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Case report

Solitary pulmonary nodule as the initial manifestation of isolated metastasis from prostate cancer without bone involvement: A case report

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ABSTRACT

Introduction: Isolated lung metastases from prostate cancer without any other organ involvement are rare. They are commonly in the form of diffuse or multiple lesions and rarely emerge as a solitary pulmonary nodule.
Presentation of case: A 61-year-old man who had undergone a laparoscopic-assisted radical prostatectomy for prostate cancer 16 months prior presented with a growing solitary pulmonary nodule. Positron emission tomography/computed tomography showed an abnormal uptake in the nodule without any other organ involvement. A surgical specimen by a thoracoscopic wedge resection proved a diagnosis of a metastasis from prostate cancer. He is currently alive only with worsening pulmonary metastases at 7 years after the lung surgery.
Discussion: A rare entity of isolated pulmonary metastases could be a sole finding of metastatic prostate cancer over the years and its initial manifestation could emerge as a solitary pulmonary nodule. It poses a diagnostic challenge because primary lung cancer is the leading differential diagnosis of solitary pulmonary nodules and is also one of the most frequent second primary malignancies in prostate cancer survivors.
Conclusion: An aggressive surgical biopsy is essential for definitive histopathological and immunohistochemical analyses of solitary pulmonary nodules to distinguish a rare form of an isolated pulmonary relapse from a second primary lung cancer in prostate cancer survivors.

1. Introduction

Although the lung is the second most common metastatic site from prostate cancer [1,2],most cases are preceded by bone involvement [3–5]. Further, pulmonary metastases are commonly in the form of diffuse or multiple lesions and rarely emerge as solitary pulmonary nodules (SPN) [1,6–11]. SPN poses a diagnostic challenge because of the necessity to be differentiated from primary lung cancer, which is one of the most frequent second primary malignancies in prostate cancer survivors [12,13]. We herein report an isolated pulmonary metastasis from prostate cancer exhibiting an SPN as the initial manifestation. This work has been reported in line with the SCARE criteria [14].

2. Presentation of case

A 61-year-old man with a history of a laparoscopic-assisted radical prostatectomy for prostate cancer (Gleason score 7) (cT3aN0M0) 16 months prior presented with a solid SPN in the left lower lobe (Fig. 1A). The serum prostate specific antigen (PSA) level was elevated to 0.40 ng/ml, which had decreased to within normal range after the prostatectomy. Chest computed tomography (CT) before the prostatectomy revealed a small nodule in the corresponding area (Fig. 1B). Positron emission tomography/computed tomography showed an abnormal uptake in the nodule with a maximum standardized uptake value of 3.9 without any other organ involvement (Fig. 2). A thoracoscopic wedge resection of the left lower lobe was performed for diagnostic purposes. A histopathological examination revealed a moderately differentiated adenocarcinoma with positive immunostaining for PSA, consistent with metastatic prostate cancer (Fig. 3A, B). The postoperative serum PSA level decreased to 0.09 ng/ml. He received no additional treatment. A chest CT 18 months later showed multiple nodules in the right lung, while the bone scintigraphy was negative for a metastasis. The serum

Abbreviations: CT, computed tomography; PSA, prostate specific antigen; SPN, solitary pulmonary nodule.

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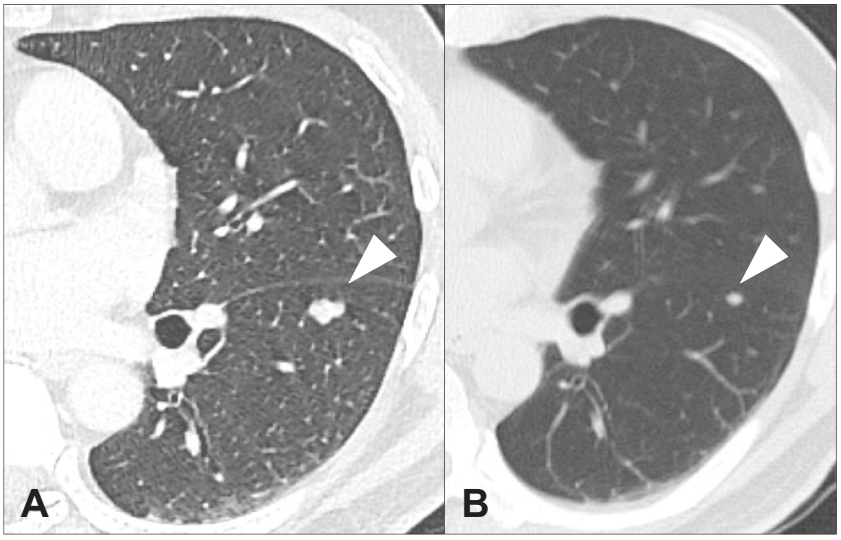

Fig. 1. A: A chest CT showing an SPN in the left lower lobe (arrowhead).
B: A Chest CT before the prostatectomy showing the corresponding nodule (arrowhead).

