

Primary adrenal extranasal NK/T cell lymphoma with subcutaneous involvement demonstrated on FDG PET/CT

A clinical case report

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Abstract

Rationale: Primary adrenal non-Hodgkin lymphomas are predominant diffuse large B cell lymphoma with frequently bilateral adrenal involvement, but the occurrence of nasal type extranodal NK/T cell lymphoma is relatively rare.

Patient concerns: A 40-year-old woman complaining of left back pain for 2-month was admitted to our department.

Diagnosis: Based on the feature of enhanced computed tomography (CT) images which showed huge bilateral well-defined adrenal masses with heterogeneous enhancement, she was tentatively diagnosed as having primary adrenal malignancy. Postoperative pathology revealed the diagnosis of primary adrenal Epstein-Barr virus-associated nasal type extranodal NK/T-cell lymphoma.

Interventions: Then, she underwent ¹⁸F-fluoro-2-deoxy-D-glucose (¹⁸F-FDG) positron emission tomography (PET)/CT examination for staging, which showed homogeneously increased FDG uptake in the right adrenal gland and left thigh subcutaneous lesion, as well as heterogeneous increased FDG uptake in the left adrenal gland region with no abnormal uptake in the nasal cavity. Subsequently, the patient has performed 7 cycles of gemcitabine, L-asparaginase, ifosfamide, dexamethasone, etoposide (GLIDE) regimen and autologous stem cell transplantation.

Outcomes: Fortunately, the subsequent 2 follow-up FDG PET/CT scans within 1 year revealed complete resolution with no abnormal FDG uptake in the initially involved sites after 7 cycles of GLIDE chemotherapy and autologous stem cell transplantation.

Lessons: The enhanced CT and FDG PET/CT features of primary adrenal extranasal NK/T cell lymphoma are huge bilateral well-defined adrenal masses with heterogeneous enhancement, high FDG uptake, especially with subcutaneous involvement. And the awareness of this entity may help clinicians to differentiate it from other primary adrenal tumors and make reasonable therapeutic strategies. Besides, FDG PET/CT scan is very useful for the treatment follow-up of the primary adrenal extranasal NK/T cell lymphoma.

Abbreviations: ¹⁸F-FDG = ¹⁸F-fluoro-2-deoxy-D-glucose, CT = computed tomography, EBV = Epstein-Barr virus, NHL = non-Hodgkin lymphomas, PET/CT = positron emission tomography/computed tomography, PRA = plasma renin activity, SUVmax = maximal standardized uptake value.

Keywords: ¹⁸F-FDG PET/CT, primary adrenal extranasal NK/T cell lymphoma

1. Introduction

Extranodal NK/T cell lymphoma, usually with an NK cell phenotype and positivity for Epstein-Barr virus (EBV), is an extranodal non-Hodgkin lymphoma (NHL).^[1] And the most

common involved extranodal site is a nasal cavity, and others include the Waldeyer ring, upper airway, skin, gastrointestinal tract, testis, lung, thyroid, or adrenal glands.^[2–9] Primary adrenal NHLs are predominant diffuse large B cell lymphoma (>70%) with frequently bilateral adrenal involvement,^[10–13] but the occurrence of nasal type extranodal NK/T cell lymphoma is relatively rare. Herein, we report a case with primary bilateral adrenal NK/T cell lymphoma with subcutaneous involvement.

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The authors declare that there is no conflict of interests.

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2. Case report

A 40-year-old woman with a 2-month history of left back pain was admitted to our clinic. Physical examination revealed no abnormalities. Laboratory tests showed a slightly increased adrenaline and plasma renin activity (recumbent position) levels at 123 ng/L (reference range, 60–104 ng/L) and 2.6 ng/mL.h (reference range, 0.05–0.79 ng/mL.h), respectively. Abdominal enhanced computed tomography (CT) (Fig. 1A and C: axial; B and D: sagittal) presented well-defined bilateral adrenal masses with the diameter of 75 cm (Fig. 1 A and B, black arrows) and 31 cm (Fig. 1C and D, white arrows), showing heterogeneous

