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Case report

Cavitary lung metastasis as relapse of prostate cancer

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A B S T R A C T

Prostate cancer is the most common non-cutaneous malignancy diagnosed in men. It usually metastasizes to bone as osteoblastic lesions on radiographs and regional lymph nodes, and uncommonly to lung, liver and brain. Metastatic prostate cancer recurrence after definitive local therapy can occur in any tissue. The role of fine needle aspiration cytology (FNAC) for diagnosis of metastatic malignancies is well established in literature. We describe a 74 years old male, previously treated for localized prostate cancer, admitted to our Department after total body computed tomography revealed multiple irregular lung lesions some of which had an excavated appearance.

1. Introduction

About one third to one half of patients with prostatic carcinoma have metastatic lesions at presentation [1]. Prostate cancer commonly metastasizes to bone and regional lymph nodes, whereas lung involvement is less common [1–3]. Pulmonary metastases from prostate cancer can occur either trough diffuse interstitial lymphatic diffusion, or trough nodular diffusion [4]. A handful of cases have described prostatic metastases to the lung, however, this is usually results in concomitance with existing bone lesions, while there are lack of data in the literature of multiple irregular lung excavated lesions as manifestation of relapse of prostate cancer. In this case report we describe a 74 years old male, Caucasian, former heavy smoker (P/Y 75), previously treated for localized prostate cancer, admitted to our Department after total body computed tomography revealed multiple irregular lung lesions some of which had an excavated appearance.

2. Case report

The patient was admitted in our Department in June 2019 after the results of the instrumental investigations requested from his family doctor due an important weight loss in the last 3 months. The contrast enhanced computed tomography (CT) scan showed multiple bilateral pulmonary lesions, some of which had an excavated appearance: an 18 × 16 mm lesion on upper right lobe and 19 × 12 mm on poster basal segment of lower right lobe (Fig. 1). A positron emission tomography–computed tomography–fluorodeoxyglucose (PET–CT–FDG) was also performed, which did not detect any increased standardized uptake value.

He was a known case of localized carcinoma prostate, diagnosed and treated five years before with radical prostatectomy and bilateral iliac lymphadenectomy and vesiculectomy. The final diagnosis was Gleason 9 [4,5] adenocarcinoma, pT3b. Patient was, furthermore, treated with local pelvic radiotherapy, the last radiological follow up, performed two years after diagnosis, there with no evidence of relapse of the disease.

On admission, the patient had no respiratory symptoms, laboratory exams were normal, and there were absence of inflammation markers. He had no lymphadenopathy, and no other mass on physically examination.

Our main diagnostic hypotheses were oriented towards a mycobacterial infectious disease, or a lung reaction of systemic autoimmune diseases.

Further examinations were performed to determine the nature of the pulmonary excavated lesions.

Tuberculin skin test was negative, and video-bronchoscopy with bronchoalveolar lavage (BAL) and bronchoaspirate (BAS) to exclude any infection disease were also performed. Blood panel tests for autoimmune diseases were evaluated with antineutrophil cytoplasmic autoantibody (ANCA) - antinuclear antibody (ANA) - extractable nuclear antigens (ENA) - rheumatoid factor (RF) and resulted negative.

We decided, in absence of relevant infectious or autoimmune diseases, to perform positron emission tomography–computed tomography–Fluoromethylcholine (PET–CT–18F) based on evidence of the advantage of choline on FDG in imaging of prostate cancer due the low

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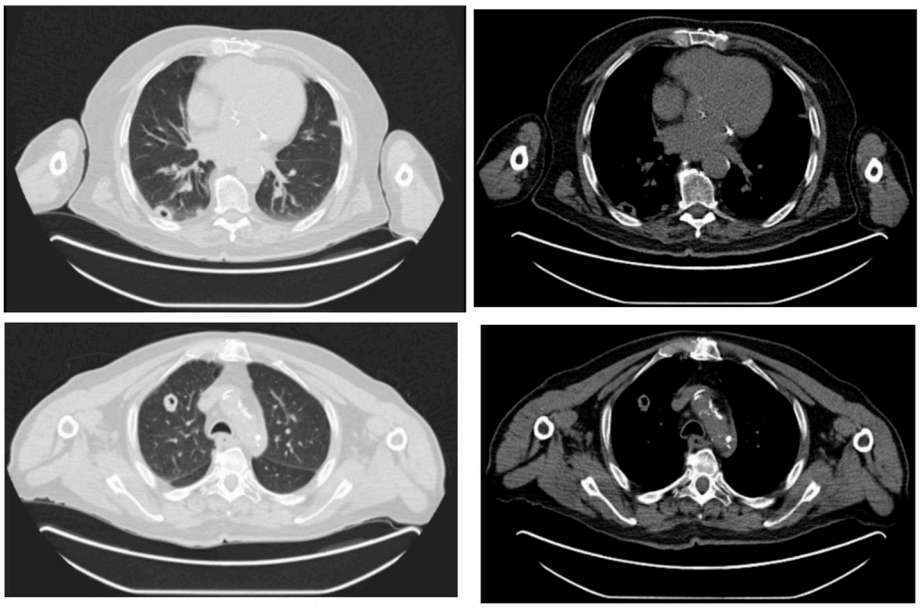


