Oncology

Multiple osteolytic bone and lung metastases from prostate cancer including small cell carcinoma with marked increases in CEA and Pro-GRP

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A B S T R A C T

It is known that prostate cancer usually presents as adenocarcinoma, frequently metastasizes to bone, appears osteoblastic on radiographs, and shows elevated PSA. Herein, we describe a case of an 80-year-old man diagnosed with prostate cancer presenting as adenocarcinoma and small cell carcinoma in different areas as well as osteolytic bone metastases in the ilium, right rib, vertebrae, and bilateral femurs with markedly elevated CEA (2391 ng/mL) and Pro-GRP (2610 pg/mL). Occasionally, prostate cancer can appear as osteolytic bone metastases, and in this case, it is possible that the prostate cancer contained small cell carcinoma.

Introduction

Prostate cancer is usually adenocarcinoma, frequently metastasizes to bone, and appears osteoblastic on radiographs. PSA is a well-known tumor marker for prostate cancer. CEA is mainly elevated in gastrointestinal carcinoma, but some case reports have described increases in prostate cancer. Pro-GRP is used as a tumor marker for small cell carcinoma. We report a case of multiple osteolytic bone and lung metastases from prostate cancer including small cell carcinoma with marked increases in CEA and Pro-GRP.

Case presentation

An 80-year-old man presented with a 7-day history of back and left femoral pain. Laboratory investigations revealed renal dysfunction (BUN 46.3 mg/dL; Cr 2.42 mg/dL), hypercalcemia (Ca 15.9 mg/dL), and high levels of tumor markers (CEA 2391 ng/mL; CA19-9 47.3 U/mL; NSE 77.5 ng/mL; Pro-GRP 2610 pg/mL; PSA 40.168 ng/mL). CT and MRI without contrast revealed a low-density area in the prostate (Fig. 1A) and osteolytic lesions in the ilium (Fig. 1B), right rib (Fig. 1C), vertebrae (Fig. 1D), and bilateral femurs (Fig. 1E). Nodules were confirmed in the lung (Fig. 1F). No abnormalities were detected in the gastrointestinal tract and pancreas. We attempted biopsies of the right rib and prostate. The samples revealed small cell carcinoma in the right rib (Fig. 2). Adenocarcinoma was found in five spots of the right prostatic lobe, while small cell carcinoma was detected in three spots of the left prostatic lobe (Fig. 3), meaning that the prostate cancer presented as different histological types in the two lobes. The patient was subsequently diagnosed with advanced prostate cancer (adenocarcinoma and small cell carcinoma) with bone metastases (small cell carcinoma). Generally, patients can undergo hormonal therapy for prostate cancer. However, considering the histological type of small cell carcinoma, which requires chemotherapy, as well as the patient’s age, general status, malignancy-associated hypercalcemia, and multiple metastases, best supportive care was implemented.

Discussion

Small cell carcinoma of the prostate is a rare subtype of prostate cancer and one of the most aggressive malignancies of this organ. It occurs in 0.5–2% of men with prostate cancer, and approximately 40–50% of such cases have a history of conventional adenocarcinoma of the prostate. Although a case of concurrent adenocarcinoma and small cell carcinoma of the prostate was reported pathologically, it remained controversial whether adenocarcinoma was the origin of small cell carcinoma. In our case, adenocarcinoma appeared in the right prostatic lobe and small cell carcinoma was confirmed in the left lobe. Because the two types were not intermingled, we consider that small cell carcinoma occurred in a pure form, rather than being derived from adenocarcinoma, and that the two cancers produced CEA and Pro-GRP, respectively. Neuroendocrine tumors frequently appear in other organs like the pancreas, but no primary lesions were confirmed in organs other than the prostate on CT images. Generally, elevated CEA is seen in carcinoma, especially those in the gastrointestinal tract, but there were no tumors in the related organs. Two previous case reports on small cell carcinoma of the prostate described elevated CEA, but there are no reports of four-digit CEA levels, as recorded in the present case, outside of gastrointestinal carcinoma. Pro-GRP is known to increase in small cell lung cancer. Although increases in Pro-GRP are considered false-positive findings in patients with CKD and in carcinoid tumors, we...
should still consider cancer in patients with highly increased Pro-GRP. It is clearly rare for prostate cancer to be associated with Pro-GRP increases of more than 2000 pg/mL, as observed in the present case. The osteolytic lesions in the ilium, vertebrae, and bilateral femurs, and the nodules in the lung were considered to be metastases from small cell carcinoma of the prostate, because the biopsy from the vertebrae showed small cell carcinoma.

Fig. 1. Patient radiographs. (A–C) CT images showing a low-density area in the prostate (A), osteolytic lesions in the ilium (B) and the right rib (C). (D, E) MRI images showing osteolytic lesions in the vertebrae (D) and the bilateral femurs (E). (F) CT images showing nodules in the lung.

Fig. 2. Small cell carcinoma in the right rib (a: CD56 (−), b: Synaptophysin (+), c: Chromogranin A (+), d: Ki-67 index 70%).
Conclusion

We experienced a patient with multiple osteolytic bone and lung metastases from prostate cancer with elevated CEA and Pro-GRP. In our case, prostate cancer presented different histological types, adenocarcinoma and small cell carcinoma, in the two lobes. It is possible for small cell carcinoma of the prostate to coincide with adenocarcinoma of the prostate, but in this case, it is thought that small cell carcinoma occurred in a pure form. Prostate cancer may exhibit osteolytic bone metastases when it contains small cell carcinoma.

Consent

The Institutional Review Board at Musashino Red Cross Hospital reviewed and approved this study.

Conflicts of interest

None of the contributing authors have conflicts of interest, including specific financial interests or relationships and affiliations relevant to the subject matter or materials discussed in this article.

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References

1. Guang-Dar Juang, Thomas I, Hwang S, et al. Metastatic prostatic cancer with elevated serum levels of CEA and CA19-9. Urological Science. 2014;25 28e30.
2. Brandes Angelika, Martin Weinmann, et al. Serum elevation of CEA and CA 19-9 in an aggressive variant of prostatic carcinoma. Acta Oncol. 2001;40(7):879–881.
3. Nadal Rosa, Schweizer Micheal, et al. Small cell carcinoma of the Prostate. Nat Rev Urol. 2014 April;11(4):213–219.
4. Hansel DE, Nakayama M, et al. Shared TP53 gene mutation in morphologically and phenotypically distinct concurrent primary small cell neuroendocrine carcinoma and adenocarcinoma of the prostate. Prostate. 2009;69:603–609.
5. Oremek GM, Sapoutzis N, et al. Anticancer Res. 2003 Mar-Apr;23(2A):895–898.