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Case report

Thyroid Metastasis from Breast Carcinoma Resembling Medullary Thyroid Carcinoma

Juraj Slipac[1], Saša Janjanin[1], Dejan Ljepava[2], Zdenka Hutinec[3] and Zdenka Bence-Žigman[3]

[1] University of Zagreb, Zagreb University Hospital Center, University Department of Head and Neck Surgery, Zagreb, Croatia
[2] Šibenik General Hospital, Department of Head and Neck Surgery, Šibenik, Croatia
[3] University of Zagreb, Zagreb University Hospital Center, Clinical Department of Pathology and Cytology, Zagreb, Croatia

A B S T R A C T

We are reporting a case of a 42-yr-old female with a history of right breast carcinoma. She was surgically treated (breast quadrantectomy with axillary dissection) and receiving a third cycle of adjuvant chemotherapy when a feeling of a constant pressure in the front of the neck and lack of air occurred. Subsequent work-up revealed a node in the right thyroid lobe with enlarged paratracheal bilateral and right mid and lower jugular lymph nodes. Fine-needle aspiration cytology, repeated within a 20 days window and analyzed by two different cytologists, showed a medullary thyroid carcinoma with a cervical lymph nodes metastasis so the patient underwent total thyroidectomy with selective and paratracheal neck dissection. Histology and immunohistochemistry revealed the specimen to be metastasis of breast carcinoma. During regular follow-up of our patient, eighteen months after initial diagnosis, no new metastases were found. To our best knowledge, this is the first described case of a thyroid metastasis of breast carcinoma that was cytologically misdiagnosed as a medullary thyroid carcinoma.

Key words: *breast carcinoma, metastasis to the thyroid gland*

Introduction

Secondary involvement of the thyroid gland is rare and the incidence is reaching approximately 2% of all thyroid neoplasms. Usually, metastatic thyroid disease is identified upon autopsy and only sporadic cases are encountered in clinical material. Primary tumor of the lung, breast, kidney or a melanoma may metastasize to the thyroid[1]. Its differentiation from other benign or primary neoplasms of the thyroid is sometimes difficult. Invasive ductal carcinoma (IDC) is the most common type of the breast cancer, which has been reported to constitute approximately 85% of all invasive breast carcinomas[2]. IDC of the breast usually metastasizes to the lungs, liver, bones and brain[3]. Solitary thyroid metastasis of IDC is rare. Due to the rarity of this condition, the optimal treatment is unclear.

We are reporting the first case of IDC of the breast that was misdiagnosed as a medullary thyroid carcinoma metastasizing solely to the thyroid gland. The patient had a long-term disease-free survival followed by a treatment of total thyroidectomy with selective and paratracheal neck dissection.

Case Report

A right breast carcinoma was diagnosed in a 42-year-old woman. Diagnosis was confirmed with the ultrasonography and a fine-needle aspiration cytology and she therefore underwent quadrantectomy and axillary dissection. Histology of the resected specimen showed an invasive ductal carcinoma of the breast (Grade II) with metastasis to the axillary lymph nodes (from 27 isolated lymph nodes, 1 was infiltrated with tumor without spreading through the capsule). Nottingham prognostic index was 4.7. She also started adjuvant chemotherapy (AC-T protocol) and chemoimmunotherapy (Taxol and Herceptin). On the third cycle of chemotherapy she re-pre-

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sented with a feeling of a constant pressure in the front of the neck and lack of air. Ultrasonography showed a node in the right thyroid lobe with enlarged paratracheal bilateral and right mid and lower jugular lymph nodes. The node was scintigraphically »cold«. The CT scan of the neck showed a larger right lobe of the thyroid gland with a hypodensic node 2.5x1 cm in size in a lower pole. Enlarged lymph nodes were observed in mid and upper jugular lymph nodes, the biggest was 1.3 cm in diameter. A fine -needle aspiration cytology at that time pointed at a medullary thyroid carcinoma with a cervical lymph nodes metastasis so the patient was referred to our hospital for further treatment. Following admission, FNAC was repeated and analyzed by a different cytologist and it pointed at the medullary thyroid carcinoma again, so the patient underwent a total thyroidectomy with selective and paratracheal neck dissection (Figure 1).

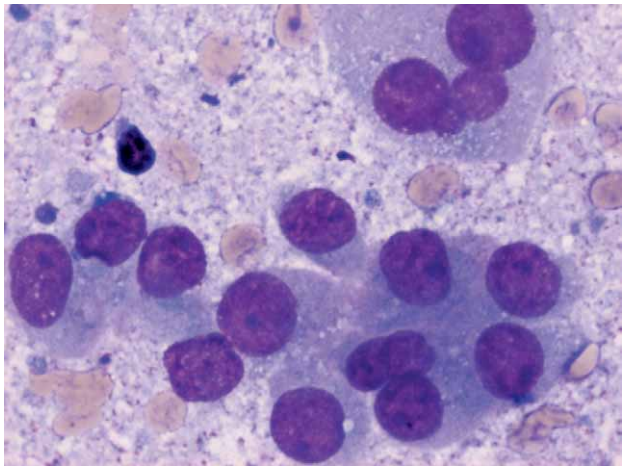

Fig. 1. Fine needle-aspiration cytology of our patient's thyroid tumor. FNAC (60x).

