



COVID-19 Vaccine-Induced Axillary Level I-III Lymphadenopathy in Lung Adenocarcinoma Patients on PET Scan - Case Report

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Abstract

Introduction: Coronavirus Disease 2019 (COVID-19), caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has caused the ongoing global pandemic. It can manifest a wide range of complications depending upon the severity of infection and comorbidities of the patient. Therefore, vaccines are a significant measure to protect from COVID-19. Record as of August 29th, 2021, the COVID-19 pandemic worldwide in a total confirmed number of cases, 216 million cases, and 4.49 million cases of death. In Taiwan, 15,954 in a total number of diagnosed cases and 833 cases of death. Making it one of the deadliest pandemics in history.

Case Report: We report two cases, one of a 64-year-old female with the medical history of adenocarcinoma of lung over left upper lobe status post lobectomy of left upper lobe and mediastinal lymph node dissection in 2012, pT2aN0M0, stage IB, under oral chemotherapy with UFUR for 2 years; complicated with supraclavicular lymph node metastasis and EGFR exon 19 deletion mutation status post supraclavicular lymph node excisional biopsy in February 2018, ypT2aN3M0, stage IIIB, under target therapy with Iressa till present days in 2021. The other is a 70-year-old male with a medical history of adenocarcinoma of lung over left upper lobe status post wedge resection of left upper lobe and mediastinal lymph node dissection in August 2021, pT1bN0M0, stage IA2. Both cases, who were underwent imaging with Positron Emission Tomography (FDG PET/CT) scan for diagnosis staging, has found to have hypermetabolic uptake (SUV_{max}: 5.3) in the dominant vaccinated side of deltoid muscle of ipsilateral left axillary level I-III lymph nodes due to the 1st dose of Moderna COVID-19 vaccine (mRNA-1273, Spikevax) administrated one month ago before (FDG PET/CT) scan.

Conclusion: After reviewing the literature, ipsilateral injection side axillary lymphadenopathy has been reported. Therefore, especially in oncology patients, detailed history regarding COVID-19 vaccination inoculation time and injected arm should be obtained before imaging to ensure the accuracy of the staging/restaging and to avoid unnecessary biopsy and the possibility of a misdiagnosis.

Introduction

Coronavirus Disease 2019 (COVID-19), caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has caused the ongoing global pandemic. Record as of August 29th, 2021; The COVID-19 pandemic worldwide in a total confirmed number of cases, 216 million cases, and 4.49 million cases of death. In Taiwan, 15,954 in a total number of diagnosed cases and 833 cases of death. Making it one of the deadliest pandemics in history. The COVID-19 pandemic has resulted in severe global social and economic disruption; it has exacerbated widespread supply shortages by panic buying, agricultural disruption, food shortages, and decreased emissions of pollutants. As a result, numerous educational institutions and public areas have been partially or fully closed, restricted freedom of daily life activities, and canceled or postponed many events. Furthermore, delayed the illness patients' treatment on schedule or the limitation of medical supplies due to shortage of production materials, local or international traffic transportation, etc., has led to the

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Received Date: 09 Sep 2021

Accepted Date: 22 Sep 2021

Published Date: 27 Sep 2021

Citation:

Tsai C-Y, Hsia J-Y, Huang H-C, Chen C-Y, Weng J-H, Kao P-F.

COVID-19 Vaccine-Induced Axillary Level I-III Lymphadenopathy in Lung Adenocarcinoma Patients on PET Scan - Case Report. *Ann Clin Case Rep.* 2021; 6: 2011.

ISSN: 2474-1655

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potential of life-threatening issue of ethics chaos. Misinformation has circulated through social or mass media; the political tensions have even expanded internationally. In addition, the pandemic has triggered racial and geographic discrimination and the balance between public health requirements, ethics, and individual rights. Initially, it is manifesting in the respiratory system. Most people under infection with COVID-19 usually experience mild to moderate symptoms and recover without special treatment. However, severe illness with life-threatening may appear and require medical intensive care attention. It can occur wider in systemic complications, such as neurology, gastrointestinal, cardiovascular, thromboembolic coagulation, and immune system, leading to multiple organ dysfunction. Therefore, the need for vaccines to prevent Severe Acute Respiratory Syndrome Coronavirus 2 (SARS- CoV-2) infection is considered the method as the light in the dark for controlling the pandemic worldwide. COVID-19 vaccines can cause mild, short-term adverse effects, such as low-grade fever, joint or muscle pain, or redness at the injection site; mostly, symptoms subside within days. The possibility of severe or long-lasting adverse effects of vaccines can occur but is extremely rare.

Case Presentation

We report two cases, one of a 64-year-old female with the medical history of adenocarcinoma of lung over left upper lobe status post lobectomy of left upper lobe and mediastinal lymph node dissection in 2012, pT2aN0M0, stage IB, under oral chemotherapy with UFUR for 2 years; complicated with supraclavicular lymph node metastasis and EGFR exon 19 deletion mutation status post supraclavicular lymph node excisional biopsy in February 2018, ypT2aN3M0, stage IIIB, under target therapy with Iressa till present days in 2021. The other is a 70-year-old male with a medical history of adenocarcinoma of lung over left upper lobe status post wedge resection of left upper lobe and mediastinal lymph node dissection in August 2021, pT1bN0M0, stage IA2. Both cases, who were underwent imaging with Positron Emission Tomography (FDG PET/CT) scan for diagnosis staging, has found to have hypermetabolic uptake (SUVmax: 5.3) in the dominant vaccinated side of deltoid muscle of ipsilateral left axillary level I-III lymph nodes due to the 1st dose of Moderna COVID-19 vaccine (mRNA-1273, Spikevax) administrated one month ago before (FDG PET/CT) scan (Figure 1, 2).

