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Case report

Bronchiolitis obliterans organizing pneumonia after stereotactic ablative radiation therapy for lung cancer: A case report



Bronchiolite oblitérante avec organisation pneumonique après une radiothérapie ablative stéréotaxique pour le cancer du poumon : à propos d'un cas

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ABSTRACT

Bronchiolitis obliterans organizing pneumonia is an interstitial lung disease rarely occurring after radiotherapy probably due to an activation of autoimmune processes. Most cases have been described after postoperative radiotherapy for breast cancer. Corticosteroids represent the main treatment, prognosis is generally favorable. We described a case of bronchiolitis obliterans organizing pneumonia after stereotactic ablative radiation therapy for a recurrent lung cancer. Antibiotics and steroids were administered to solve the clinical picture. After three years, a new lesion at the right lung was found and treated with stereotactic ablative radiation therapy and concomitant long course of steroids with no recurrence of bronchiolitis obliterans organizing pneumonia. Bronchiolitis obliterans organizing pneumonia is a rare event after radiotherapy with undefined risk factors. In our case, steroids played an important role in management and, maybe, in preventing bronchiolitis obliterans organizing pneumonia recurrence after second course of stereotactic ablative radiation therapy.

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R É S U M É

La bronchiolite oblitérante avec organisation pneumonique est une pneumopathie interstitielle qui se manifeste après la radiothérapie, probablement à cause de l'activation d'un processus auto-immun. Plusieurs cas ont été décrits après une radiothérapie postopératoire pour cancer du sein. Les corticostéroïdes constituent le traitement de choix, le pronostic est généralement favorable. Nous rapportons un cas de bronchiolite oblitérante avec organisation pneumonique après radiothérapie en conditions stéréotaxiques pour cancer du poumon récidivant. Les antibiotiques et les corticostéroïdes ont été administrés pour résoudre le tableau clinique. Au bout de trois ans, une nouvelle métastase dans le poumon droit a été découverte, puis prise en charge par radiothérapie en conditions stéréotaxiques et une administration prolongée de corticostéroïdes sans réapparition de la bronchiolite oblitérante avec organisation

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pneumonique. La bronchiolite oblitérante avec organisation pneumonique est un événement rare sans facteurs de risque défini. Dans notre cas, les corticostéroïdes ont joué un rôle important pour le traitement et, probablement, pour prévenir un nouvel épisode de bronchiolite oblitérante avec organisation pneumonique après le deuxième cycle de radiothérapie en conditions stéréotaxiques.

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1. Introduction

Several studies have demonstrated the effectiveness of stereotactic ablative radiation therapy in managing early-stage non-small cell lung cancer and recurrent or metastatic pulmonary lesions [1,2]. Stereotactic ablative radiation therapy not only provides a high local control rate but also allows completely painless ambulatory treatment with a low incidence of adverse reactions [3].

The most frequent radiation-induced lung injuries are early radiation pneumonitis and late fibrosis [4]. Rare cases of bronchiolitis obliterans organizing pneumonia are described after radiotherapy; most cases have been reported after breast-conserving therapy, few cases for lung tumors both after long course thoracic radiotherapy and after stereotactic ablative radiation therapy [5,6]. Patient- and treatment- related characteristics influencing bronchiolitis obliterans organizing pneumonia occurrence in patients treated with radiotherapy remain unknown.

We describe the case of a woman who developed a bronchiolitis obliterans organizing pneumonia syndrome after a stereotactic ablative radiation therapy for isolated recurrent non-small-cell lung cancer. Because of a single metachronous lung metastasis, this patient received a second course of stereotactic ablative radiation therapy without the development of a second bronchiolitis obliterans organizing pneumonia appearance.

2. Case report

The patient was a 76-years-old smoking woman with no significant comorbidities (in particular, absence of previous diagnosis of tuberculosis, asthma, collagen vascular disease or allergic disease). She expressed written informed consent for research and scientific purpose. Her oncologic history started with a surgical resection of the left upper lobe for a squamous cell carcinoma (pT2 cN0 cM0). Seven years later, the patient was diagnosed with multifocal recurrence of the right lung treated with surgery (middle lobectomy with mediastinal lymphadenectomy hilum en bloc with segmentectomy of the upper lobe and dual wedge of the lower lobe).

