Benign lymphoid hyperplasia mimicking oligometastasis from non-small cell lung cancer after stereotactic ablative radiotherapy

Benigní lymfoidní hyperplazie imitující oligometastázu nemalobuněčného karcinomu plic po stereotaktické ablační radioterapii

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Summary

Background: Benign lymphoid hyperplasia (BLH) is a rare lymphoproliferative disorder of normal polyclonal B lymphocytes, but is sometimes difficult to distinguish from malignancy. ***Case:*** An 87-year-old man with a history of localized non-small cell lung cancer (NSCLC) was referred for evaluation and treatment of an elastic hard tumor in the left supraclavicular fossa one year after stereotactic ablative radiotherapy (SABR). Whole-body PET scan showed high ^{18}F-fluorodeoxyglucose uptake in the left supraclavicular fossa, and a diagnosis of oligometastasis was made. The tumor was homogeneously high signal on T2-weighted image with homogeneous enhancement after contrast administration. Since the palpation and MRI findings were inconsistent with those of metastatic NSCLC, a biopsy was performed. Pathological and immunohistochemical investigation revealed the lesion to be BLH. ***Conclusion:*** In a patient with suspected oligometastasis after SABR for NSCLC, caution should be exercised before undergoing SABR for oligometastasis because BLH may be present.

Key words

oligometastatic disease – pseudolymphoma – reactive lymphoid hyperplasia – stereotactic body radiotherapy – lymph node metastasis

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Souhrn

Východiska: Benigní lymfoidní hyperplazie (BLH) je vzácné lymphoproliferativní onemocnění normálních B-lymfocytů, přičemž někdy je obtížné odlišit jej od malignity. ***Popis případu:*** Muž ve věku 87 let s lokalizovaným nemalobněčným karcinomem plic (non-small cell lung cancer – NSCLC) v anamnéze byl přijat pro zhodnocení a léčbu elastického solidního tumoru v levé supraklavikulární jamce jeden rok po stereotaktické ablační radioterapii (SABR). Celotělová PET ukázala vysoký uptake ^{18}F-fluorodeoxyglukózy v levé supraklavikulární jamce a byla diagnostikována oligometastáza. V T2-váženém obraze byl tumor homogenně hypersignální při homogenním zesílení signálu po podání kontrastní látky. Jelikož po palpačním vyšetření a MR nálezy neodpovídaly metastáze NSCLC, byla provedena biopsie. Patologické a imunohistochemické vyšetření odhalilo, že léze má původ v BLH. ***Závěr:*** U pacienta s podezřením na oligometastázu po SABR při NSCLC je před provedením SABR pro oligometastázu nutná opatrnost, a to kvůli případnému výskytu BLH.

Klíčová slova

oligometastatické onemocnění – pseudolymfom – reaktivní lymfoidní hyperplazie – stereotaktická radioterapie – metastázy lymfatických uzlin

Introduction

Several studies have suggested that stereotactic ablative radiotherapy (SABR) is well tolerated and of clinical benefit for patients with oligometastatic non-small cell lung cancer (NSCLC) [1,2]. However, the diagnosis of oligometastases is generally based on noninvasive imaging findings. Therefore, accurate diagnosis of oligometastasis is an important factor in determining treatment and evaluating treatment efficacy. Here we report a case of NSCLC with a solitary hypermetabolic mass in the left supraclavicular fossa on positron emission tomography (PET), which was finally diagnosed as benign lymphoid hyperplasia (BLH) on pathological examination. As far as we know, this is the first case of NSCLC treated with SABR that subsequently developed BLH.

Case report

All procedures performed in this case report were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from the patient for use of clinical data in research.

