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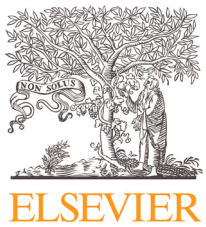

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Thymic hyperplasia after mRNA based Covid-19 vaccination

Introduction

Reactive lymphadenopathy with increased 18F-Fluordeoxyglucose (FDG) uptake in positron emission tomography (PET)/computed tomography (CT) scans occurs in up to 16% of patients after mRNA vaccination (BNT162B2, mRNA-1273) against severe acute respiratory syndrome coronavirus type 2 (SARS-CoV2). It has not yet been described for the adenoviral vector vaccine JNJ-78436735 [1,2] and only sporadically for AZD1222 [3]. Lymphadenopathy due to vaccination might confound initial disease assessment and restaging thereby hampering optimal therapy in patients with cancer.

It is known that, SARS-CoV-2 infection might lead to thymic hyperplasia [4] in addition to lymphadenopathy.

However, thymic hyperplasia has thus far not been described after SARS-CoV2 vaccination.

Case report

Here, we report the case of a 35-year-old female patient who was admitted to our hospital with first diagnosed mantle cell lymphoma (MCL).

No concomitant diseases were known. Patient reported no disease-related complaints and particularly no B symptoms. Physical examination as well as testing of laboratory values showed no pathological findings.

The diagnosis was made by resection of a coincidentally detected enlarged right cervical lymph node. Histopathologic findings showed partial infiltration with mantle zone proliferation and confluence. A Ki67 of <10%, expression of cyclin D1 and SOX11, and clonality of IgH were noted. Bone marrow biopsy excluded infiltration.

Shortly after diagnosis, the patient was vaccinated with mRNA-1273 in the left upper arm. The vaccination was well tolerated. On day +36 after vaccination, the patient showed a strong SARS-CoV-2 IgG antibody response (ELISA Euroimmun with ratio 8.80, positive over 1.1 ratio of patient sample/control sample) and weakly measurable T-cell immunity in Oxford Immunotec EliSpot from 5 spikes (T-SPOT.COVID positive over 6 specific spikes).

10 days after vaccination, an 18F-FDG PET/CT staging displayed moderately increased uptake in the cervical right region, but markedly increased uptake in the axillary left and anterior superior mediastinal regions (Fig. 1). Clinically, the axillary lymphadenopathy disappeared a few days after immunization.

Since radiotherapy with curative intent was planned and thymic involvement of MCL would have made localized radiotherapy unfeasible, a diagnostic thymus resection was performed [5]. Histology showed hyperplasia of the thymus without infiltration of the lymphoma (Fig. 1), possibly as an immunologic response to vaccination. Therefore, the patient is referred to local radiotherapy of the affected cervical lymph node region with curative intent.

Discussion

Our case brought out that markedly increased uptake in 18F-FDG PET/CT scans with temporal association to vaccination with mRNA-based vaccines may occur not only in regional lymph nodes but also in the thymus. In the context of cancer, it is critical to distinguish such immune responses from involvement by malignancy to avoid false positive staging results that may lead to inadequate treatment decisions.

Patient consent

Written informed consent for publication was obtained from the patient.

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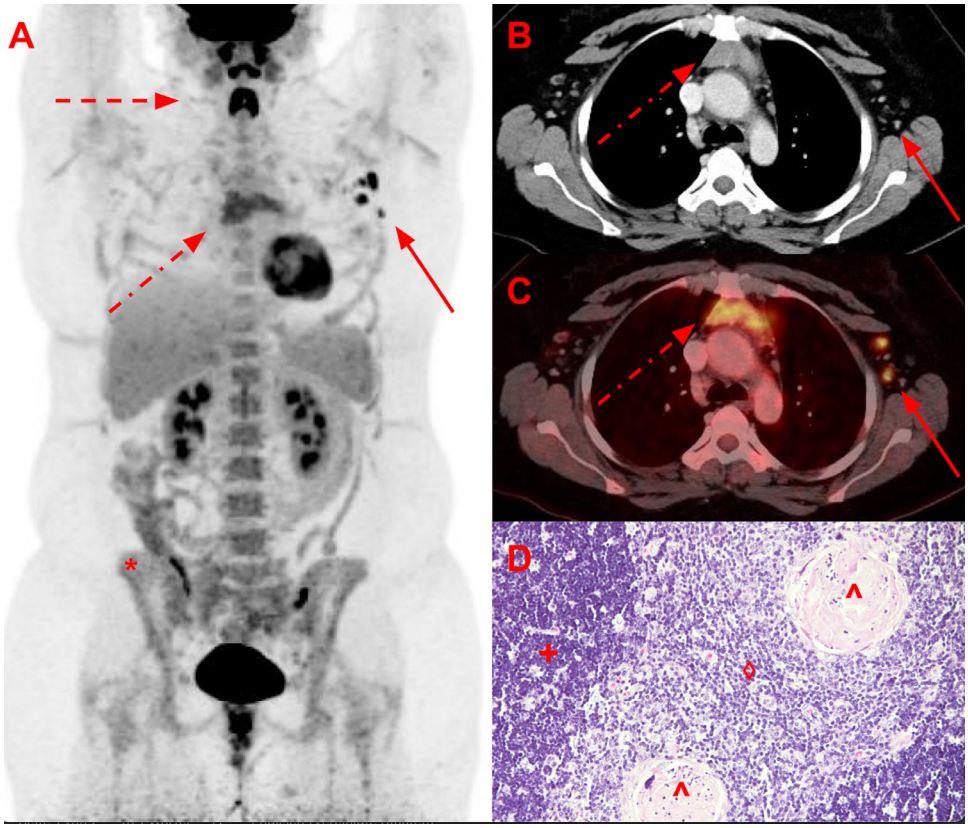

Fig. 1 – (A) Maximum intensity projection of the patient with only moderate tracer uptake in the detected right cervical mantle cell lymphoma (MCL, dashed arrow, Deauville 3), increased uptake in the thymus (dot-dashed arrow, Deauville 4) and left axillary reactive lymphadenopathy (arrow, Deauville 5), and moderate homogeneous uptake in the reactive bone marrow (asterisk, Deauville 3). (B) Axial CT slice of the same patient with hyperplastic thymus and small left axillary lymph nodes, both regions showing intense tracer uptake in PET/CT fusion (C). (D) Hemalaun and Eosin (HE) stained histological section of thymus showing classic structure of medulla (◇), cortex (+) and thymic corpuscles (^) and no signs of MCL

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