Fig. 1. Chest computed tomography (CT) showed a lesion on upper right lobe and 19 × 12 mm on poster basal segment of upper right lobe.

basic activity of choline in the pelvic region, in particularly the bladder [5].

PET–CT–18F showed multiple pulmonary bilateral increased standardized uptake value (SUV), in particularly the upper right lobe lesion was 7.12 SUV and poster basal segment of lower right lobe was 6.14 (SUV), were also pathological increased of SUV on solid tissue between posterior wall of the bladder and the rectum, right clavicle and bronchial lymph nodes (Fig. 2).

In agreement with patient, we decided to continue investigation with ultrasound-guided lung biopsy (USPLB) with an 18-gauge tru-cut needle (Medax Velox 2) on poster basal lesion of lower lung right lobe (Fig. 3).

According to our standard procedure which requires, if technically possible, multiple subsequent passes to obtain as much material as possible for histological evaluation, because is not available rapid on-site cytology, we performed 2 subsequent passes without any complication after procedure.

Histological sections showed striated muscle tissue infiltrated by a neoplastic population. The cells had irregular, hyperchromic nuclei and pale cytoplasm. Immunohistochemical investigation was performed which showed negative staining with TTF-1 and positive with PSA and racemase (Fig. 4). Overall features were of metastatic prostate neoplasia in lung.

3. Discussion

Lung represent a major metastatic site of the body, being about 30–50% of all secondary locations. Typical radiologic findings of pulmonary metastases include multiple round variable-sized nodules, generally located in peripheral parenchyma and diffuse interstitial thickening.

Excavated lesions in lung parenchyma represent an atypical radiologic feature of pulmonary metastasis, and most of the time differential diagnostic hypotheses for these appearances include infective conditions either bacterial or fungal in origin, rheumatoid nodules and vasculitis processes, lymphomas and all metastatic diseases. The occurrence of excavated lung metastases is rarely observed, being only in 4% of cases [6].

Usually primitive tumor with this radiological characteristic corresponds mainly to squamous cell carcinoma of the head and neck or cervix, rarely to colon [7] or metastatic sarcomas can disseminate as excavated pulmonary nodules [8]. A prostatic cancer with pulmonary metastasis after radical prostatectomy is not an infrequent case.

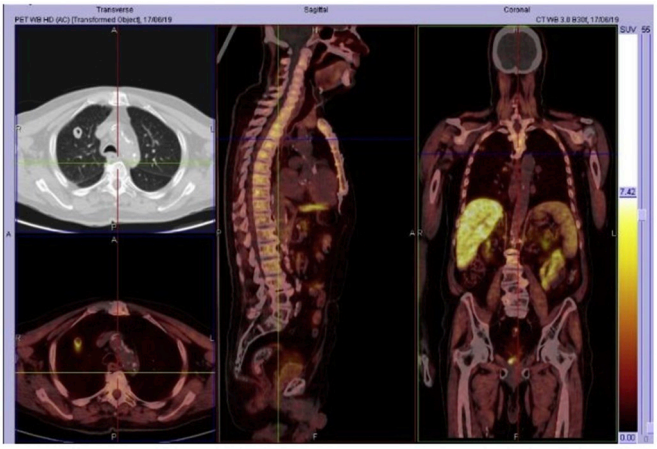
We could not find in the literature any case of excavated pulmonary relapse from prostatic cancer. In autopsy series of patients with metastatic prostatic cancer, isolated pulmonary metastasis has been documented in less than 1% of cases [9].

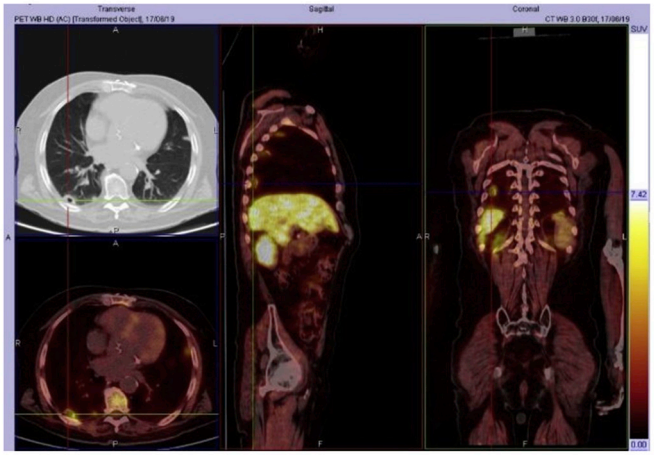
We report a very rare case of pulmonary excavated metastasis of prostatic cancer negative on PET–CT–FDG, emphasizing the role of PET–CT–18F to identify relapses of prostatic cancer with increased SUV and ultrasound-guided lung biopsy.