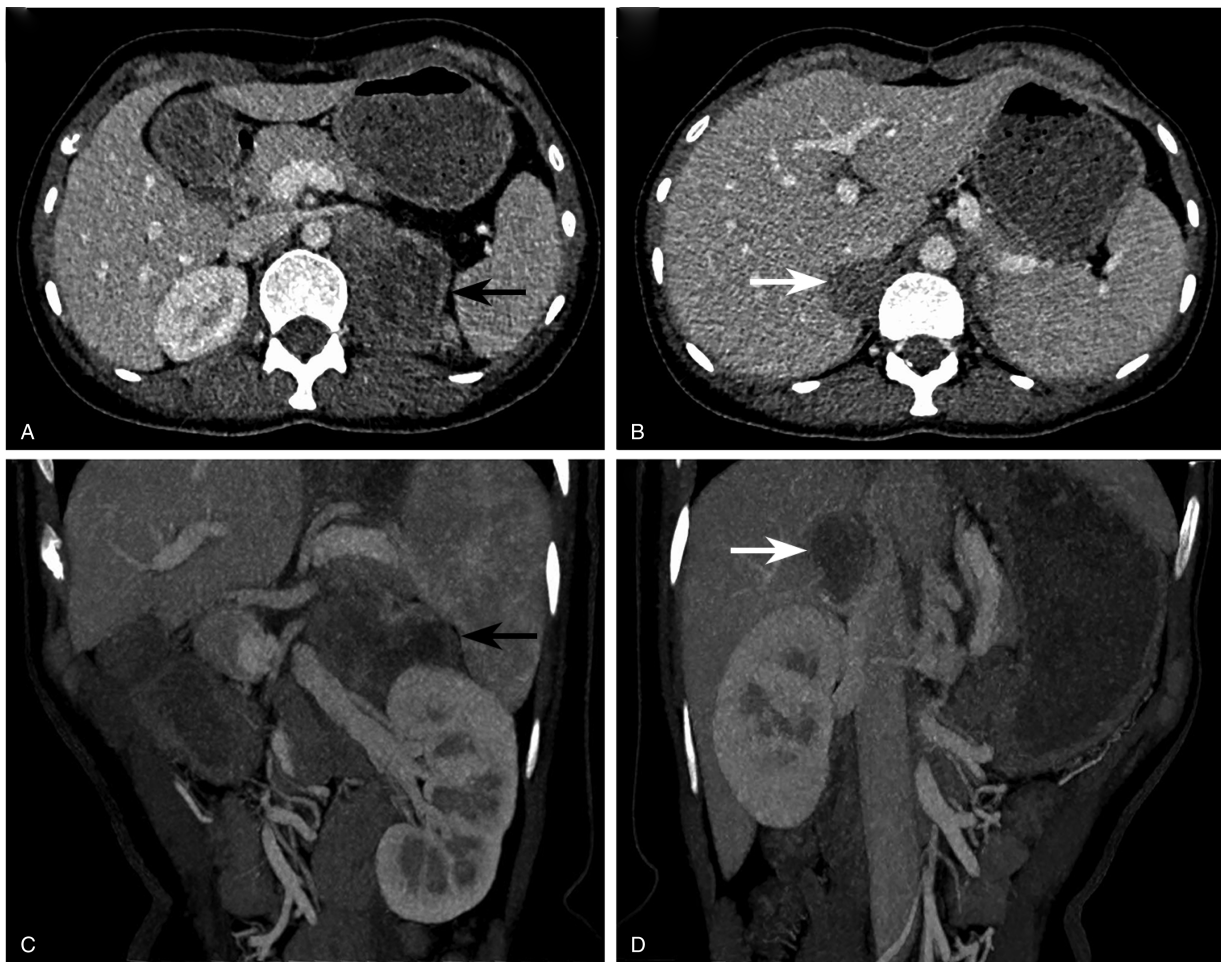


Figure 1. Abdominal enhanced CT (A and C: axial; B and D: sagittal) presented well-defined bilateral adrenal masses with the diameter of 7.5 cm (A and B, black arrows) and 3.1 cm (C and D, white arrows), showing heterogeneous enhancement, suggestive of primary adrenal malignancy. CT=computed tomography.

enhancement. She was tentatively diagnosed as having primary adrenal malignancy based on the CT findings.

