Co-existence of astrocytoma and hurtle cell carcinoma with rare metastasis pattern

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Case Report

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Abstract

Hurtle cell thyroid carcinoma is a rare types of thyroid cancer that include 3% of all thyroid malignancies. It is generally more aggressive than other thyroid cancers and can metastasis to various body organs. Metastasis of thyroid cancers to the paranasal sinuses is very rare. Thyroid cancer metastasis to the brain is also very rare. In this report, we described the rare case of hurtle cell thyroid carcinoma metastasized to the frontal sinus with coexistence of fibrillary astrocytoma in the adjacent frontal lobe of brain.

Introduction

Hurtle cell thyroid carcinoma (HCC) is a rare type of cancer taking part in only about 3% of all thyroid malignancies(1)(2). Hurtle cells (HCs) are large cells with abundant mitochondria which is considered either benign or malignant. Mechanisms leading to development of HCC are not clearly known yet but as obvious, mitochondrial over-proliferation plays the major role (3). Based on histologic findings, HCCs are divided into minimally invasive and highly invasive subgroups. Minimally invasive carcinomas are encapsulated tumors with complete foci of vascular or small capsular invasion (4 > Foci) which is associated with good prognosis, while highly invasive HCCs have poor prognosis with extra-thyroidal invasion. Thyroid malignancies may manifest with distant metastasis. Lungs, mediastinum and bones are common sites of metastasis(4); however, there is only one study reporting metastatic hurtle cell thyroid cancer to the mandibular bone(5). Brain metastasis may also occur in thyroid malignancies but coexistence of hurtle cell carcinoma with primary brain tumors is not common. Herein we report a rare case of HCC with frontal sinus metastasis that was accompanied by fibrillary astrocytoma.

Case Report

A-57-years old woman presented to endocrinology clinic complaining of dysphagia and an enlarged mass in neck. The mass has been growing since six months ago.

The patient’s documented medical history revealed that she had an incidentally diagnosed frontal sinus tumor five years ago. The resected sinus mass had morphological and immunohistochemistry findings suggestive for neoplastic proliferation in epithelial cells with uniform nuclei and vast eosinophilic cytoplasm. Further immunohistochemically(IHC) studies had demonstrated that the lesion may be originated from a metastatic lung or thyroid malignancy (table 1) however, the patient had refused to undergo further investigations for determining the main source of tumor metastasis.

Table 1. Immunohistochemical findings of the frontal sinus mass
Ck: positive
CD117: NEGATIVE
S100: NEGATIVE TTF1: POSETIVE
SMA: NEGATIVE
VIMENTIN: POSITIVE
Synaptophysin: negative
choromograinin: negative

Now after 5 years, she presented to our clinic for the neck mass. Physical examination revealed a palpable and painful mass in both right and left sides of neck. Thyroid sonography showed enlargement of left (96*57*40 mm) and right (81*78*39 mm) lobes and the thyroid isthmus compressing the right carotid artery and enlarged hypoechoic lymph nodes in zones I, II, III, and IV. Reports from Computed tomography(CT) Scan confirmed sonography findings. Further, fine needle aspiration biopsy was performed which was indicative for highly invasive hurtle cell carcinoma Thus, the patient underwent total thyroidectomy. The pathologic study of the excised thyroid showed; unifocal hurtle cell thyroid carcinoma, widely invasive with vascular and lymphovascular invasion. During Post-surgical evaluations before radioactive iodine therapy, abnormally high levels for thyroglobulin was noted. Regarding that high levels of serum thyroglobulin could be indicative for tumor metastasis or co-existence of any other tumors and according to the history of frontal sinus tumor, we decided to perform a brain MRI in order to examine for any metastatic lesion.

Brain MRI indicated infiltrative high signal mass in left frontal lobe of brain and small ones at the right frontal lobe with peripheral edema and marked heterogeneous enhancement (gyral like) at the area measured about 58*40 mm (axial plane) (figure 2 &3). There was also enhancement of frontal bone at site of previous craniotomy and underlying brain parenchyma. We further decided to take a biopsy from the brain lesion. The pathologic studies indicated increased cellularity of the tissues compared to normal brain tissue. Hyper chromic vesicle nuclei with pleomorphism was notable. A small number of mini gemistocytics were observed scattered between cells. According to the IHC and pathology results (table 2), the presence grade 2 fibrillary astrocytoma was confirmed (Figure 4). eventually the patient was referred to oncologist / radio-oncologist for appropriate treatment. We visited the patient again in the 6th months' follow up; the patient was in favorable general condition without any complaints.

