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**Malignant melanoma of the prostate: Primary or metastasis? A case report
and literature review**

Hong Z *et al.* Malignant melanoma of the prostate

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Abstract

BACKGROUND

Malignant melanoma of the prostate is rare. Twenty-five studies describing 45 cases have been reported. Prostate melanoma is characterized by an insidious onset and poor prognosis. The prognosis and treatment vary according to primary or secondary melanoma.

CASE SUMMARY

A 75-year-old man attended the hospital due to low back pain for two months. He denied a history of trauma nor abnormal urinary symptoms. Digital rectal examination showed an indentation in the left lobe of the prostate, which was 1 cm in diameter. His prostate-specific antigen was 5.6 ng/mL and ^{18}F -FDG-PET/CT showed focal glucose metabolism in the left lobe. Imaging examinations showed bone metastases to T12 and bilateral ribs. Transperineal prostate biopsy was done and three tissue specimens on the left side showed prostate adenocarcinoma (Gleason score 3+3=6), but the specimen on the right side showed malignant melanoma. The patient underwent T12 tumor resection and the pathology findings indicated metastatic malignant melanoma. The patient underwent gastroscopy and colonoscopy, and gastroscopy revealed multiple mucosal black spots in the body and fundus of the stomach. The patient was diagnosed with secondary malignant prostate melanoma and primary gastric disease.

CONCLUSION

Diagnosis of primary prostate melanoma requires caution and ^{18}F -FDG PET/CT may result in false-negative findings in the detection of melanoma.

Key Words: Melanoma; Prostate; Primary; Metastases; Diagnosis

Core Tip: Malignant melanoma of the prostate is rare. To date, 25 studies

describing 45 cases have been reported. There is a significant difference in prognosis between primary and secondary cases. We here report a case of secondary malignant prostate melanoma with primary gastric disease. We also review the literature on 10 cases of primary prostate melanoma, and found that most primary cases did not receive sufficient tests and ^{18}F -FDG-PET was false-negative for the prostate melanoma. We conclude that caution should be used in the diagnosis of primary prostate melanoma, and ^{18}F -FDG-PET/CT may result in false-negative findings in the detection of melanoma.

INTRODUCTION

Malignant melanoma, derived from melanocytes, mainly occurs in the skin, but can also be seen in the mucosa and internal organs, accounting for approximately 3% of all tumors^[1]. Melanoma of the genitourinary tract is a rare disease, representing less than 1% of all melanomas in men^[2]. The majority develop from the penis and distal urethra, and melanoma of the prostate is even rarer, most are of prostatic urothelial origin or secondary to metastatic disease^[3], and only 10 cases of primary melanoma of the prostate^[4-13] and several cases of metastasis^[14-17] have been reported in the English literature.

CASE PRESENTATION

Chief complaints

A 75-year-old man attended the hospital due to low back pain for two months.

History of present illness

The patient had no history of trauma, tumor, and skin melanoma, and no recent weight loss. He also had no urinary symptoms.

History of past illness

The patient had a free previous medical history.

Physical examination

Digital rectal examination showed an indentation in the left lobe of the prostate, which was 1 cm in diameter.

Laboratory examinations

Laboratory tests showed an abnormal level of prostate-specific antigen (PSA), which was 5.6 ng/mL, and free PSA/total PSA was 13.19%. His hemoglobin was 114 g/L, and lactate dehydrogenase was 376 U/L. Other biochemical tests were within the reference range.

Imaging examinations

Lumbar magnetic resonance imaging (MRI) showed multiple abnormal signals in the bone, indicating possible metastatic tumors, and compressed bone in thoracic 12 (T12) vertebrae (Figure 1), with a high T1 signal and a low T2 signal. Bone single photon emission computed tomography showed T12 compression of whole body bone, with a concentration of radioactivity in bilateral ribs, and bone metastases were considered (Figure 2).

Positron emission tomography (PET)/CT showed benign prostate hyperplasia, focal glucose metabolism in the left lobe, a malignant tumor waiting to be excreted, and puncture biopsy was recommended. Extensive bone lesions in the whole body were considered large metastases, and multiple small lymph nodes in the retroperitoneal and left pelvic wall required close follow-up (Figure 3).

Further diagnostic work-up

The patient underwent a transperineal prostate biopsy. Six tissue specimens were obtained. Three on the left side showed prostate adenocarcinoma

(Gleason score 3+3=6), grade 1 (Figure 4a), and one on the right side showed small foci of melanocytes in the proliferative prostate tissue (Figure 4b). Immunohistochemical results were as follows: S100+, Ki-67 +10%, CD68-, SOX10+, Melan A+, P40-, and HMB45+ (Figure 4c).