PET–CT–FDG has been shown to be effective in the imaging of a wide variety of malignant tumours [10]. However, imaging of prostate cancer with FDG PET has not been very successful because of the low uptake of FDG in prostate cancer and high accumulation of FDG in the urine [11–14]. PET–CT–18F in prostate tumours has potential to replace FDG as a tracer of choice [15–17].

This case report demonstrates that although lung excavated metastases are described in literature, initial failure to reach a diagnosis is common. The mis-diagnosis of infectious diseases has been reported for 10% of metastatic lung adenocarcinomas presenting the features of multiple cavitating nodules [18].

In conclusion, in daily practice unusual cavitated lung metastases are not rare and it is often difficult to distinguish metastases from other non-malignant pulmonary disease. Lung biopsy of the lesion allowed the diagnosis of prostatic carcinoma metastases. Clinicians and radiologist should be alerted to the possibility of unusual atypical features of





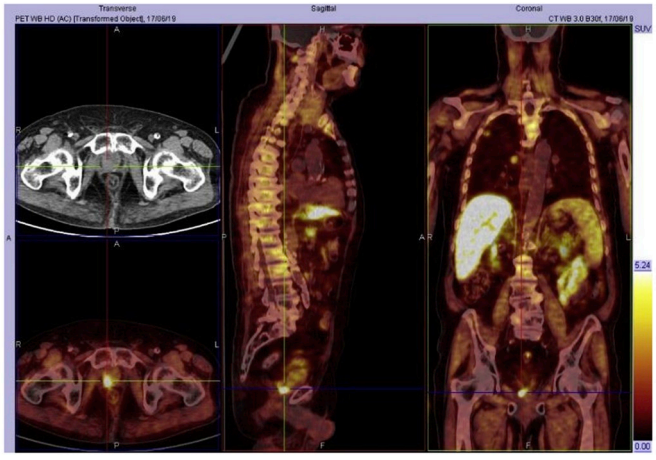


Fig. 2. A) PET–CT–18F pulmonary increased SUV of upper right lobe lesion was 7.12 SUV. **B)** PET–CT–18F pulmonary increased SUV of poster basal segment of lower right lobe was 6.14. **C)** PET–CT–18F: increased SUV of solid tissue between posterior wall of the bladder and the rectum.

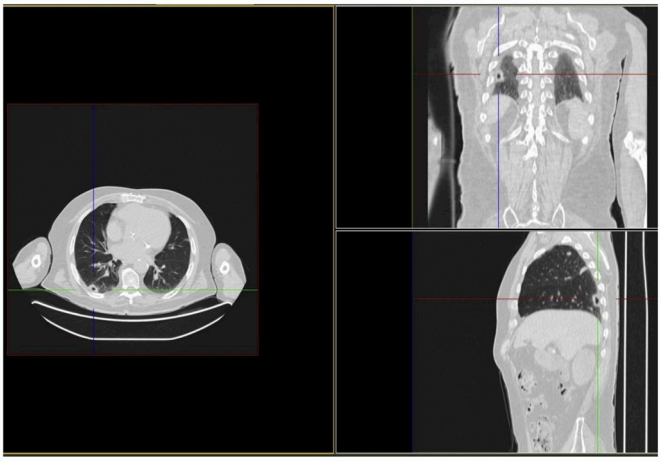


Fig. 3. CT localization of poster basal lesion of lower lung right lobe before USPLB with an 18-gauge tru-cut needle.

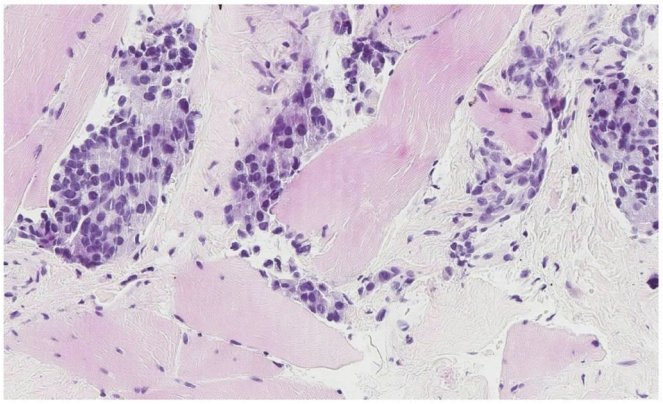


Fig. 4. Striated muscle tissue and mixed groups of neoplastic cells (Hematoxylin-eosin, 10x magnification).

pulmonary metastases from prostatic carcinoma.