Table 2. Immunohistochemistry findings of the frontal lobe mass
Olig-2: positive
GFAP: POSETIVE
ATRX: POSETIVE
KI67: POSETIVE in about 1% of nuclei

Pathology report:

Sections show neoplastic proliferation of astrocytes in diffuse growth pattern in a fibrillary background.

The neoplasm is moderately cellular with microcytic change.

Mild nuclear pleomorphic and a network of delicate astrocytic processes are noted.

No evidence of necrosis, microvascular proliferation and mitotic activity is seen in this specimen.

which is indicative for diffuse astrocytoma WHO grade 2 .

Sections show neoplastic proliferation of epithelial cells in solid and follicular growth pattern. More than 75% of these cells have oncocytic features as large size, distinct cell borders, deeply eosinophilic and granular cytoplasm with large nucleus accompanied by prominent nucleolus (hurthle cell). Capsular and vascular invasion is seen. These findings are associated with hurtle cell carcinoma.

Discussion

Carcinomas arising from thyroid constitute about 1.5 percent of all malignancies and 0.5 percent of cancer related mortalities. Malignant thyroid nodules are dived to Papillary, follicular, medullary, hurtle and anaplastic thyroid carcinomas. 84% of thyroid malignancies are PTCs. FTCs, MTCs and HCCs are less common constituting only 6%, 4% and 3% of all thyroid cancers respectively. Lymphomas originating from thyroid and other rare types of cancer are only 2 percent of all thyroid malignancies(6).

HCC are known as follicular thyroid carcinomas with oxiphilic cells which is differentially diagnosed from FTCs and PTCs. Vascular invasions are a common finding in HCC. They are divided to two types of invasive and highly Invasive. Highly invasive HCCs are capable of distal metastasis to neck, lungs, liver and bone(7)(8).

Distant metastasis worsens the prognosis in patients with HCC as the mortality may increase to 80%. Moreover, patients with distant metastatic HCCs have worse outcomes compared to patients with FTCs and PTCs with distant metastasis(8).

Metastatic invasion of thyroid malignancies to paranasal sinus is extremely rare. In our case Discovering the thyroid malignancy, invading to paranasal sinus, as an incidental finding made the case more

interesting(9).

Also Reported a case of FTC with metastasis to paranasal sinuses. The patient was a woman with intractable frontal headache and recurrent goiter of which were surgically excised 3 times. They reported that the metastatic lesion was invading the orbital roof and anterior fossa. Further studies revealed that the metastatic lesion was originated from FTC arising from the thyroid(10).

In another case report by seddiqi et al had reported a case of PTC invading nasal cavity. The authors reported favorable outcomes in one year follow up despite the difficult surgery. PTC with metastatic lesions to gingiva was noted of which the patient underwent surgical resection and radioactive iodine therapy though the outcomes were not favorable(11).

Beside the unusual site of metastasis in our case, she had also another tumor in her frontal lobe of brain. Although according to the adjacent lesion in posterior wall of frontal sinus, we expected the brain tumor to be originated from thyroid HCC, results from biopsy indicated that the tumor was a grade 2 fibrillary diffuse astrocytoma. The coincidence of two distinct cancers in a patient is infrequent and may be associated to particular genetic predispositions however, in this case we did not find any clue for genetic factors that could associate these two type of cancers and to the best of our knowledge we are reporting a case with concurrent HCC and diffuse fibrillary astrocytoma for the first time. More interesting fact about this case was the adjacent sites of tumoral lesions misleading to the diagnosis of brain metastasis of HCC.

Conclusion

Co-existence of rare malignant tumors in one patient is an infrequent phenomenon which may mislead the diagnosis and treatment. Despite brain masses in patients with other solid organ cancers are more likely to be diagnosed as metastasis, primary brain tumors could also be considered.

Declarations

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Contributions

Iraj Baratpour : Follow up patient , gathering information, preparation of manuscript.