Definitive histology showed white cancer 3.2x2.5 cm in size that is not clearly separated from normal tissue. Cancer tissue was made of solid clusters of malignant cells that were covered by typical epithelial cells. Cancer tissue was partially necrotic. Immunohistochemical staining was negative for calcitonin, chromogranin, S-100, LCA and vimentin, but it was surprisingly diffuse positive on cytoceratin AE1/AE3. The analysis of dissected tissue showed a metastasis of cancer in right mid jugular lymph nodes (4 nodes of 10 isolated were positive) and paratracheal bilateral lymph nodes (on the right side all 7 isolated nodes were positive, and on the left 2 of 3 isolated nodes were positive). The pathologist concluded that cancer tissue is in fact a metastasis of IDC resembling medullary thyroid carcinoma on repetitive FNAC (Figure 2).

Discussion

Metastatic carcinoma of the thyroid is not an unusual finding in autopsy series on patients with proven malig-

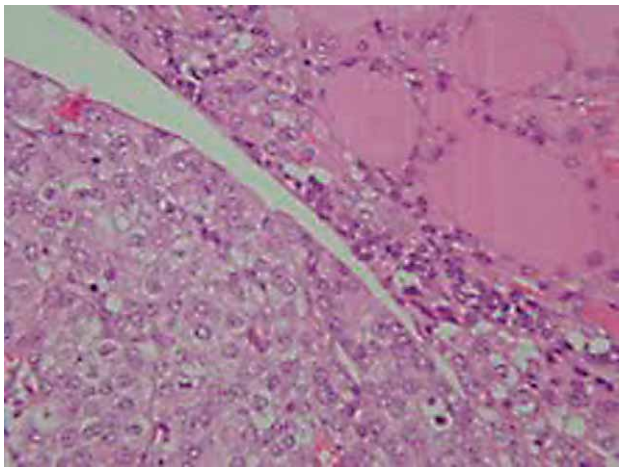

Fig. 2. Histology of our patient's thyroid tumor. histology (400x)

nancy. Shimaoka et al. have reported that metastatic neoplasms of the thyroid are present in 8.6% of 2180 patients with various malignancies at autopsy[4]. There are two types of metastatic pathways to the thyroid, the hematogenous or the lymphangitic one. For the breast carcinoma it has been suggested that it can metastasize both ways[5]. Carcinomas metastatic to the thyroid represent a rare cause of clinically significant thyroid disease. Most thyroid metastases (80%) present within 3 years of primary tumor resection, but with renal clear cell carcinoma they can occur as late as 19 years. Clearly it is important to distinguish primary from secondary thyroid cancer as each is managed differently. Invasive ductal carcinoma of the breast is considered a systemic disease. Generally, distant metastasis is an upset aspect for a cancer patient. However, studies on some malignant diseases suggested that when metastasis is isolated to the single gland, surgical resection of the metastases can lead to survival benefit[6,7]. Long-term survival can be achieved after resection of the metastatic tumor. Furthermore, thyroidectomy may also palliate/prevent the potential morbidity of tumor recurrence in the neck. FNAC of patient's tumor showed numerous isolated malignant cells, clusters of malignant cells and some formed rosette-like structures. Malignant cells had eccentrically enlarged sphere nucleus with partially nucleolus and they were rarely polynuclear. Cytoplasms were , unsharply limited, and finely vacoulised. Some parts of specimen had clusters of homogenic acellular amyloid-like material (Figure 1). For comparison, FNAC of medullary thyroid carcinoma shows usually yielding clusters of tumor cells as well as singly dispersed plasmacytoid cells of variable sizes that are dispersed and are characterized by eccentric nuclei, »neuroendocrine type« chromatin, inconspicuous nucleoli, binucleated and multinucleated cells and a relatively clean background. The detection of amyloid is also a valuable pointer to the diagnosis (Figure 3)[8]. Also, FNAC of IDC shows cell dissociation pattern with both a population of single carcinoma cells and cell clusters. Practically all tumours have a granular chromatin pat-

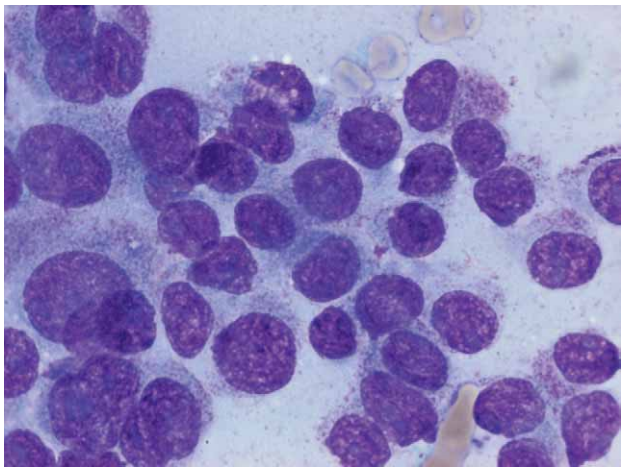

Fig. 3. Fine needle-aspiration cytology of medullary thyroid carcinoma. FNAC (60x).

