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Case Report

Unilateral axillary lymphadenopathy following COVID-19 vaccination: A case report and imaging findings ☆,☆☆,★

*Jennifer Ledezma Dominguez, BS, Steven C. Eberhardt, MD, Jonathan W. Revels, DO**

Department of Radiology, University of New Mexico, MSC 10 5530, 1 University of New Mexico, Albuquerque, NM 87131, USA

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ABSTRACT

As more people receive coronavirus disease 2019 (COVID-19) vaccinations, the side effects of the vaccines will become more apparent. One reported side effect that has come to light is unilateral axillary lymphadenopathy ipsilateral to the vaccination site. In general, unilateral axillary lymphadenopathy has a broad differential including malignancy, infection, autoimmune disorder, and iatrogenic etiologies. We present a case of a previously healthy 38-year-old woman who received her first dose of Pfizer COVID-19 vaccination 3 days prior to presenting to the emergency department complaining of 2 weeks of abdominal pain and 20-pound unintentional weight loss. Unilateral axillary lymphadenopathy, ipsilateral to the vaccination site, was found on a contrast-enhanced computed tomography examination of the chest, abdomen, and pelvis. Subsequent diagnostic mammograms did not demonstrate evidence of malignancy; however, axillary ultrasound again revealed nonspecific lymphadenopathy. A short-term follow-up axillary ultrasound was recommended, rather than a lymph node biopsy, given the history of recent vaccination. At clinical follow-up, the patient's abdominal pain resolved and no further weight loss was noted. This case report discusses the key components and workup recommendation of unilateral axillary lymphadenopathy in the setting of COVID-19 vaccination.

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Introduction

As of March 2021, the World Health Organization (WHO) estimated over 129 million confirmed coronavirus disease 2019

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* Corresponding author.
E-mail address: Revels.DO@gmail.com (J.W. Revels).
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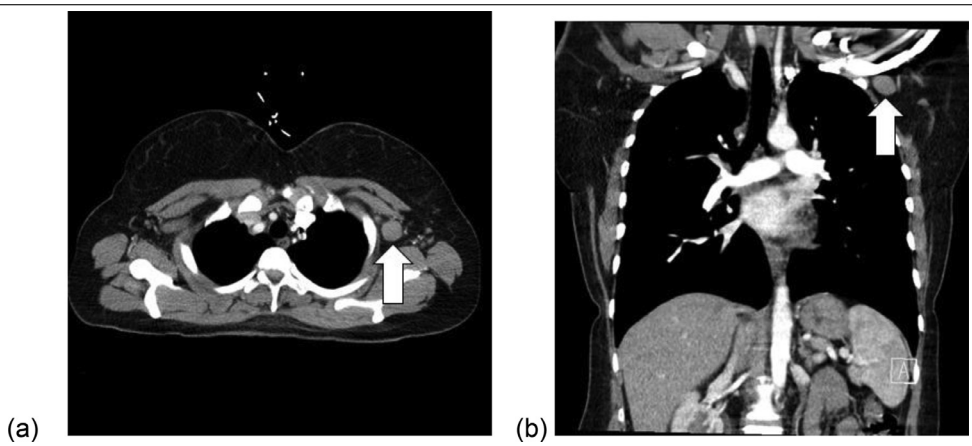

Fig. 1 – Contrast-enhanced computed tomography (CT) imaging of the chest, abdomen, and pelvis demonstrate an enlarged left axillary lymph node (arrow) measuring 2.2 x 2 cm on axial (a) and coronal planes (b).