Mohammad Fakhrolmobasheri : revision , follow up patient ,

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Vahid Reisi Vanani :Follow up patient , revision, preparation of manuscript.

Azar Baradaran Ghahfarrokhi : follow up patient , supervision , revision manuscript , report of pathology sample

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Ethics Approval

Informed content and the manuscript was approved by the Local Ethics Committee of Shahrekord University of Medical Sciences (no. IR.SKUMS.REC.1400.197).

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report.

Conflict of Interest

The authors declare no competing interests.

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Figures

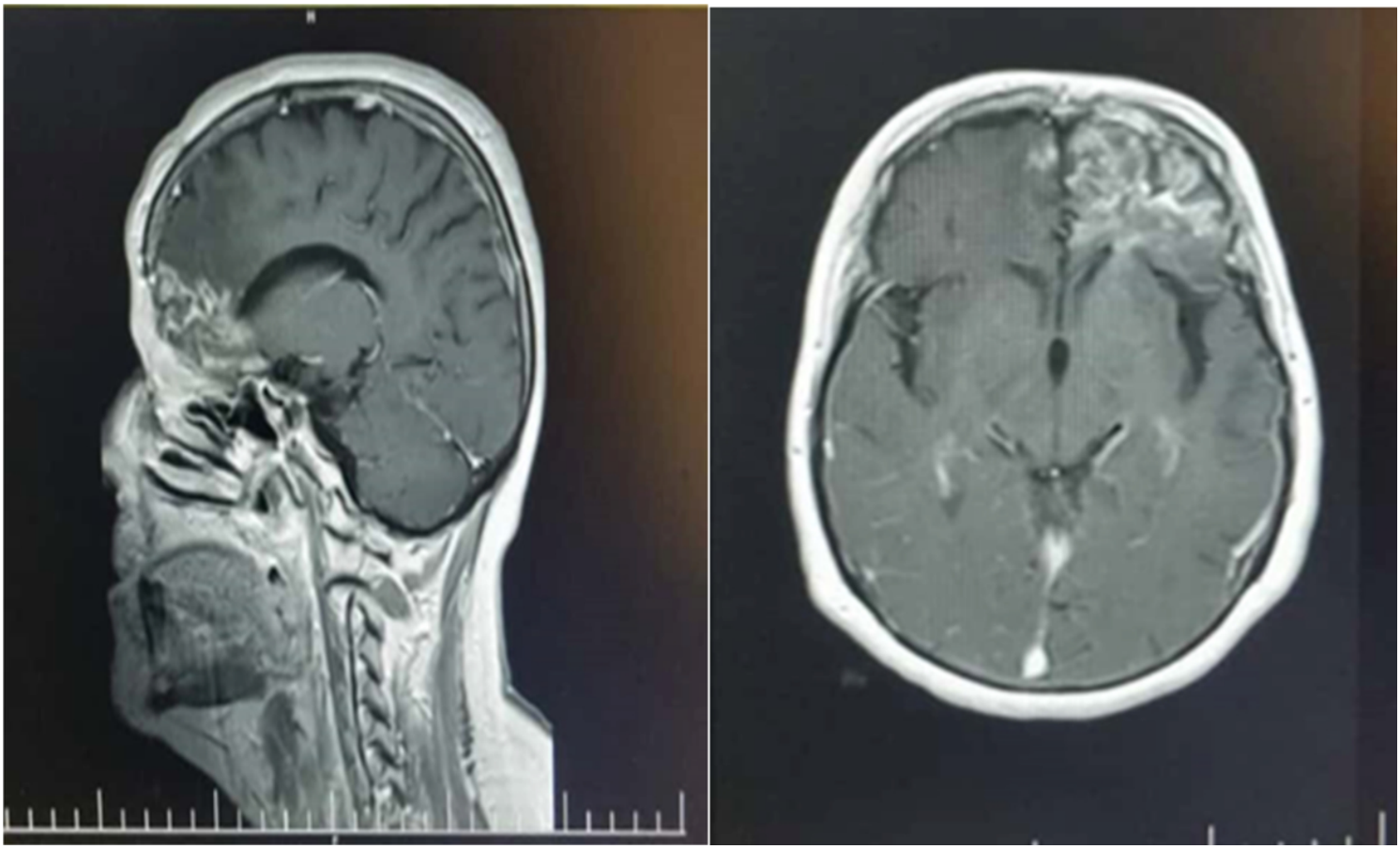

Figure 1

axial & coronal T1 images Showed Infiltrative high signal mass at left frontal lobe and involvement of the right frontal lobe with peripheral white matter edema and markedly heterogeneous enhancement (gyral like).

