patient with metastatic non small cell lung cancer. Scheme of the axial(A), sagittal(B) and coronal(C) images show the radiation dose distribution for lung mass of primary site. The isodose distribution of individual colors showed as ellow (100%), Green(95%), blue(90%), magenta(70%), cyan(50%) and white(30%) associated to prescribed dose. (D) MLC shaping in anterior beam's eye view.

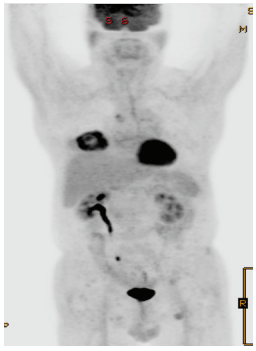

Fig. 3. FDG PET scan at the end of radiotherapy combining with hyperthermia and GM CSF. The image shows excellent response in lung mass of primary site which was irradiated and complete remission in all metastatic lesions which were outside the radiation field.