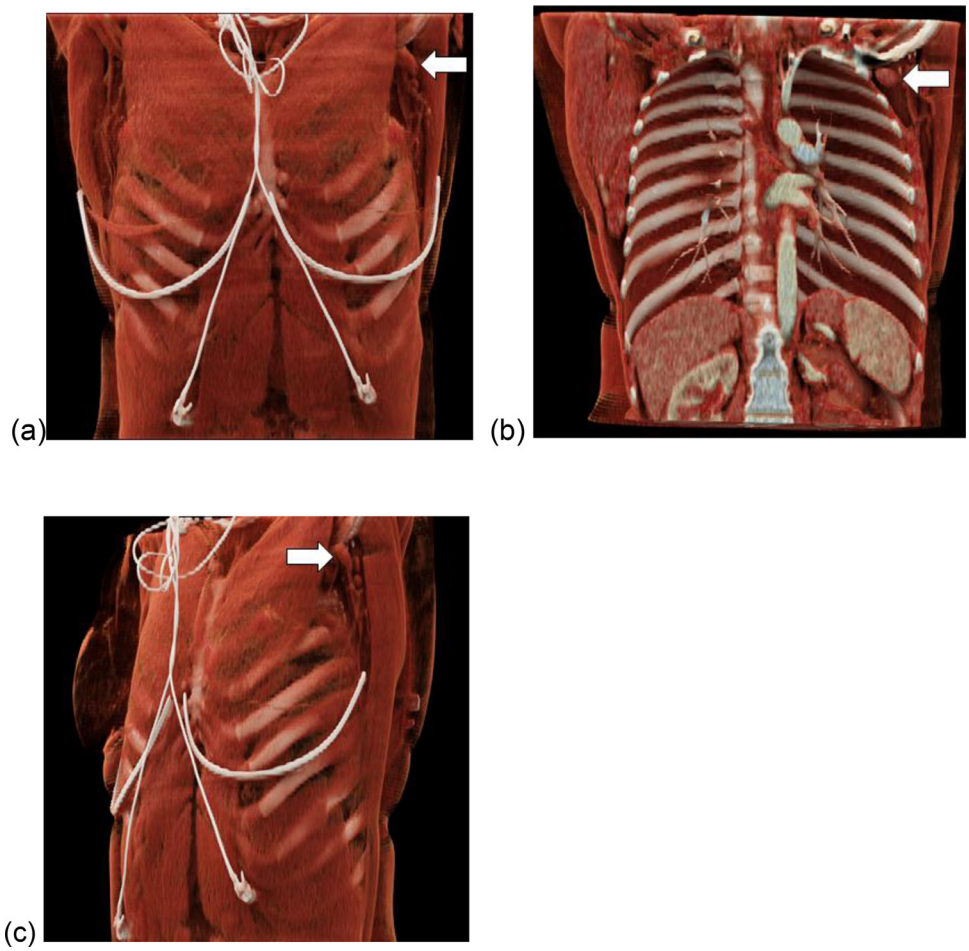

Fig. 2 – Cinematic rendering 3D projections demonstrate left axillary lymphadenopathy (arrows) in anterior (a), posterior (b), and oblique (c) planes.

(COVID-19) cases and 500 million vaccinations administered [1]. Axillary lymphadenopathy is not unique to the COVID-19 vaccine, and has also been reported in the influenza vaccine; however, recent studies suggest possibly higher rates of unilateral axillary lymphadenopathy with COVID-19 vaccines prompting updated recommendations for evaluation of patients in these instances [2]. As the number of vaccinations increases and time passes, more information will be learned and made available regarding the side effects and long-term impacts of the vaccines. Radiologists should be

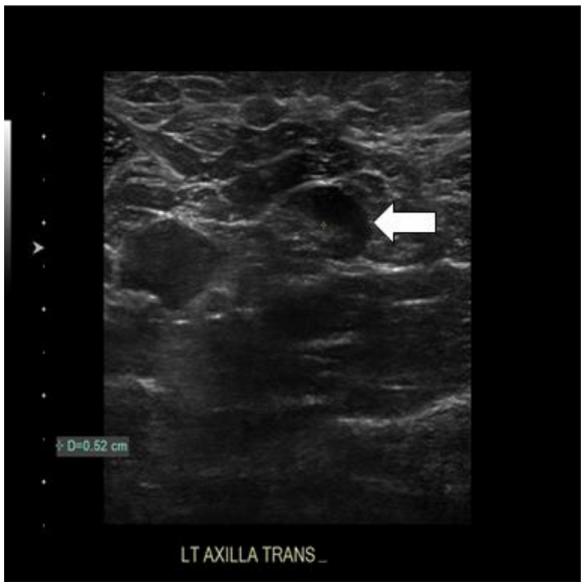

Fig. 3 – Ultrasound demonstrates multiple left axillary lymph nodes with cortical thicknesses measuring up to 0.5 cm (arrows). The lymph nodes had relative maintained reniform morphology with fatty hila.

familiar with this phenomenon so as to best guide patient care.

