

Prostate carcinoma with peripheral metastases after prostatectomy and low levels of serum prostate specific antigen

To the Editor: In the article of Dr A. Bantis et al on the Hell J Nucl Med 2007; 10(1): 56-61 there is no reference as to the rare possibility that serum prostate specific antigen (PSA) may have a normal value in cases of metastatic prostate cancer after prostatectomy. We describe such a patient, male 67 years old, who had undergone radical prostatectomy for prostate carcinoma. He was referred to our department for bone scintigraphy because of pain in the lower extremities. The PSA serum level was 0.6 ng/ml (normal: <4 ng/ml). Whole body bone scintigraphy was performed after the intravenous injection of 740 MBq technetium-99m methylene diphosphonate (^{99m}Tc -MDP) using a dual-head gamma camera interfaced with a dedicated computer (Siemens E.CAM, Siemens Medical Systems, Inc. Hoffman Estates, IL 60195, USA). The photopeak was centered at 140 keV with a 20% window. Anterior and posterior images revealed increased multifocal uptake at the pelvis and less intense uptake at the proximal region of the right femur. Foci of atypical intense uptake were also seen in the left tibia and in the proximal and distal regions of the right tibia (Fig. 1). Multidetector computed tomography (MDCT) scanning, confirmed osteoblastic lesions compatible with bone metastases in both tibias (Fig. 2). Pathological accumulation of the tracer was also seen in the right ribs due to previous injury.

Prostate specific antigen measurement is a very useful method for the detection of prostate carcinoma recurrence after radical prostatectomy. Its level should be undetectable after prostatectomy while elevation of PSA values indicates relapse and metastatic disease. There are very few papers in the literature of metastatic prostatic cancer, with bone metastases and low PSA [1-4]. Also after prostatectomy, metastases in the peripheral bones are found in only 1%-2% [5-9].

The reason for the low PSA in the above cases is controversial. It is considered that PSA is reduced after hormonal treatment, since increase of serum PSA is related to the androgen-responsive gene [1]. Normal PSA level has also been reported in a prostate carcinoma patient in recurrence [4, 7]. The volume of the prostate carcinoma has also been related to the production of PSA [1, 4, 8, 10]. Small prostate carcinomas do not produce enough PSA, therefore in recurrence after radical prostatectomy, PSA levels may be found normal. Also, poorly differentiated prostate carcinomas produce less PSA than the moderately or well differentiated carcinomas [1, 9, 11]. Our patient had a poorly differentiated prostate carcinoma which induced a low serum PSA.

Bone metastases are most frequent in prostate carcinoma. However the prevalence of peripheral bone metastases ranges only from 1% to 2% [3, 6]. A few cases of solitary metastasis in the tibia in patients with prostate carcinoma have been reported [3, 5, 6]. In the present case, multiple

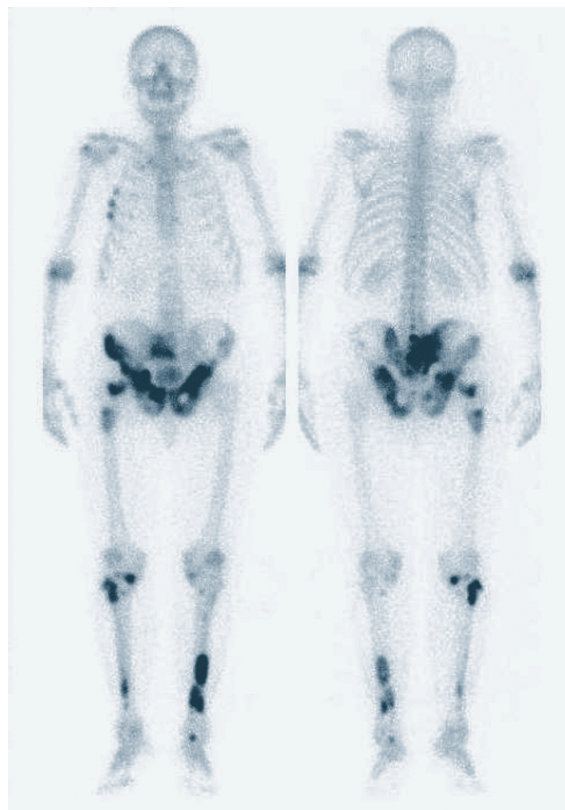


Figure 1. Anterior and posterior whole body bone scintigraphy shows multiple bone metastases in the pelvis, right femur, both tibias and pathological post-traumatic accumulations of the tracer, in the right ribs.



Figure 2. Coronal multidetector CT imaging of the lower extremities shows osteoblastic metastases in the both tibias (arrows). Left leg is congenitally atrophic.

metastatic lesions in bone scintigraphy were seen in both tibias and also in the MDCT scanning.

The interest of our case lies in the undetectable serum PSA levels in a patient with prostatic carcinoma after prostatectomy and recurrence of the disease and also in the site of metastases, in the peripheral bones. Hormonal treatment and the poorly differentiated kind of carcinoma of our patient may at least partly, explain the undetectable serum PSA levels.

Bibliography

1. Goldrath DE, Messing EM. Prostate specific antigen: not detectable despite tumor progression after radical prostatectomy. *J Urol* 1989; 142: 1082-1084.
2. Leibmann BD, Ozdal D, Wheeler TM, Scardino PT. Distant metastasis after radical prostatectomy in patients without an elevated serum prostate antigen level. *Cancer* 1995; 76: 2530-2534.
3. Takayama TK, Krieger JN, True LD, Lange PH. Recurrent prostate cancer despite undetectable prostate specific antigen. *J Urol* 1992; 148: 1541-1542.
4. Hudson MA, Bahnson RR, Catalona WJ. Clinical use of prostate specific antigen in patients with prostate cancer. *J Urol* 1989; 142: 1011-1017.
5. Reigman HIE, Stokkel MPM. Peripheral bone metastases in prostate cancer: a rare localization at initial presentation. *Clin Nucl Med* 2004; 29: 335-336.
6. Hubler J, Sukosd F, Czipri M. Tibia metastasis without prostate specific antigen (PSA) increase following radical vesiculo-prostatectomy. *Int Urol Nephrol* 2000; 32: 281-284.
7. Sciuk J, Kirchner B. Atypical bone metastases in prostate cancer. *Aktuelle Radiol* 1991; 1: 134-137.
8. Barkow U, Weissbach L, Strohmeier A et al. Solitary metastasis of prostate cancer in the tibia. *Aktuelle Radiol* 1994; 4: 274-276.
9. Imbriaco M, Yeung H, Narayanan G, Divgi C. Prostate cancer with leg pain. *J Nucl Med* 1998; 39: 5A, 932.
10. Ono Y, Chiba K, Tanaka H. Characteristics of prostatic cancer in men with a serum prostate-specific antigen level of < or =4.0 ng/ml. *Hinyokika Kyo* 2005; 51: 647-650.
11. Cerović S, Tatić V, Dimitrijević J et al. Advanced prostatic carcinoma with low levels of serum prostate-specific antigen. *Vojnosanit Pregl* 2002; 59: 137-140.

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