Subsequently, the patient underwent left adrenalectomy and ipsilateral nephrectomy. Postoperative pathology showed proliferating lymphocytes with necrosis, infiltration of plasma cells and tissue cells. The immunohistochemical staining revealed that proliferative lymphocytes were positive for CD3 ϵ , CD30, CD56, granzyme B, EBER1/2-ISH, as well as a high proliferation index (Ki-67) of about 70%, but negative for PCK, CD20, CD5, CD4, CD8, CD21, or CD79a. Background plasma cells were positive for CD79a, CD138, Ig κ (P), Ig λ (P). No rearrangement peaks of the *TCR γ* gene were detected by gene rearrangement detection. Combined with the above morphological findings, immunohistochemical staining and gene rearrangement results, the diagnosis of EBV-associated nasal type extranodal NK/T-cell lymphoma was confirmed.

Subsequently, she underwent ^{18}F -fluoro-2-deoxy-D-glucose (^{18}F -FDG) positron emission tomography (PET)/CT examination for staging. PET/CT images showed homogeneously increased FDG uptake in the right adrenal gland (maximal standardized uptake value (SUV_{max}) of 15.7, Fig. 2A, H, I, and J: thick arrows) and left thigh subcutaneous lesion (SUV_{max} of 12.5, Fig. 2A, K, L, and M: arrows), as well as heterogeneous increased FDG uptake in the left adrenal gland region (SUV_{max} of 8.3, Fig. 2A, E, F, and G: thin arrows). The whole body PET/CT

revealed no abnormal uptake of FDG in the nasal cavity (Fig. 2A, B, C, and D), indicating that the bilateral adrenal masses might be primary lesions with subcutaneous involvement. Then, the patient has performed 7 cycles of gemcitabine, L-asparaginase, ifosfamide, dexamethasone, etoposide (GLIDE) regimen and autologous stem cell transplantation. Fortunately, the subsequent 2 follow-up FDG PET/CT scans within 1 year revealed complete resolution with no abnormal FDG uptake in the initially involved sites after chemotherapy and autologous stem cell transplantation (Fig. 2N and O).

The Ethics Committee of West China Hospital of Sichuan University, Chengdu, China, waived the need to obtain informed consent.

3. Discussion

Extranodal NK/T-cell lymphoma is a subtype of mature T- and NK-cell lymphomas that most often involve the nasal region (nasal NK/T-cell lymphoma), with a broad range of morphologic appearances, frequent necrosis, and angioinvasion.^[14] Extranodal NK/T cell lymphoma is most common in Asia (eg, China, Korea, and Japan) and in native populations of Central and South America (eg, Peru and Mexico), accounting for 5% to 10% of all NHL.^[15-17] The median age at presentation is approximately 52 years with a male predominance.^[17,18] Primary adrenal

