Radiology Case Reports 17 (2022) 3979–3981

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Pneumocystis pneumonia in patient with lung adenocarcinoma: early side effects from pembrolizumab ☆

Zahi Hiba, MD, Hosni Abdelmoughit, Iraqi Houssaini Zaynab, Jerguigue Hounaida, Latib Rachida, Omor Youssef*

Radiology Department, National Institute of Oncology, Ibn Sina Hospital, Mohammed V University, Rabat, Morocco

ARTICLE INFO

Article history:
Received 12 May 2022
Revised 20 July 2022
Accepted 23 July 2022

Keywords:
Pembrolizumab
Lung cancer
Pneumocystis
CT

ABSTRACT

Immune check point inhibitor has made far-reaching changes in the management of lung adenocarcinoma improving drastically the prognosis. We present a case of a 50 years old women beneficiary of pembrolizumab who has suffered an acute pneumonitis diagnosed with CT imaging the days following the initiation of the drug. The occurrence of immune-related events such as pneumonitis complicates the use of immunotherapy and requires a well verse radiologist in the matter to diagnosis and helps prevent further aggravation.

Introduction

Immunotherapy also known as immune check-point inhibitor transformed the management of patients with advanced cancers. The use of these molecules has revealed new side effects commonly called immune-related adverse events. These side effects are yet to be well-described and classified in literature as their clinical, biological, and radiological manifestation are still to be reported.

As for our case, Pneumonitis is a potentially lethal side effect of immune checkpoint inhibition, occurring in 1%-5% [1,2] and it can occur in patients treated with pembrolizumab for lung adenocarcinoma, manifesting a rapidly evolving penumocystis pneumonia right after the first use of this drug.

Case report

We report a case of 50 years old women known to be a heavy chronic smoker, diagnosed for a locally advanced lung adenocarcinoma (Fig. 1). The patient received induction chemotherapy (carboplatin/paclitaxel) for 2 cycles. At the end of the third cycle of carboplatin, the patient went into anaphylactic shock. After studying the immunohistochemical profile of the tumor,

☆ Competing Interests: The authors declare that they have no competing interests.

* Corresponding author.
E-mail address: hbzahi@gmail.com (Z. Hiba).

https://doi.org/10.1016/j.radcr.2022.07.083

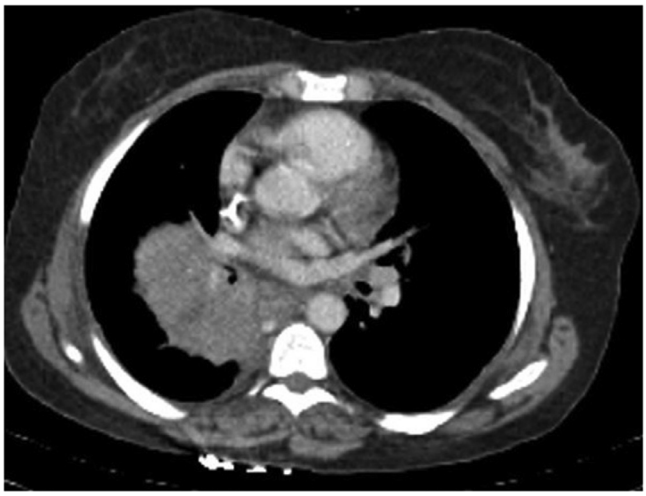

Fig. 1 – Axial chest CT image (soft tissue window) revealing a cancerous mass at the right lower pulmonary lobe invading the posterior mediastinum and involving the inferior pulmonary vein.

the decision was made to introduce pembrolizumab in the patient's treatment protocol.

Three days after her first pembrolizumab administration, the patient experienced dyspnea, productive cough, myalgia and night sweats. She rapidly became hypoxemic with an oxygen saturation of 75%, a heart rate of 120 beats per minute, a respiratory rate of 20 breaths per minute and a temperature of 38°C.

Chest CT scan was performed and showed diffuse ground glass nodules associated with parenchymal opacities with air bronchogram at the inferior lung lobe in addition to disseminated thickening of the interlobular interstitium related to acute interstitial lung disease (Fig. 2).

The patient started intravenous and oral corticotherapy, nevertheless her clinical condition worsened with increasing fever, another chest CT scan was realized and described exacerbation of the pre-existing lesions, the appearance of several ground-glass areas associated with septal thickening forming the crazy paving pattern (Fig. 3). A bronchoscopy with broncho-alveolar lavage confirmed the diagnosis of pneumocystis pneumonia. A treatment has been initiated based on trimethropin/sulfamethozal without significant improvement and the patient died 2 days later in intensive care. The patient family refused a postmortem autopsy.