Four years after the second surgery, a follow-up computed tomography (CT) scan showed a new-suspected lesion in the right lower lobe. Corticosteroids and antibiotic were administered for two weeks in order to exclude an inflammatory lung process. Two months later a new CT scan demonstrated an increase (11 mm vs. 5 mm) of the nodule size. A subsequent fluorodeoxyglucose (FDG)-positron emission tomography (PET)-CT showed a pathologic glucose uptake. The patient refused biopsy and, after a multidisciplinary discussion, she was referred for hypofractionated radiotherapy.

Therefore, in 4 months later, the patient received stereotactic ablative radiation therapy up to a total dose 54 Gy (prescribed at ICRU point) administered in three fractions (18 Gy per fraction), every other day. Treatment planning system in use was iPlannet version 4.1.1 with Pencil Beam calculation algorithm and heterogeneities correction. Dynamic conformal multi-arc therapy was employed using a X 6MV linear accelerator. Planning target volume was 17 cm³. The mean lung dose was 3.97 Gy. The percent of lung volume that received 20 Gy was 4% and the volume that received 30 Gy was 3% (Fig. 1). Before each fraction, premedication with 4 mg

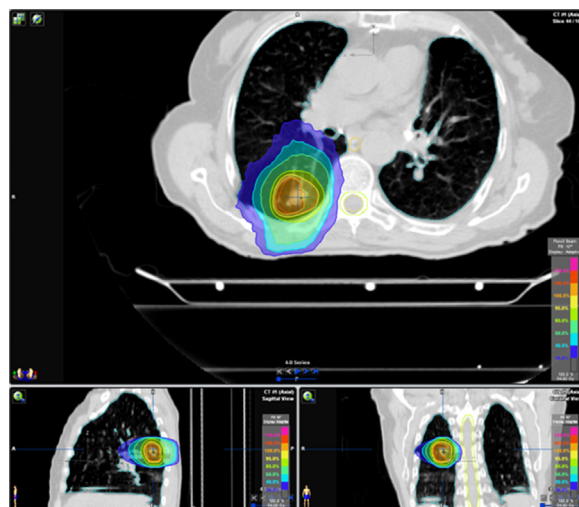


Fig. 1. Stereotactic ablative radiation therapy planning in a 76-year-old woman with a recurrent lesion in the right lower lobe. Image with isodose lines shows the highly conformal dose distribution on the target volume. Blue represents areas receiving 30% of the dose.

Planification d'une radiothérapie ablative en conditions stéréotaxiques chez une patiente de 76 ans atteinte d'une lésion récidivante dans le lobe inférieur droit du poumon. Les lignes d'isodose montrent une bonne conformation de la dose au niveau du volume cible. La couleur bleue représente la région recevant 30% de la dose.

of dexamethasone was administered according to our institutional policy to prevent acute side effect.

Four months after the end of the treatment, the patient referred a persistent fever (37.5 °C) and mild dyspnea at rest, worsening during daily activity. A chest radiography showed an extensive infiltrative opacities spread over the right lower lobe. Antibiotic was prescribed for ten days without any clinical improvement. Because of progressive symptoms worsening, oxygen desaturation (90%), neutrophilic leukocytosis (white blood cell $14.73 \times 10^3/\text{mL}$, 84% neutrophil granulocytes), a steroid treatment (prednisone 25 mg for 10 days) was added with clinical benefit and fever resolution 5 days after. The steroid dosage was gradually reduced over the following 10 days. A subsequent chest radiograph showed a partial attenuation of the lung opacities.

One month later, the patient presented again with cough, slight increase of plasma inflammatory markers, oxygen desaturation (90%) and new patchy opacity in the left lower lobe contralateral to the site of radiotherapy at chest CT (Fig. 2). Oral and intramuscular antibiotics were prescribed for 10 days without clinical improvement. Because of worsening dyspnea, hypocapnia at blood gas analysis, oxygen desaturation (89%) and persistent opacity in the left lung at chest radiography and patient underwent a bronchoscopy. Cultures for bacteria, fungi and mycobacteria as well as bronchioloalveolar lavage cytology were negative. Steroids and antibiotics were therefore administered with improvement of clinical symptoms and radiological signs. Furthermore, inhalation steroids and bronchodilator (budesonide and formoterol) therapy was started.

Ten months after stereotactic ablative radiation therapy the patient was asymptomatic and the CT images showed definite

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