Discussion

COVID-19 can manifest a wide range of complications depending upon the patient's severity of infection and comorbidities. Therefore, vaccines are a significant measure to protect from COVID-19. In Taiwan, the Moderna COVID-19 vaccine (mRNA-1273, Spikevax) and Oxford–AstraZeneca COVID-19 vaccine (AZD-1222, adenovirus ChAdOx, Vaxzevria) have received use authorization. After reviewing the literature, ipsilateral injection side axillary lymphadenopathy has been reported. SWENI et al. [1] report five cases undergoing FDG PET-CT demonstrating various uptake patterns, including an ipsilateral deltoid muscle, axillary, supraclavicular, and subpectoral lymph nodes post COVID-19 vaccination. In addition, Rebecca et al. [2] report a false positive as found in the FDG PET/CT scan compared to ultrasound exam in the left axilla of a woman treated for metastatic breast cancer after COVID-19 vaccination, which indicated no metastasis, and the lymphadenopathy was likely due to an immune response following the COVID-19 vaccination. Finally, Balraj et al. [3] report a case that developed left (ipsilateral) axillary and pectoral lymphadenopathy detected on FDG PET/CT scan 3



Figure 1: 64 year old female, FDG PET/CT scan coronal view showing hypermetabolic uptake in the left axillary level I-III lymph nodes (red arrow).

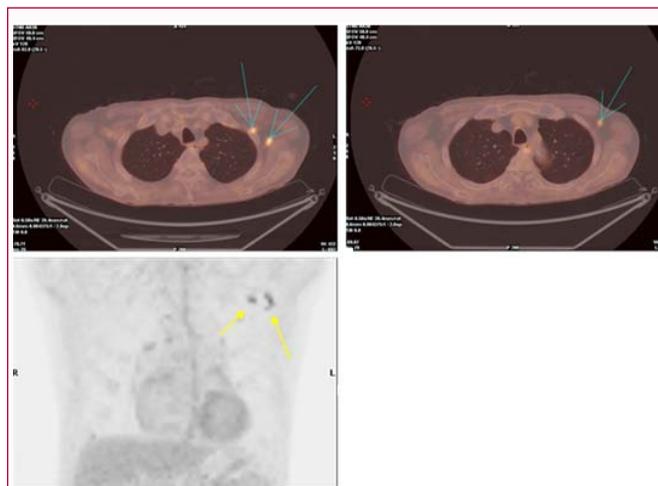


Figure 2: 70 year old female FDG PET/CT scan cross section view (blue arrow), and coronal view (yellow arrow) showing hypermetabolic uptake in the left axillary level I-III lymph nodes.

days after administration of the COVID-19 vaccine. Rafał et al. [4] report a case with metastatic melanoma that increased accumulated axilla lymph node uptake on FDG PET/CT scan 4 days after the AZD1222 COVID-19 vaccination. However, another FDG PET/CT scan scheduled one month later showed that it did not present any uptake accumulation in the reported lymph node compared to the previous scan; the lymphadenopathy occurrence was then verified as a false recurrent disease. Stephan et al. [5] showed in their reports that FDG PET/CT-avid lymph nodes ipsilateral to the vaccine injection in 54% of patients with a mean SUVmax of 5.1 (range 2.0 to 17.3). The avidity of lymph nodes is more frequent in the Moderna mRNA-1273 COVID-19 vaccine than in Pfizer-BioNTech COVID-19 vaccines, as 72% vs. 43% cases reported. Fernández et al. [6] describe 20 cases of acute onset of single supraclavicular lymphadenopathy manifesting between 24 h and 9 days after ipsilateral intramuscular administration of an mRNA-based COVID-19 vaccine; Comirnaty, Pfizer–BioNTech (Puurs, Belgium) in 19 cases or mRNA-1273, Moderna (Madrid, Spain) in one case. Results indicate that the swelling of supraclavicular lymph nodes following immunization may constitute a benign and self-limited condition. As in many clinical reports, the impact of

the COVID-19 vaccines on FDG PET/CT findings, the potential of common and longer-lasting regional lymphadenopathy observed on imaging as a result of higher uptake on the ipsilateral administration after the COVID-19 vaccines should be aware in the up following clinical practice since the pandemic has shown its affected power next to any of us worldwide.

Conclusion

We report two cases with lung adenocarcinoma who were underwent imaging with Positron Emission Tomography (FDG PET/CT) scan for diagnosis staging, has found to have hypermetabolic uptake (SUVmax: 5.3) in the dominant vaccinated side of deltoid muscle of ipsilateral left axillary level I-III lymph nodes due to the Moderna COVID-19 vaccine (mRNA-1273, Spikevax) administrated one month ago before FDG PET/CT scan. Therefore, detailed history regarding COVID-19 vaccination inoculation time and injected arm should be obtained before imaging to ensure the accuracy of the staging/restaging, inform patients of potential false-positive results to reduce patient anxiety, and avoid unnecessary biopsy following the COVID-19 vaccines have become widely available, especially in oncology patients, to prevent the possibility of a misdiagnosis.

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