Case report

A previously healthy 38-year-old woman presented to the emergency department complaining of 2 weeks of diffuse abdominal pain and a 20-pound unintentional weight loss. The patient stated she had received her first does of the Pfizer COVID-19 vaccination 3 days prior to presenting to the emergency department. Laboratory results were normal with hemoglobin, hematocrit, platelet, and white blood cell counts within reference ranges. A metabolic panel was also normal with sodium, potassium, chloride, calcium, and phosphate values within reference ranges. Creatinine, blood urea nitrogen, and blood glucose were also normal within reference ranges. Thyroid stimulating hormone and total T4 were within reference ranges of normal. Human chorionic gonadotropic (HCG) was negative, indicating the patient was not pregnant. C-reactive protein and erythrocyte sedimentation rate were not elevated.

Contrast-enhanced computed tomography (CT) imaging of the chest, abdomen, and pelvis demonstrated an enlarged left axillary lymph node measuring 2.2 × 2 cm (Figs. 1 and 2). Follow-up axillary ultrasound and diagnostic bilateral mammograms were obtained 4 days later. The ultrasound demonstrated multiple mildly enlarged left axillary lymph nodes measuring up to 0.5 cm in cortical thickness, but with somewhat maintained reniform morphology and maintained fatty hila (Fig. 3). The diagnostic mammograms did not demonstrate evidence of malignancy (Fig. 4).

The patient's abdominal pain resolved over the subsequent weeks, and as mentioned in the history, this symptom was present prior to receiving the COVID-19 vaccination. Therefore, although no etiology was ultimately found for the patient's abdominal pain, it was unlikely to be vaccination related. To date, no etiology for the patient's weight loss has been found, but her weight remains stable. Clinically, the patient did not appear to develop any symptoms directly related to the COVID-19 vaccination, and the axillary lymphadenopathy was considered an incidental imaging finding.

Given the absence of any risk factors for breast cancer, and the decrease in size of the left axillary lymphadenopathy between the CT and the mammogram, the patient was reassured that the lymphadenopathy was very likely related to her recent COVID-19 vaccination. The patient was counseled that no further follow-up or interventions were needed unless she or her physician notes recurrence of the lymphadenopathy, or develops other worrisome breast or axillary symptoms.

Discussion

The release of COVID-19 vaccinations has led to the multiple publications regarding patients presenting with unilateral axillary lymphadenopathy after receiving their vaccination [1]. The presence of lymphadenopathy creates a broad differential; however, clinical history is key in suggesting a benign, postvaccination reactive etiology. Axillary lymphadenopathy ipsilateral to the site of a COVID-19 vaccination may be seen 1-2 days, and up to a few weeks, following vaccination [1]. A postvaccination immune response on ultrasound may demonstrate "hyperplastic axillary adenopathy" and "cortical thickening" of lymph nodes ipsilateral to vaccine administration site with an unremarkable contralateral axilla [1].

When a patient presents with unexplained axillary lymphadenopathy, a detailed history and physical exam can narrow down the potential cause significantly [3]. The mnemonic MIAMI (malignancy, infection, autoimmune disorder, miscellaneous, and iatrogenic) is a commonly used remembrance tool for the differential of lymphadenopathy. Risk factors for malignant lymphadenopathy include: ≥40 years of age, male sex, white race, supraclavicular location of the lymph nodes, and presence of systemic symptoms such as fever, night sweats, and weight loss [3]. Other features concerning for malignancy include lymphadenopathy lasting >4-6 weeks, as well as generalized lymphadenopathy.

The Society of Breast Imaging (SBI) has released recommendations for the management of unilateral axillary lymphadenopathy following administration of COVID-19 vaccinations. The SBI acknowledges that there do appear to be "higher rates of axillary adenopathy" with both the Pfizer and Moderna COVID-19 vaccines when compared to other vaccines, such as "BCG, influenza, and human papilloma vaccinations" [4]. The society suggests completing screening mammograms before COVID-19 vaccine administration, or delaying performing diagnostic mammograms until 4-12 weeks after receiving the second vaccine dose, if possible [4]. If this adjusted mammogram schedule cannot be performed, the SBI recommends patient education at the time of vaccine administration regarding the possibility of unilateral axillary lymphadenopathy as a side effect [4].