Discussion

Immune check point inhibitor is one of the most revolutionary treatments for advanced cancers. This treatment allowed obvious improvement tumor progression and overall survival [3]. This class of drugs targets a specific group of antigens: the cell surface receptors cytotoxic T-lymphocyte antigen-4 (CTLA-4), programmed cell death protein 1 (PD-1), or programmed cell death ligand 1 (PD-L1) [4]. The mechanism of action of this type of treatment is responsible for immune related adverse events including pneumonitis.

The imaging response patterns from immune check point inhibitor vary from chemotherapies and fall within the scope of acute interstitial lung disease. Naidoo et al [5] had previously classified and distributed the CT findings of 43 patients under immunotherapy with pneumonitis: ground-glass opacities (37%), interstitial (22%), cryptogenic OP (19%), hypersensitivity (7%), and unclassified (15%).

Pneumonitis commonly occurs in patients who have non-squamous cell lung cancer 4.1% and renal cell carcinoma 4.1%, compared with patients with metastatic melanoma 1.6% [3]. The vulnerability to pneumonitis in lung cancer patients can most often be explained by smoking exposure associated with the presence of an underlying pulmonary pathology [6,7].

The start of pneumonitis can be variable, Nishino et al [3] confirmed in a study that the median time to onset the induced pneumonitis ranging from 0.5 months to 11.5 months. In other study by Delaunay et al found that the patients with lung cancer get the pneumonitis earlier than the patient with melanoma, with median time to start between 2.1 and 5.2 months [8].

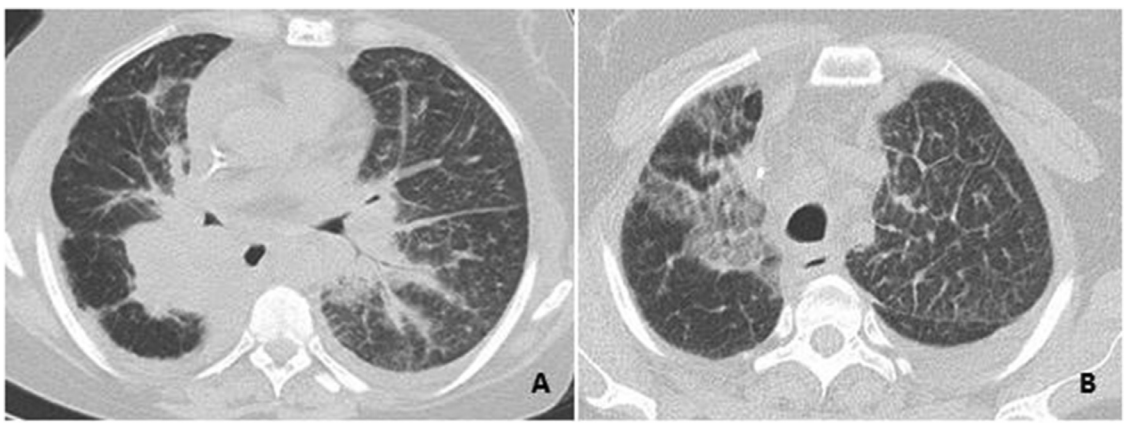

Fig. 2 – Axial chest CT images showing diffuse interstial pneumopathy associated with decreased pulmonary mass (A) thickening of the interlobular interstitium with bronchial wall thickening. (B) Ground glass opacities.

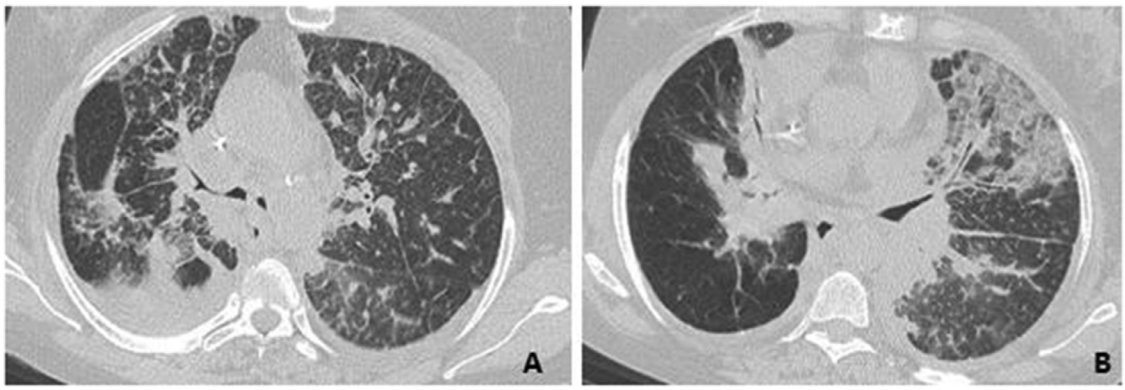

Fig. 3 – Axial Chest CT images (A), (B) revealing an exacerbation of interstial pneumopathy with diffuse ground glass.