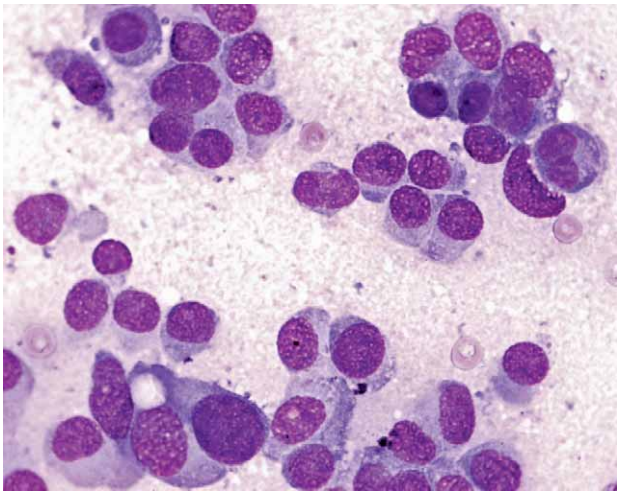

Fig. 4. Fine needle-aspiration cytology of invasive ductal carcinoma of the breast. FNAC (40x).

tern and a slightly irregular nuclear margin with folds and grooves. Nucleoli are mostly indistinct or small with some degree of pleomorphism (Figure 4)[9]. Clearly, there is significant resemblance between these cancers so great attention is needed for identification of the cancer. Medullary carcinoma of the thyroid is an unusual neoplasm which cytological diagnosis is often difficult. Depending on the specific cytomorphology of the tumor, a number of differential diagnoses may arise. The small cell pattern may be mistaken for a malignant lymphoma, poorly differentiated insular carcinoma or metastatic small cell carcinoma, a fibroblastic tumor, a melanoma or like in our case an IDC[8]. Knowledge of an individual patient's personal and family history, as well as a region of origin, may be very useful in determining what immunostaining to perform for patients with an unknown primary tumor[10]. The use of immunohistochemistry has allowed far more undifferentiated cancers to be correctly identified. In our case the CT scans, ultrasonography and a fine-needle aspiration biopsy showed medullary thyroid carcinoma with a cervical lymph nodes metastasis, histology and immunohistochemistry revealed that the thyroid sample was negative for calcitonin, cromogranin, S-100, LCA and vimentin and diffusely positive on cytoceratin AE1/AE3, so actually it was a metastasis of IDS resembling medullary thyroid carcinoma.

Conclusion

Although IDC commonly metastasizes to lungs, liver, bones and brain, its spread to the thyroid gland is uncommon, and should be considered a diagnostic possibility in patients with a past history of IDC presenting with a thyroid nodule. In cases where cytology or histology is not diagnostic, immunohistochemistry may be definite in making the diagnosis. Detection of metastasis to the thyroid gland often indicates poor prognosis, but an aggressive surgical and medical therapy may be effective in a small percentage of patients.

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J. Slipac

University of Zagreb, Zagreb University Hospital Center, University Department of Head and Neck Surgery, Kišpatićeva 12, 10 000 Zagreb, Croatia
e-mail: jslipac@gmail.com

METASTAZA KARCINOMA DOJKE U ŠTITNU ŽLIJEZDU KOJI NALIKUJE MEDULARNOM KARCINOMU ŠTITNJAČE. PRIKAZ SLUČAJA

S A Ž E T A K

Prikazujemo slučaj 42-godišnje žene s anamnezom karcinoma dojke koja je kirurški liječena (kvadrantektomija dojke s aksilarnom disekcijom) i primala je treći ciklus adjuvantne kemoterapije kada se javio osjećaj nedostatka zraka i konstantnog pritiska u prednjem dijelu vrata. Naknadnom obradom je otkriven čvor u desnom režnju štitnjače s obostrano povećanim paratrahealnim i desnim srednjim i donjim jugularnim vratnim limfnim čvorovima. Citološkom punkcijom, koja je ponovljena s razmakom 20 dana i analizirana od strane dva različita citologa, dijagnosticiran je medularni karcinom štitnjače s metastazama u vratne limfne čvorove vrata pa je pacijentici učinjena totalna tiroidektomija sa selektivnom i paratrahealnom disekcijom vrata. Patohistološka i imunohistokemijska analiza je otkrila da uzorak zapravo odgovara metastazi karcinoma dojke. Na redovitim kontrolama pacijentice, osamnaest mjeseci nakon inicijalne dijagnoze, nove metastaze nisu pronađene. Prema našim spoznajama, ovo je prvi opisani slučaj metastaze karcinoma dojke koji je citološki dijagnosticiran kao medularni karcinom štitnjače.