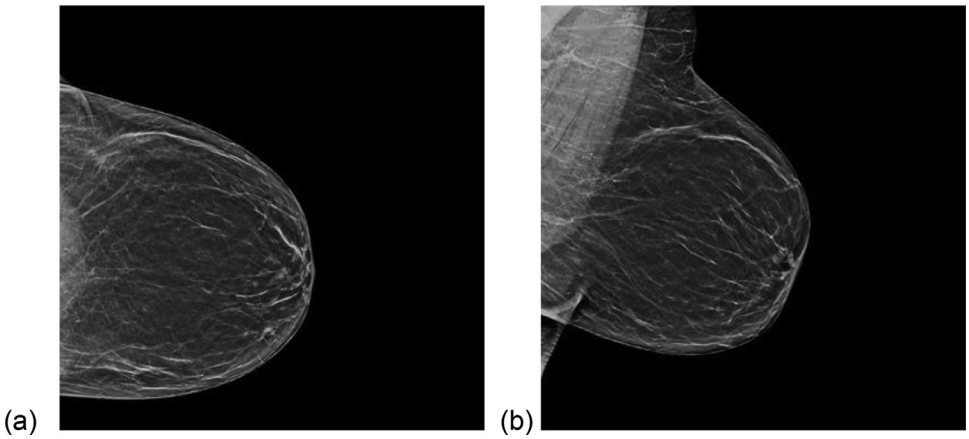

Fig. 4 – Diagnostic mammogram of the left breast is unremarkable with no evidence of malignancy in craniocaudal (a) and medial lateral oblique (b) projections.

When obtaining patient information prior to mammography, the SBI recommends documenting information regarding patient COVID-19 vaccination status, and if appropriate, the location of administration [4]. The presence of unilateral axillary lymphadenopathy should be considered a BI-RADS category 0 in the screening setting, and BI-RADS 3 in the diagnostic setting [4]. After additional work up is complete, follow-up mammography and axillary ultrasound can be considered in 4-12 weeks, which again should occur after administration of the second vaccine [4]. By performing a follow-up clinical examination shortly time after the second vaccine, vaccine-induced axillary lymphadenopathy will have the possibility of resolving and potentially avoiding the need for unnecessary additional imaging and biopsy. If at the 4-12 follow-up the axillary lymphadenopathy has not resolved, lymph node biopsy should be considered to exclude malignancy [4].

In our case, the patient presented with significant weight loss and lymphadenopathy, raising concern for a possible malignant process. Given that axillary lymph nodes are a lymphatic pathway for the breast, upper extremity, and thoracic wall, both a dedicated physical examination and imaging were appropriately directed toward these regions [4]. The normal serology findings in the patient decreased possibilities of hematologic etiologies, including lymphoproliferative disorders and autoimmune processes. As the breast imaging assessment demonstrated significant improvement in lymphadenopathy compared to the CT, no lymph node biopsy was deemed warranted.

Conclusion

As COVID-19 vaccines become widely available, unilateral axillary lymphadenopathy may be self-identified by patients or found incidentally on imaging examinations. These cases of unilateral axillary lymphadenopathy may lead to costly clinical and radiologic workups. Therefore, it is crucial to obtain patient vaccination information, including date and location of vaccination to help to ensure patients are followed up appropriately, and to help guide future management recommendations.

Patient consent statement

All patient identifying information has been stripped from the images and movie files. Additionally, no patient identifying information is used in the case report.

IRB statement

No IRB approval was required for this manuscript.

Author contributions

Neither this work—which has been approved by all co-authors—nor any part of its essential substance, or figures have been published or submitted to another scientific journal during the submission and review process.

According to *Authorship and Co-authorship Requirements for Manuscripts Submitted to Biomedical Journals* of International Committee of Medical Journal Editors (ICMJE), all the authors have made substantial contributions to: conception and design, drafting the article or revising it critically for important intellectual content, and final approval of the version submitted to the Journal.

REFERENCES

[1] World Health Organization. WHO coronavirus (COVID-19) dashboard. Available at: https://covid19.who.int/ [accessed 01.04.21].

[2] Mehta N, Sales RM, Babagbemi K, Levy AD, McGrath AL, Drotman M, et al. Unilateral axillary adenopathy in the setting

of COVID-19 vaccine. Clin Imaging 2021;75:12–15 doi: 10.1016/j.clinimag.2021.01.016. Epub ahead of print.
[3] Gaddey HL, Riegel AM. Unexplained lymphadenopathy: evaluation and differential diagnosis. Am Fam Physician 2016;94(11):896–903.
[4] Grimm L, Destounis S, Dogan B, Nicholson B, Dontchos B, Sonnenblick E, et al. SBI recommendations for the management of axillary adenopathy in patients with recent COVID-19 vaccination Society of Breast Imaging Patient Care and Delivery Committee. Available at: https://www.sbi-online.org/Portals/0/Position%20Statements/2021/SBI-recommendations-for-managing-axillary-adenopathy-post-COVID-vaccination.pdf [accessed 14.03.21].