Fig. 2. Positron emission tomography showing an abnormal uptake in the nodule (arrow) without any other organ involvement.

PSA level was elevated to 0.76 ng/ml. Given the clinical diagnosis of metastatic lung tumors, androgen deprivation therapy and local radiation therapy (56 Gy in 4 fractions and 70 Gy in 10 fractions, respectively) for the upper and lower lobe nodules were administered. The androgen deprivation therapy was withdrawn due to breast pain and gynecomastia 3 months later. A chest CT 18 months later (39 months after the lung resection) revealed another nodule outside the radiation field in the right upper lobe. He received additional radiation therapy (56 Gy in 4 fractions) for the new lesion. Multiple nodules of both lungs emerged thereafter and were gradually worsening without any antineoplastic treatment administered. He is currently alive with pulmonary metastases without any other organ involvement at 7 years after the lung surgery.

3. Discussion

The present case represents a rare isolated pulmonary metastasis as a sole manifestation of a metastasis from prostate cancer, while most cases in the literature were consequently followed by other metachronous organ involvement [11,15]. This may suggest the hypothesis of an atypical cava-type metastasis without a backward venous pathway of the prostate cancer [2,16]. Moreover, pulmonary metastases are often in the form of diffuse or multiple lesions [1,6–11] and SPN cases have been infrequently reported [5,17,18]. Primary lung cancer is the leading differential diagnosis of growing solid SPNs in general [19–21]. Further, along with the wide spread use of serum PSA screening reduced prostate cancer specific mortality [22], novel concern has been raised about metachronous second primary malignancies in prostate cancer survivors [23]. Although its exact prevalence is unknown [24–26], primary lung cancer has been one of the most frequent second primary malignancies [12,13].

Furthermore, because adenocarcinoma is the most frequent histological subtype in both primary lung and prostate cancer, a permanent histological examination including immunostaining is essential to identify these two etiologies accurately [4]. A meticulous histological assessment is also essential to avoid over-treatment such as a lobectomy due to a misdiagnosis of a primary lung cancer in metastatic cases [15,27]. The surgical biopsy was valuable to obtain adequate tissue sampling for the definitive histopathological and immunohistochemical analyses in the present case.

4. Conclusion

Isolated pulmonary metastases from prostate cancer without any other organ involvement rarely occur and could be a sole metastatic finding over the years. An SPN could be the initial manifestation and should be distinguished from primary lung cancer, which is one of the most frequent metachronous primary malignancies in prostate cancer survivors. An aggressive surgical lung biopsy is a feasible option for growing SPNs in patients with a history of prostate cancer.

Ethics approval and consent to participate

Not applicable.

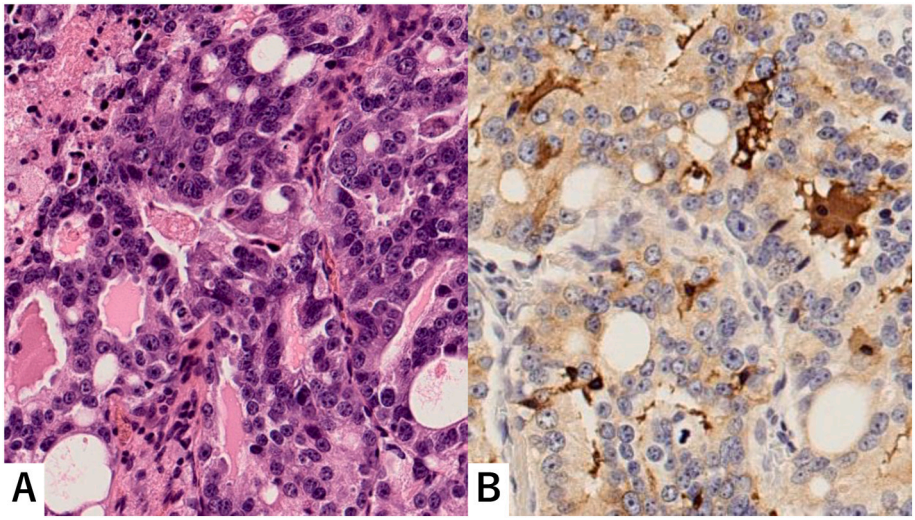

Fig. 3. A: A histopathological examination revealed a moderately differentiated adenocarcinoma.
B: Immunohistochemically, the tumor cells were positive for PSA, which was consistent with metastatic prostate cancer.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Availability of data and material

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CRediT authorship contribution statement

TK wrote this paper. All authors read and approved the final manuscript.

Declaration of competing interest

The authors declare that they have no competing interests.

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