Declaration of competing interest

The Authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rmcr.2019.100973.

References

[1] M. Elkin, H.P. Mueller, Metastases from cancer of the prostate, Cancer (1954) 1246.
[2] S.J. Fabozzi, P.F. Schellhammer, A.M. El-Mahdi, Pulmonary metastases from prostate cancer, Cancer (1995).
[3] H. Kume, K. Takai, S. Kameyama, K. Kawabe, Multiple pulmonary metastasis of prostatic carcinoma with little or no bone or lymph node metastasis, Urologia Internationalis - Urol Int 62 (1999) 44–47.
[4] Behrakis, Koutsilieris, Pulmonary metastases in metastatic prostate cancer: host tissue-tumor cell interactions and response to hormone therapy, Anticancer Res. 46 (1997).
[5] I.J. De Jong, J. Pruim, P.H. Elsinga, W. Vaalburg, H.J.A. Mensink, Visualization of prostate cancer with 11C-choline positron emission tomography, Eur. Urol. 42 (2002) 18–23.
[6] J.B. Seo, J.G. Im, J.M. Goo, et al., Atypical pulmonary metastases: spectrum ofradiologic findings, RadioGraphics 21 (2001) 403–417.

[7] W. Mermershtain, H. Schulman, Y. Hertzanu, Y. Cohen, Massive cavitation of solid pulmonary metastatic lesions in a breast cancer patient: a case report, Ann. Oncol. 13 (2002) 173–174.
[8] K. Oshikawa, Y. Ishii, M. Hironka, S. Kitamura, Multiple pulmonary metastases with cavitation from gallbladder cancer, Intern. Med. 37 (1998) 292–294.
[9] H. Saitoh, M. Hida, T. Shimbo, Metastatic patterns of prostatic cancer Correlation between sites and number of organs involved, Cancer 54 (1984) 3078–3084.
[10] S.S. Gambhir, J. Czernin, J. Schwimmer, D.H.S. Silverman, R.E. Coleman, M. E. Phelps, A tabulated summary of the FDG PET literature, J. Nucl. Med. 42 (2001), 1S–93S.
[11] C. Hofer, C. Laubenbacher, T. Block, J. Breul, R. Hartung, M. Schwaiger, Fluorine-18-fluorodeoxyglucose positron emission tomography is useless for the detection of local recurrence after radical prostatectomy, Eur. Urol. 36 (1999) 31–35.
[12] I.J. Liu, M.B. Zafar, Y.H. Lai, G.M. Segall, M.K. Terris, Fluorodeoxyglucose positron emission tomography studies in diagnosis and staging of clinically organ-confined prostate cancer, Urology 57 (2001) 108–111.
[13] C.K. Hoh, M.A. Seltzer, J. Franklin, J.B. deKernion, M.E. Phelps, A. Belldegrun, Positron emission tomography in urological oncology, J. Urol. 159 (1998) 347–356.
[14] M. Picchio, C. Messa, C. Landoni, L. Gianolli, S. Sironi, M. Brioschi, M. Matarrese, D.V. Matei, F. De Cobelli, A. Del Maschio, F. Rocco, P. Rigatti, F. Fazio, Value of [11C] choline-positron emission tomography for re-staging prostate cancer: a comparison with [18F]fluorodeoxyglucose-positron emission tomography, J. Urol. 169 (2003) 1337–1340.
[15] J. Kotzerke, J. Prang, B. Neumaier, et al., Experience with carbon-11-choline positron emission tomography in prostate cancer, Eur. J. Nucl. Med. 27 (2000) 1415–1419.
[16] I.J. De Jong, J. Pruim, P.H. Elsinga, W. Vaalburg, H.J. Mensik, Preoperative staging of pelvic lymph nodes in prostate cancer by 11C-choline PET, J. Nucl. Med. 44 (2003) 331–335.
[17] I.J. De Jong, J. Pruim, P.H. Elsinga, W. Vaalburg, H.J.A. Mensik, 11CCholine positron emission tomography for the evaluation after treatment of localized prostate cancer, Eur. Urol. 44 (2003) 32–39.
[18] S. Abi Khalil, A.L. Gourdier, N. Aoun, et al., Cavitary lesions of the lung: imaging characteristics and differential diagnosis, J. Radiol. 91 (2010) 465–473.