The patient underwent gastroscopy and colonoscopy, and gastroscopy revealed multiple mucosal black spots in the body and fundus of the stomach (Figure 5a). A biopsy of the mucosa showed acute chronic non-atrophic gastritis in the stomach antrum. Alcian Blue-Periodic Acid-Schiff (AB-PAS) in the gastric body suggested malignant melanoma. Immunohistochemical results were as follows: tumor cells S100 +, HMB45+, AE1/AE3-, p53 +, Ki-67+3%, CD68-, SOX10+, and Melan A + (Figure 5b).

The patient underwent T12 tumor resection, spinal canal decompression and vertebroplasty. Black lesions were found on the thoracic vertebrae and lumbar appendages. Pathology findings indicated metastatic malignant melanocytoma.

FINAL DIAGNOSIS

This patient was diagnosed with primary prostate adenocarcinoma, gastric melanoma with bone metastases, and prostate metastases.

TREATMENT

Following bone surgery (T12 tumor resection, spinal canal decompression and vertebroplasty), the patient received dacarbazine + cisplatin chemotherapy and (Rh-endostatin) targeted therapy for 4 courses.

OUTCOME AND FOLLOW-UP

The patient died within 11 months.

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DISCUSSION

Melanoma is a malignant tumor arising from pigment-containing cells, known as melanocytes, which are mainly located in cutaneous tissue. Prostate malignant melanoma may be primary or secondary^[2], and a total of 46 cases have been reported to date including our patient. The median age of the patients was 61 years ranging from 29 to 84 years^[1].

¹ The most common presentation is obstructive lower urinary tract symptoms. Diagnosis needs histological analysis during transurethral resection of the prostate or core-biopsy material. When a diagnosis of prostate melanoma is made, it is important to distinguish between primary and secondary lesions, so it is important to look for melanoma lesions in other sites.

Our patient had primary gastric malignant melanoma with multiple metastases to the prostate and bone. In this case, ¹⁸F-FDG PET/CT showed high glucose metabolism on the left side of the prostate. The final pathological findings confirmed that it was prostate carcinoma. Melanoma has the lowest glucose metabolism of all malignant tumors. The lesions in the right prostate, gastric mucosa and ribs were not observed by ¹⁸F-FDG PET/CT. So PET/CT of ¹⁸F-FDG may bring in a false negative diagnosis. Teoh^[18] and colleagues found that glutamine metabolism was more specific than deoxyribose metabolism both in melanoma and prostate cancer. In 2017, US Food and Drug Administration approved ¹⁸F-fluciclovine PET/CT for imaging of recurrent prostate cancer. ⁶ Fluciclovine also has the potential ability to selectively image T-cell modulation in the tumor microenvironment. Thus, ¹⁸F-fluciclovine PET/CT may perform better than ¹⁸F-FDG PET/CT in the detection of prostate melanoma.

The MRI manifestations of bone metastases from prostate carcinoma are generally T1 signal hypointensity and T2 hyperintensity. The MRI images in our patient were characterized by T1 enhancement and T2 attenuation, which can be used to differentiate between melanoma and prostate carcinoma of bone metastasis.

Following MRI, PET-CT, and prostate biopsy, our patient underwent gastroenteroscopy, which revealed the primary lesion in the stomach. In the ten cases of primary prostate melanoma reviewed in the present study (Table 1), it was found that there was a lack of thorough examination in most cases: only 3 cases underwent endoscopy of the gastrointestinal tract and 2 received ^{18}F -FDG PET/CT. The prognosis in these patients also varied, ranging from 1 month to 84 months^[1-14]. We suggest that some patients diagnosed with primary prostate melanoma may have metastatic lesions at the time of diagnosis.

In the only systematic review presented to date on all cases of prostate melanoma, Caputo^[14] and colleagues summarized 45 cases both in English and non-English literature. The median age of patients was 61 years and only 10 primary prostatic cases have been reported so far. Caputo's team found that patients with prostatic metastases from melanoma had a dismal prognosis with a median survival of 3 months (range 7 days to 6 months). The prognosis of primary prostatic melanoma was not as bad as expected: of the 7 available cases with at least one year of follow-up, two survived longer than five years, while the remaining five died after an average of one year.

It is important to distinguish between primary and secondary melanoma. Radical surgery followed by adjuvant chemo-/immuno-therapy represents the most reasonable therapeutic strategy. For patients with primary disease, a more aggressive approach may provide better benefits.

CONCLUSION

Malignant melanoma of the prostate is rare. There have been 46 cases reported including our patient. There is a significant difference in the prognosis between primary and secondary cases^[14] (3 months *vs* 12 months). The diagnosis of primary prostate melanoma has important implications for treatment. For accurate diagnosis, physical examination of the body skin surface, CT of the whole body, and endoscopy including the urinary tract and

gastrointestinal tract should be conducted. ^{18}F -FDG PET may result in false-negative findings in the detection of melanoma both in the prostate and gastric mucosa.

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SIMILARITY INDEX

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