An 87-year-old man was referred to our institution for evaluation and treatment of a palpable mass in the left supraclavicular fossa. His past medical history was unremarkable except for surgical resection for early-stage colon cancer three years ago, and SABR (60 Gy / 5 fractions) for stage IB NSCLC (adenocarcinoma, American Joint Committee of Cancer, 8th ed.) of the right upper lobe one year ago. Prior to SABR, there were no metastases on whole-body ^{18}F-fluorodeoxyglucose (FDG) PET imaging (Fig. 1A). He had no recurrence without adjuvant therapy, but a painless elastic mass that was clinically unfixed appeared in the left supraclavicular fossa one year after SABR. Whole-body FDG-PET and PET/CT scan showed intense FDG uptake in the left supraclavicular fossa, but no other abnormalities were found (Fig. 1B, C). Maximum standardized uptake value (SUV_{max}) increased at 2 hours (4.52) compared to 1 hour (3.77) after FDG administration. CEA and CA 19-9 concentrations were within normal limits. Based on PET imaging findings, the patient was diagnosed with oligometastasis from NSCLC. Since there was no medical indication for systemic chemotherapy or immunotherapy, MRI-guided radiotherapy was planned. On MRI taken for radiation treatment planning, the tumor was homogeneously high signal on T2-weighted image (Fig. 1D), high signal on T1 map (Fig. 1E), and low signal on apparent diffusion coefficient from diffusion-weighted imaging (Fig. 1F). Post-gadolinium T1-weighted image demonstrated homogeneous enhancement of the tumor (Fig. 1G). Since the palpation and MRI findings were inconsistent with those of metastatic NSCLC, a core needle biopsy was performed. Pathological and immunohistochemical investigation of the biopsy specimen revealed the atrophic germinal center surrounded by concentric zones of lymphocytes (Fig. 1H), predominantly with CD20+ B cells. Based on the histopathological and immunohistochemical findings, a diagnosis of BLH was made. Since there was no recurrence of NSCLC, SABR was cancelled and followed up without treatment. The tumor of the left supraclavicular fossa gradually shrank and FDG uptake normalized one year after biopsy (SUV_{max} 1.94: 2 hours).

Discussion

Oligometastasis is a type of metastasis in which cancer cells from the primary tumor travel through the body and form 1–5 metastatic lesions [3]. Studies have shown that aggressive treatment of NSCLC with oligometastasis improves overall survival compared to palliative approaches or immunotherapy alone [4]. SABR is one of the most effective treatments for oligometastatic disease, but standard diagnostic methods for each metastatic lesion have not been established. In general, the diagnosis of oligometastases is made by noninvasive imaging, including whole-body PET, with little or no histopathologic examination. This case was initially diagnosed as oligometastasis from NSCLC by whole-body PET, but was later diagnosed as BLH by histopathology.

BLH is a rare disorder characterized by polyclonal lymphocytic infiltration predominantly with B lymphocytes, but the diagnosis of BLH is of clinical importance as it may be confused with malignant lymphoma or oligometastasis. FDG-PET can easily detect BLH, but its diagnostic accuracy is controversial [5]. Because of the rarity of this disease, there have been no well-organized studies investigating the diagnostic accuracy of FDG-PET. This case suggests the importance of routine physical examination and a multimodal diag-

