Prostatic Adenocarcinoma Metastasis in the Thyroid Gland

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Abstract. Metastasis from prostate to thyroid gland is very uncommon. Here we report a 77-year-old man who was admitted to the hospital because of a nodular goiter. A fine-needle aspiration biopsy of the nodule showed metastatic prostatic adenocarcinoma. This is the second case of a metastatic prostate carcinoma to the thyroid gland.

Key words: Thyroid metastasis, Prostatic adenocarcinoma, Fine needle aspiration cytology

Owing to its rich vascular supply, the thyroid gland is a common site of metastasis from malignant tumors elsewhere. The most common sites of origin are breast, kidney, lung, gastrointestinal tract as well as lymphoma and squamous carcinoma of the head and neck region, and melanoma [1–3]. Prostate cancer is the second leading cause of cancer death, after lung cancer, among males [4]. The most frequent sites of metastatic prostate carcinoma are regional lymph nodes, followed by bone, lung, bladder, liver, and adrenal gland [5]. Here, we report an unusual metastasis of prostatic carcinoma presented as a thyroid nodule.

Case Report

A 77-year-old man with prostatic carcinoma was referred to our department for a nodular goiter. According to the patient’s history, the nodule was present for one year and was slowly growing. Medical history revealed that prostatic adenocarcinoma (Gleason grade 4 + 5) was diagnosed after transurethral prostatectomy two years ago. Prostatic cancer located in the right lobe of the prostatic gland. Preoperative PSA level was 84.08 ng/ml (normal: 0–4 ng/ml). Combined androgen blockade (CAB) therapy consisted of gonadotrophine-releasing hormone analogue (leuprolide acetate) and bicalutamide was started. After 20 months of stable disease, PSA level rose to 127 ng/ml and lumbar vertebrae and bilateral shoulder metastases were detected. Thereafter, owing to the persistence of the patient’s complaints and high PSA levels bilateral orchiectomy was performed.

Clinical examination revealed a hard, palpable, painless, 2 × 1 cm nodule in the right lobe of the thyroid gland. The nodule was slightly movable on swallowing. Chest X-ray, complete blood count and serum biochemistry were normal. Thyroid-stimulating hormone (TSH), free triiodothyronine (fT₃), and free thyroxine (fT₄) were 0.42 μU/ml (normal: 0.1–4 μU/ml), 2.01 pg/ml (normal: 1.62–3.76 pg/ml), and 1.2 ng/dl (normal: 0.89–1.78 ng/dl), respectively. Thyroid auto-antibodies including anti-thyroglobulin and anti-thyroid peroxidase were negative. Thyroid scan revealed a large “cold” nodule (Fig. 1); ultrasonographic examination showed a solid 2 × 2 cm in size nodule with a nonhomogeneous structure in the right lobe of the thyroid gland (Fig. 2).
Fine needle aspiration cytology (FNAC) of this nodule showed metastatic prostate adenocarcinoma (Fig. 3). Tumor cells were positive with prostate-specific antigen (PSA) and negative with thyroglobulin in immunostaining (Fig. 4). The antibodies used were polyclonal antibodies raised in rabbits against human PSA (Neomarkers, ready to use diluted form), and thyroglobulin (Dako Corp, 1/200 dilution).

Because of the widespread bony metastases, no thyroid surgery was considered. The patient was referred back to his urologist for palliative therapy and is alive one year later.