Figure 2

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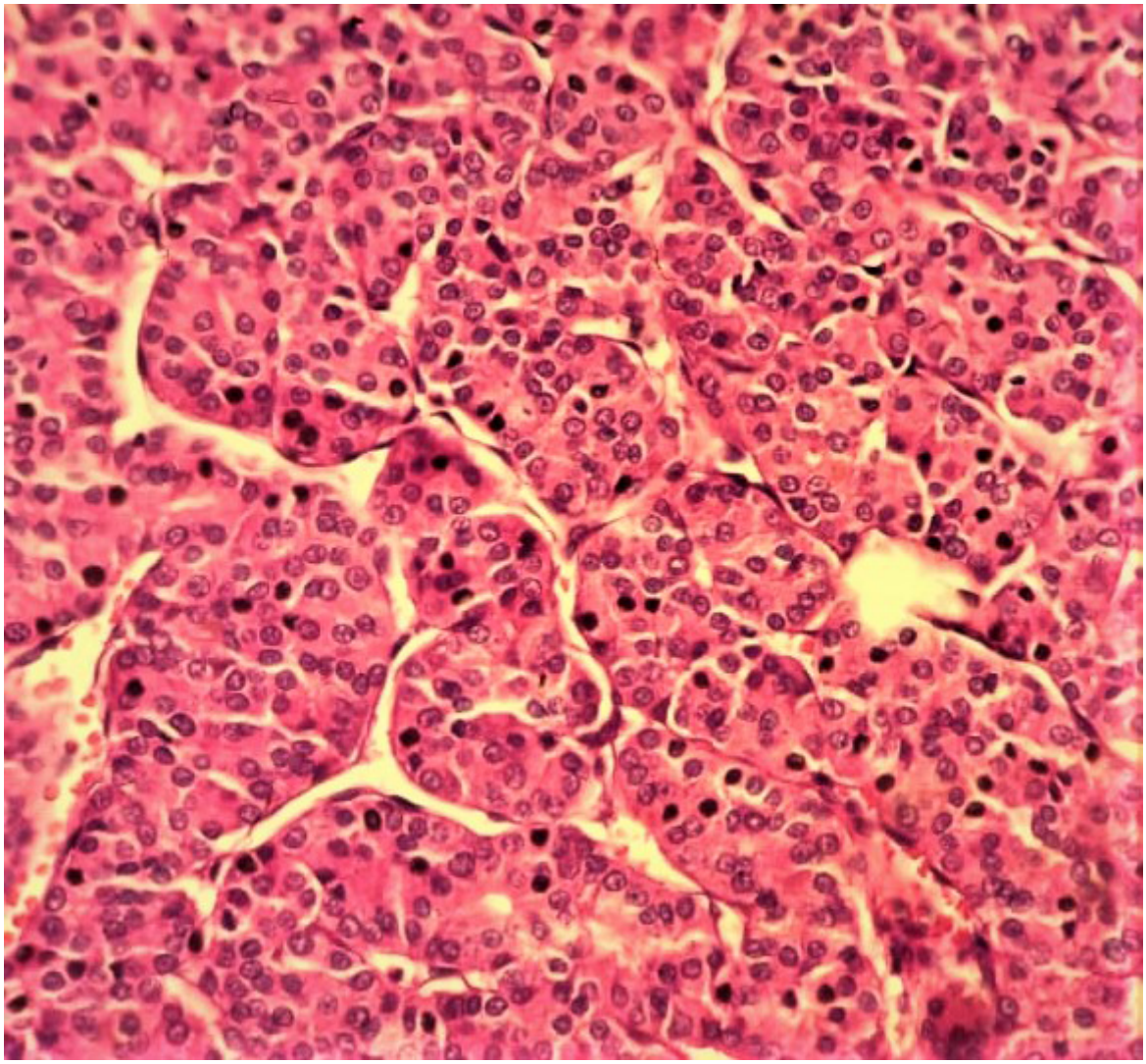

Figure 3

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