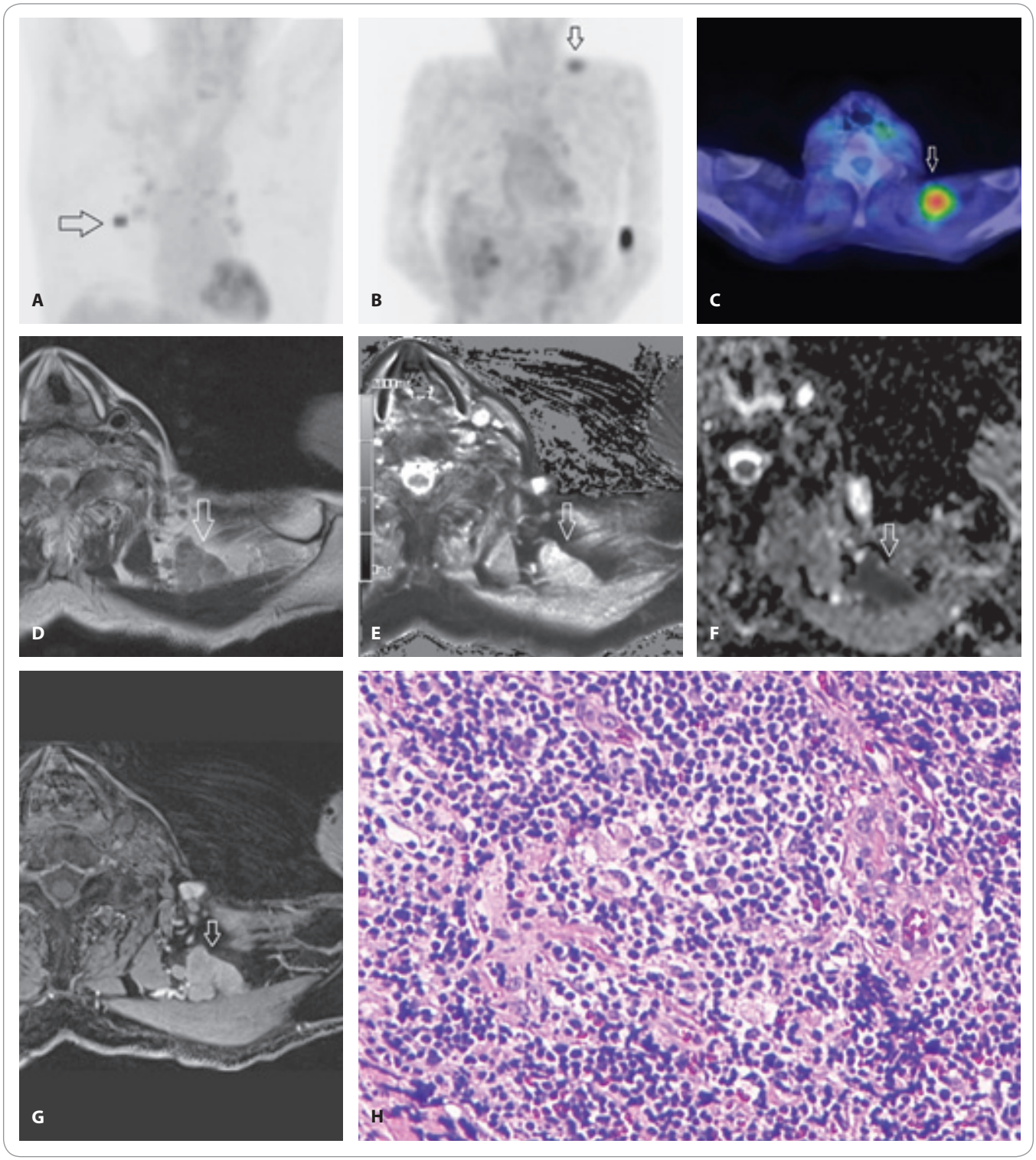

Fig. 1. An 87-year-old man with benign lymphoid hyperplasia after stereotactic ablative radiotherapy for non-small cell lung cancer. (A) Maximum intensity projection PET imaging showed there was no abnormal FDG uptake besides the primary tumor in the right upper lobe (arrow). (B) Maximum intensity projection PET and (C) PET/CT imaging showed intense FDG uptake in the left supraclavicular fossa without other abnormal uptake, suggesting oligometastasis of non-small cell lung cancer. The tumor (arrow) was homogeneously high signal on (D) T2-weighted image, high signal on (E) T1 map, and high signal on (F) diffusion-weighted image (b-value 800 s/mm^2). (G) Post-gadolinium T1-weighted image demonstrated homogeneous enhancement of the tumor (arrow). (H) Photomicrograph of the biopsy specimen from the left supraclavicular lymph node (hematoxylin-eosin stain, 40×). Biopsy specimens show an atrophic germinal center surrounded by concentric zones of lymphocytes.
FDG – ^{18}F-fluorodeoxyglucose

nostic approach using PET and MRI for an accurate diagnosis of BLH. Although it is difficult to distinguish lymphoma from BLH by PET and/or MRI, it may be possible to rule out lymph node metastasis from NSCLC. Homogeneous hyperintensity of the tumor on T2-weighted image and T1 map with homogeneous enhancement after contrast agent administration, and the absence of central necrosis or hemorrhage are important clues to exclude metastases of NSCLC [6]. Elastic, unfixed lymph nodes on palpation are an adjunctive finding and are useful in the diagnosis [7].

Conclusion

In conclusions, a single case report cannot be generalized to others without further validation; however, a multimodal and multifactorial diagnostic approach would be warranted before performing SBRT for oligometastasis of NSCLC.

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Authors' contributions

YH and ET designed the study, collected the data, and prepared the manuscript. Both authors approved the final version of the article.

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