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Mixed Gangliocytoma – Thyrotroph Adenoma: Third Case in literature

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Conflict of interest: Nil

Abstract

The coexistence of gangliocytic and pituitary adenomatous components, known as mixed gangliocytoma–pituitary adenoma, is rare, with an incidence of 0.14-0.52%. This report presents a very rare case – Third in literature, of mixed gangliocytoma - thyrotroph adenoma.

We report a case of 41-year-old male with right eye vision loss. Neurologically conscious and obeying verbal commands. Imaging studies showed a sellar/suprasellar mass. Patient underwent tumor resection.

Histological examination revealed a biphasic tumor with two distinct cell populations: mature ganglion cells and neuroendocrine cells arranged in a sheet-like pattern, with minimal mitotic activity. Immunohistochemistry (IHC), showed TSH strong positive, Pit-1 and synaptophysin diffuse strong positive, NF was scattered positive, with MIB-1 ranging from 1-3%.

This condition is rare and requires detailed histological and immunohistochemical analysis for accurate diagnosis.

Keywords: Mixed gangliocytoma- thyrotroph adenoma, Pituitary adenoma, Gangliocytoma, Dual lineage

Introduction

Gangliocytomas are extremely rare benign tumors representing < 1% of Sellar tumors.[1,2,3,4] Even rarer are, Gangliocytomas existing with pituitary adenomas which account for 0.14% - 0.52% of Sellar tumors and are recognized as mixed gangliocytoma – pituitary adenomas.[1,2,5,6] The most common functioning mixed gangliocytoma – pituitary adenoma are growth hormone secreting adenomas associated with acromegaly and less often cushing disease and hyperprolactinemia.[3,7,8]

The following report describes a rare case of mixed gangliocytoma - thyrotroph adenoma.

Case Report

A 41year old male presented with the complain of vision loss (R>L) since 3 years.

On neurological examination patient was conscious, obeying verbal commands, GCS was E4V5M6, pupils were B/L 3MM RL, Bowel/ bladder tone was normal, DTR was normal, plantar reflex was B/L flexor.

MRI scan of Sella showed enlarged sella with bilateral parasellar and suprasellar extension upto 3rd ventricular. lesion is extending in interpeduncular fossa compressing the both cerebral puduncles. Bilateral parasellar extension on right side the lesion is extending above and below the cavernous ICA – Knosp grade 3. On left side the lesion is completely encasing the cavernous ICA - Knosp grade 4.

The pituitary lesion was treated with endoscopic transsphenoidal resection of tumor and drainage of sellar cyst with autologous fat duroplasty.

Intraoperative findings suggest tumor was greyish white in colour, soft, suckable, moderately vascular.

Histopathological examination of resected tumor composed of cells with round to oval nuclei showing nuclear atypia & abundant eosinophilic cytoplasm. Some ganglionic cells also seen. Mitotic activity is not significant. On H&E, the differential diagnosis was pituitary adenoma and mixed gangliocytoma- adenoma tumor.

Immunohistochemical analysis shows TSH strong positive, PIT-1 and synaptophysin diffuse strong positive, NF was scattered positive. T-PIT, NeuN, TTF-1, GFAP, OCT-4, GH, ACTH, FSH, LH, PRL showed negative expressions. The MIB-1 was 1–3%.

The diagnosis of a mixed gangliocytoma-thyrotroph adenoma was made.

Post operative course was uneventful, managed with IV antibiotic, IV analgesic. At discharge patient was stable, ambulatory, taking oral intake, afebrile, with a healthy wound.

