



COVID-19 Vaccination Induced Lymphadenopathy in a Specialized Breast Imaging Clinic in Israel: Analysis of 163 cases

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Introduction: Following vaccination of Israeli population with Pfizer-BioNTech COVID-19 Vaccine, an unusual increase in axillary-lymphadenopathy was noted. This study assesses the rate and magnitude of this trend from breast-imaging standpoint.

Materials and Methods: Participants undergoing breast-imaging, in whom isolated axillary-lymphadenopathy was detected were questioned regarding SARS-CoV-2 vaccine to the ipsilateral arm. Patients' and imaging characteristics were statistically compared. In order to perform a very short-term follow-up, twelve healthy vaccinated medical staff-members, underwent axillary-ultrasound shortly after the second dose, and follow-up.

Results: Axillary-lymphadenopathy attributed to vaccination was found in 163 women undergoing breast-imaging, including *BRCA*-carriers. During the study, number of detected lymphadenopathies increased by 394% ($p = 0.00001$) in comparison with previous 2 consecutive years. Mean cortical-thickness of abnormal lymph-nodes after second dose vaccination was 5 ± 2 mm. Longer lymph-node diameter after second vaccination was noted (from 15 ± 5 mm, to 18 ± 6 mm, $p = 0.005$). In the subgroup of medical staff members, following trends were observed: in patients with positive antibodies, lymph-node cortical-thickness was larger than patients with negative serology ($p = 0.03$); lymph-node cortical-thickness decreased in 4-5 weeks follow-up ($p = 0.007$). Lymphadenopathy was evident on mammography in only 49% of cases.

Discussion: Vaccine-associated lymphadenopathy is an important phenomenon with great impact on breast-imaging clinic workload. Results suggest the appearance of cortical thickening shortly after both doses. Positive serology is associated with increased lymph-node cortical-thickness. In asymptomatic vaccinated women with ipsilateral axillary-lymphadenopathy as the only abnormal finding, radiological follow-up is probably not indicated. *BRCA*-carriers, although at higher risk for breast-cancer, should probably receive the same management as average-risk patients.

Key Words: COVID-19 vaccine; SARS-Cov-2; axillary lymphadenopathy; breast imaging; *BRCA*-carriers.

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INTRODUCTION

In December 2020, following the approval of the BNT162b2 COVID-19 vaccine (Pfizer-BioNTech COVID-19 Vaccine), a massive vaccination program of the Israeli population began. Within a few weeks, vaccination was offered to all Israelis over 16 years of age excluding those

with prior SARS-Cov-2 infection and pregnant women. At the time of reporting, 54.8% of the total population have been fully vaccinated, and 9% tested positive for the virus (Israel's Ministry of Health <https://govextra.gov.il/ministry-of-health/corona/corona-virus/>).

Our breast imaging center performs over 15,000 mammography exams and 3500 breast MRI's annually, the latter offered primarily to young women at high risk for developing breast cancer (e.g., *BRCA1 BRCA2* mutation carriers).

In early January 2021, an unusual increase in the number of radiologically detected and clinically palpable unilateral axillary lymphadenopathy in women undergoing breast imaging at our breast imaging center was noted. This increase encompassed women who underwent breast imaging as part of the average-risk population screening, for surveillance after diagnosis of breast cancer, and for high-risk screening in *BRCA1*

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