**Discussion**

Even though metastases to the thyroid gland are usually considered rare, the overall incidence in autopsy series varies from 1.25% in unselected autopsy studies to 24% in patients with widespread malignant neoplasm [6]. One series of nearly 25,000 FNACs of...
the thyroid revealed 25 cases (0.1%) of metastases, the primary tumors were carcinomas of the kidney (8 cases), lung (7 cases), breast (5 cases), cervix uteri (1 case), colon (1 case) and 1 case each of malignant melanoma, malignant pleural mesothelioma and rhabdomyosarcoma [7]. Another series reported rare sources of primary tumors such as esophagus, stomach, skin, uterus [6], nasopharyngeal carcinoma, malignant phyllodes, osteosarcoma [8], and choriocarcinoma [9]. Although the majority of the secondary tumors of the thyroid are carcinomas, there are also reported cases of sarcomas [8]. Secondary involvement by direct invasion of the thyroid gland from tracheal carcinoma was also reported [10]. Metastasis to a primary thyroid neoplasm may also occur. Lung [11] and prostate carcinoma [12] metastases to the follicular adenoma of thyroid have been previously reported. In that case, while the metastatic tumor was a prostatic adenocarcinoma, the patient had a history of prostatic adenocarcinoma with diffuse osseous metastases and a large goiter for two years. FNAC of the thyroid mass showed metastatic prostate adenocarcinoma. Histologic examination of the surgical specimen confirmed the FNAC result and also revealed that a follicular adenoma of the thyroid gland was the recipient tumor [12]. To our knowledge, this is only the second reported case of thyroid metastasis from an adenocarcinoma of the prostate to the thyroid gland. Metastasis to the thyroid gland, however, is rarely seen in clinical practice and can be mistaken clinically and pathologically for primary thyroid cancer [12]. Schmid et al. reported 25 metastatic tumors in their large series and among them, 11 patients were known to have previous malignancy [7]. Metastasis to the thyroid gland is usually considered as a terminal event. Nakhjavani et al. reported that 10 of 14 patients with renal cell carcinoma died after thyroid metastasis, 3 developed progressive disease, only one patient had prolonged survival. Five of 7 patients with breast adenocarcinoma had progressive disease after thyroid involvement, one had cancer regression, and one had a stable course [6].

Prostate cancer is the second leading cause of cancer-related deaths in men in Western countries. Histologic evidence of prostate adenocarcinoma is present in 30% of men older than 50 years of age and in 70% of men older than 80 years. About 9.5% of men will have a clinical diagnosis of prostate cancer in their lifetime, and 2.9% will succumb to this malignancy [13, 14]. Prostate cancer has been shown to metastasize by following the venous drainage system through the lower paravertebral plexus, or Batson’s plexus [15, 16]. Although hematogenous spread of other malignancies occurs most commonly to the lungs and liver, 90% of prostatic metastases involve the spine, particularly the lumbar spine. Prostate cancer also spreads to the lungs in about 50% of patients with metastatic disease, and to the liver in about 25 percent of those with metastases [15]. The route of spread to the thyroid gland is also most often hematogenous [12].

FNAC is also useful at the diagnosis of thyroid nodules in metastatic malignancy. FNAC can confirm the clinical suspicion of metastasis to the thyroid gland, with low morbidity and reasonable cost. In some patients, FNAC detects an unsuspected malignancy or may help avoid unnecessary thyroidectomy in patients with a poor prognosis. Positive immunostaining for thyroglobulin of aspiration material suggests a primary thyroid malignancy. However, because only 20–30% of anaplastic carcinomas are also stained positively for thyroglobulin, a negative result is not diagnostic [6]. The histopathologic distinction between a clear cell thyroid tumor and renal cancer metastasis in the thyroid may be quite difficult. Stains for immunoreactive thyroglobulin, if positive, are very helpful, but metastatic tumors may uptake thyroglobulin from the surrounding gland [17]. In our case, thyroglobulin staining was negative, whereas PSA staining was positive. Clinical and pathologic characterization of prostate cancer has been markedly aided by the discovery of PSA. PSA, used as an immunohistochemical marker for prostate gland epithelium, offers a highly sensitive and specific test for diagnosing metastatic prostate cancer [4, 18].

Although thyroid metastasis from a primary adenocarcinoma of the prostate is unusual, physicians must always consider the possibility of metastases, especially in patients with thyroid mass who had a past medical history of prostate carcinoma.

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References