Pneumocystis pneumonia is an opportunistic fungal pathogen that causes an often-lethal pneumonia in immunosuppressed individuals [9]. In literature 5 cases of pneumocystis pneumonia secondary to immune check point inhibitor have been reported so far [10,11]. The occurrence of pneumocystis is accentuated by corticosteroid treatment of pneumonitis. Radiological patterns of pneumocystis are similar to interstitial pneumonitis and represent one of the main differential diagnoses to be mentioned in the radiological report [12].

Conclusion

Immune check point inhibitor (pembrolizumab) has revolutionized cancer treatment. In this case we present a patient with lung adenocarcinoma who develops after pembrolizumab therapy one of the rarest and earliest side effects.

The pneumocystis represents one of the severe diagnostic to be feared in a patient with pembrolizumabas treatment.

Patient consent

Written informed consent for publication was obtained from patient.

REFERENCES

[1] Garon EB, Rizvi NA, Hui R, Leighl N, Belmanoukian A, Eder JP, et al. Pembrolizumab for the treatment of non–small-cell lung cancer. N Engl J Med 2015;372:2018–28. doi:10.1056/NEJMoa1501824.

[2] Sano T, Uhara H, Mikoshiba Y, Kobayashi A, Uchiyama, R, Uchiyama R, et al. Nivolumab-induced organizing pneumonia in a melanoma patient. Jpn J ClinOncol 2016;46:270–2.

[3] Nishino M, Giobbie-Hurder A, Hatabu H, Ramaiya NH, Hodi FS. Incidence of programmed cell death 1 inhibitor-related pneumonitis in patients with advanced cancer: a systematic review and meta-analysis. JAMA Oncol 2016;2(12):1607–16.

[4] Immune checkpoint inhibitor therapyrelated pneumonitis: patterns and management Radiographics 39(7):1923–1937.

[5] Naidoo J, Wang X, Woo KM, Iyriboz T, Halpenny D, Cunnigham J, et al. Pneumonitis in patients treated with anti-programmed death-programmed death ligand 1 therapy. J Clin Oncol 2017;35(7):709–17.

[6] Cui P, Liu Z, Wang G, Ma J, Qian Y, Zhang F, et al. Risk factors for pneumonitis in patients treated with anti-programmed death-1 therapy: a case-control study. Cancer Med 2018;7(8):4115–20.

[7] Ahn MJ, Gandhi L, Hamid O, Hellmann MD, Garon EB, Ramalingam SS, et al. 459P Risk of pneumonitis in patients with advanced NSCLC treated with pembrolizumab in KEYNOTE-001. Ann Oncol 2015;26:ix125.

[8] Delaunay M, Cadranel J, Lusque A, Meyer N, Gounant V, Moro-Sibilot D, et al. Immune-checkpoint inhibitors associated with interstitial lung disease in cancer patients. EurRespir J 2017;50(2):1700050.

[9] Update on the diagnosis and treatment of Pneumocystis pneumonia Eva M. Carmona and Andrew H. Limper *Therapeutic advances in respiratory disease*, 2011, vol. 5, no 1, p. 41-59.

[10] Schwarz M, Kocher F, Niedersuess–Beke D, Rudzki J, Maximilian H, Widman G, et al. Immunosuppression for immune checkpoint–related toxicity can cause Pneumocystis jiroveci pneumonia (PJP) in non–small–cell lung cancer (NSCLC): a report of 2 cases. Clin Lung Cancer 2019;20:e247–50.

[11] Slevin F, Mulatero C, Marples M. Pneumocystis jiroveci pneumonia in a patient with melanoma treated with infliximab and corticosteroids for ipilimumab–associated colitis Glob. Dermatology 2016;3:381–4.

[12] Sadek M, Loizidou A, Drowart A, Van den Wijngaert S, Gomez-Galdon M, Aspeslagh S. Pneumocystis infection in two patients treated with both immune checkpoint inhibitor and corticoids. Journal of Immunotherapy and Precision Oncology 2020;3(1):27–30.