Intracranial Immature Teratoma

see also Intracranial teratoma.

Intracranial immature teratoma is an extremely rare disease with poor prognosis and requires complicated treatment. Owing to the deep midline location of the tumor, total surgical resection of the tumor is challenging.

Diagnosis

The detection of their clinical manifestation, the analysis of imaging features and the serum levels of tumor markers are helpful in diagnosing intracranial teratomas [1].

When an intracranial immature teratoma involves the nasal cavity, the lesions in the nasal cavity may mimic other tumors including olfactory neuroblastoma. Jiang et al. suggested that thorough examination of tumor tissues and identification of variable components are critical for the appropriate diagnosis of intracranial immature teratoma [2]

Treatment

The total removal of the tumor is important to cure the disease. Huang et al. did not see a difference in outcome between patients who received postoperative chemotherapy or radiotherapy and those who did not. Regular follow-up MRI examinations are necessary so that the conditions of the patients can be closely monitored. If a patient has residual or recurrent tumor after surgery, gamma knife surgery can be effective [3].

Outcome

The prognosis of intracranial immature teratomas is poor [4].

Case series

The clinical data, serum levels of tumor markers, treatment regimens and prognosis of 15 patients with intracranial immature teratomas were reviewed retrospectively.

In patients whose plasma alpha-fetoprotein (AFP) and beta-human chorionic gonadotropin (beta-HCG) were determined, AFP and beta-HCG were elevated in 57.1 and 16.7% of the cases, respectively. All patients received surgical treatment. The tumor was totally removed in 12 cases, subtotally in 2, and

partially in 1 case. After surgery, of the 15 patients, 9 received radiotherapy, 4 gamma knife surgery and 7 chemotherapy. Thirteen patients were followed up. Compared to the common 5-year survival rate of 40%, in patients who received gamma knife surgery, the 5-year survival rate after surgery was 100%, which is better than the 5-year survival rate of patients who did not receive gamma knife surgery ($p = 0.0049$). Postoperative radiotherapy and chemical therapy had no significant impact on the 5-year survival rate ($p > 0.05$).

The prognosis of intracranial immature teratomas is poor. The detection of their clinical manifestation, the analysis of imaging features and the serum levels of tumor markers are helpful in diagnosing intracranial teratomas. The total removal of the tumor is important to cure the disease. We did not see a difference in outcome between patients who received postoperative chemotherapy or radiotherapy and those who did not. Regular follow-up MRI examinations are necessary so that the conditions of the patients can be closely monitored. If a patient has residual or recurrent tumor after surgery, gamma knife surgery can be effective [5].

Case reports

Woo et al. presented the experience with a fast-growing pineal gland immature teratoma in a 4-year-old boy, who presented with obstructive hydrocephalus and abducens nerve palsy, which was treated with total surgical resection of the tumor. In addition, they aimed to determine the appropriate treatment modality for intracranial immature teratomas by reviewing the literature and investigating the prognosis [6]

A 27-year-old woman was referred for headache, nasal congestion, and decreased olfactory sensation. Imaging showed a mass measuring approximately 5 cm × 4 cm in the right frontal lobe, which also filled the right nasal cavity. Histopathologically, the intracranial tumor tissues were composed of both mature tissues, including glands and squamous epithelial cells and immature neuroectodermal components. However, the tumor tissues in the nasal cavity were mainly immature neuroectodermal components that mimicked olfactory neuroblastoma. The cells stained positively for neuron-specific enolase, Alpha Thalassemia/Mental Retardation Syndrome X-Linked, and Oligodendrocyte transcription factor on immunostaining, proving a neuroectodermal differentiation.

According to these findings, the tumor was diagnosed as a primary intracranial immature teratoma that also involved the nasal cavity after excluding the metastatic tumors.

The patient underwent 2 surgeries. The first surgery was via the subfrontal approach, followed by a second endoscopic sinus surgery performed 22 days later.

The patient had no recurrence within a 6-month follow-up after the last surgery.

When an intracranial immature teratoma involves the nasal cavity, the lesions in the nasal cavity may mimic other tumors including olfactory neuroblastoma. We suggest that thorough examination of tumor tissues and identification of variable components are critical for the appropriate diagnosis of intracranial immature teratoma, a rare tumor [7]

[1] [3] [4] [5]
Huang X, Zhang R, Zhou LF. Diagnosis and treatment of intracranial immature teratoma. Pediatr

Neurosurg. 2009;45(5):354-60. doi: 10.1159/000257524. Epub 2009 Nov 11. PMID: 19907199.
[2] [7]
Jiang Y, Mao X, Zhao Y, Fan C. Intracranial immature teratoma invading the nasal cavity mimicking olfactory neuroblastoma: A case report. Medicine (Baltimore). 2018 Jul;97(28):e11527. doi: 10.1097/MD.0000000000011527. PMID: 29995824; PMCID: PMC6076187.
[6]
Woo SB, Lee CY, Kim CH, Ko YS, Kim E, Shim YJ, Kim SP, Kwon SM. Rapid-Growing Intracranial Immature Teratoma Presenting Obstructive Hydrocephalus and Abducens Nerve Palsy: A Case Report and Literature Review. Brain Tumor Res Treat. 2022 Apr;10(2):117-122. doi: 10.14791/btrt.2022.0005. PMID: 35545832.