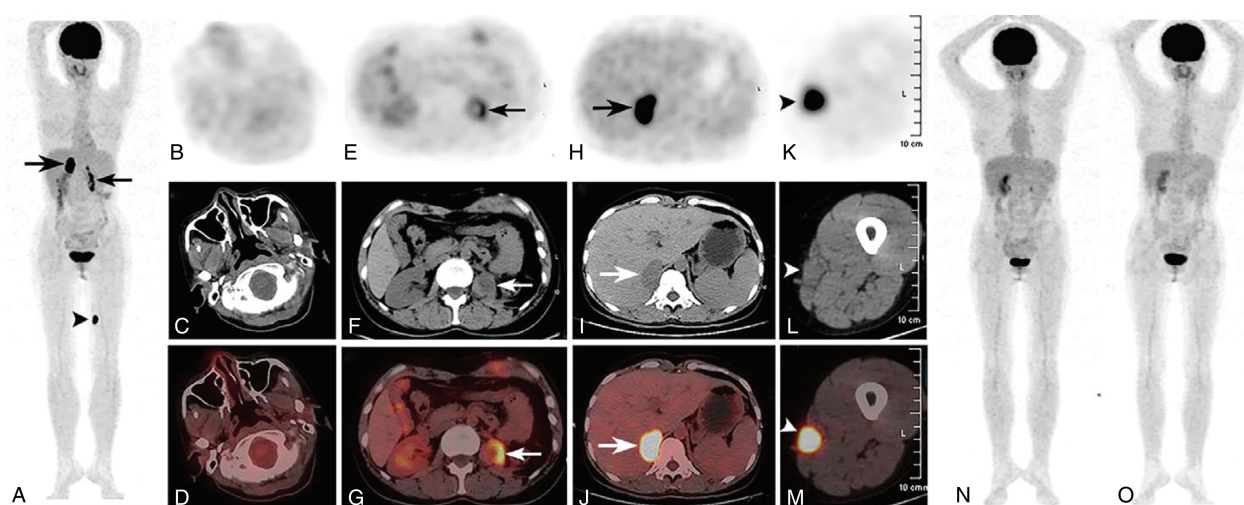


Figure 2. ^{18}F -PET/CT images showed homogeneously increased FDG uptake in the right adrenal gland (maximal SUVmax) of 15.7, A, H, I, and J: thick arrows) and left thigh subcutaneous lesion (SUVmax of 12.5, A, K, L, and M: arrows), as well as heterogeneous increased FDG uptake in the left adrenal gland region (SUVmax of 8.3, A, E, F, and G: thin arrows). The whole body PET/CT revealed no abnormal uptake of FDG in the nasal cavity (A, B, C, and D), indicating that the bilateral adrenal masses might be primary lesions with subcutaneous involvement. Fortunately, the subsequent 2 follow-ups FDG PET/CT scans revealed complete resolution with no abnormal FDG uptake in the initially involved sites after chemotherapy and autologous stem cell transplantation (N and O). CT = computed tomography, PET = positron emission tomography, SUVmax = standardized uptake value.

extranasal NK/T cell lymphoma is a very rare extranodal lymphoma mainly involving the adrenal glands, which is also associated with EBV.^[1–3,19] The commonest presentation of patients with primary adrenal extranasal NK/T cell lymphoma is back pain with or without B symptoms (ie, fever, night sweats, and weight loss).^[11,20–21] Imaging features of this disease are well-defined bilateral adrenal masses with heterogeneous enhancement, but without the regional lymph node involvement.^[22] Differential diagnoses include metastatic disease, primary adrenal malignancy, such as adrenocortical carcinoma, primary adrenal benign disease like adenoma, pheochromocytoma, or tuberculosis.^[22] Certainly, the definitive diagnosis is made by an image-guided percutaneous biopsy or surgical excision.^[23,24] This patient was diagnosed with primary adrenal extranasal NK/T cell lymphoma by surgical excision. The therapeutic strategies for this disease are diverse combinations of chemotherapy, surgery, radiation, or autologous stem cell transplantation.^[9] In this case, the patient received 3 treatments, including surgery, chemotherapy, and autologous stem cell transplantation.

Recently, Kumar et al reviewed the imaging characteristics of diverse adrenal gland diseases on PET/CT using different tracers.^[25] ^{18}F -Fluorodopa PET/CT and ^{11}C -Hydroxyephedrine PET/CT have been used for imaging of adrenal medullary lesions, such as pheochromocytoma, and ^{11}C -Metomidate PET/CT has been used for adrenocortical imaging like adrenocortical carcinoma.^[25] While for imaging of adrenal lymphoma, ^{18}F -FDG PET is very useful.^[25] Apart from the demonstration of adrenal involvement, it can also show lymphomatous involvement at other sites. In this case, ^{18}F -FDG PET/CT scan revealed not only the huge bilateral well-defined adrenal masses with marked FDG uptake, but also the left thigh subcutaneous involvement. This finding should be added to the list of primary adrenal tumors or adrenal infections with increased FDG uptake, commonly involving metastatic tumors, adrenocortical carcinoma, pheochromocytoma, neuroblastoma, or histoplasmosis, tuberculosis, and should be taken into account when interpreting similar images. Additionally, ^{18}F -FDG PET/CT plays an

important role in staging, predicting disease progression and response evaluation.^[25–27]

4. Conclusions

In conclusion, we presented a rare case of primary adrenal extranasal NK/T cell lymphoma with subcutaneous involvement demonstrated on ^{18}F -FDG PET/CT. Besides, ^{18}F -FDG PET/CT is a useful diagnostic and follow up imaging modality in patients with an adrenal disease, which can not only help to do staging but also evaluate therapeutic response. Primary adrenal extranasal NK/T cell lymphoma, although a rare entity, should always be considered in patients with huge bilateral adrenal masses.

Author contributions

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Writing – review and editing: Ping Dong, Guohua Shen, Lin Li.

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