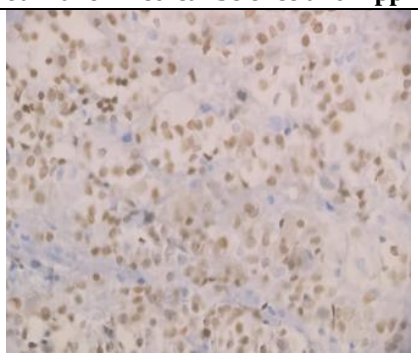

Figure 1: Pit-1 (IHC)

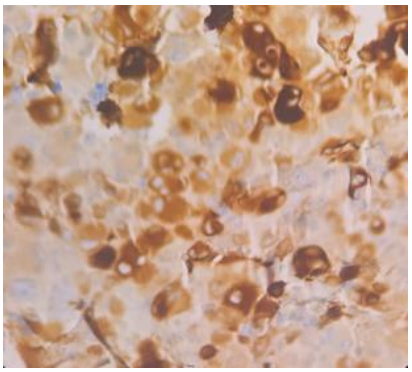

Figure 2: TSH (IHC)

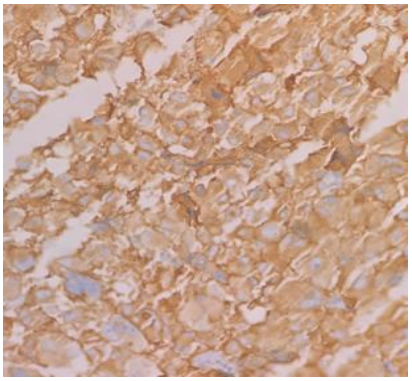

Figure 3: Synaptophysin (IHC)

Discussion

The identification of a dual sellar pathology is considered challenging since majority cases are present clinically and radiologically as pituitary adenomas. The definitive diagnosis is determined on the basis of histological and/or immunohistochemistry studies.

These pituitary tumors have also been called pituitary adenoma – neuronal choristoma (PANCH), pituitary adenoma with neuronal choristoma and pituitary adenoma with gangliocytic component.[3,9]

The origin of the pituitary gangliocytomas is still controversial, with various proposed hypotheses. First, the pituitary adenoma formation occurs as a result of endocrine or paracrine stimulation of adenohypophysial cells by the pituitary hormone-releasing hypothalamic hormones, produced by ganglion cells. Second, the ganglionic component originates from the neural differentiation of a preexisting pituitary adenoma in a process suggestive of transdifferentiation. Third, a common origin for both neuronal and adenomatous components from uncommitted stem cells from the adenohypophysis, which is capable of multidirectional differentiation.[1]

Transcription factors are important for cell specific differentiation include: Pit1 leads to the differentiation of somatotrophs, lactotrophs and thyrotrophs. Tpit drives the differentiation of corticotrophs. SF1 regulates gonadotroph cell differentiation.[3]

In our study, TSH strong positive, Pit-1 and synaptophysin diffuse strong positive, NF was scattered positive.

Reviewing the literature, Only case study we found after extensive search was of Kiyohiko Sakata et al (2020) stated that IHC was positive for TSH, TRH, Pit-1, GATA2, SSTR2A and for most neuronal markers like synaptophysin, chromogranin A, NF and show scattered expression for CAM 5.2, CK7.[6]

And one case in an original article of 20 cases was found. Bao Yang, Chenlong Yang et al (2018) stated that endocrine examination showed elevated TSH level in one case out of the 20 cases.[10]

To rule out the presence of neurohypophysis or pituitary stalk in the area of neuropil-like matrix, immunostaining for pituicytes using TTF-1 was performed with no reactivity in any area of the tumor.[3]

Conclusion

We present a rare case of mixed gangliocytoma-thyrotroph adenoma. The frequent coexistence of gangliocytic and adenomatous components within a neuroendocrine tumor suggests their origin from multipotent progenitor cells capable of differentiating into diverse morphological patterns and synthesizing multiple hormones. The differential diagnosis of Mixed gangliocytoma – pituitary adenoma should be kept in mind while evaluating tumors of Sellar / suprasellar region. Immunohistochemical (IHC) analysis in our case revealed strong positivity for TSH and diffuse strong positivity for Pit-1. Given that many cases may be clinically and biochemically silent, as observed in our case, definitive diagnosis relies on immunohistochemical evaluation.

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