Long-term Endocrine Evaluation of Childhood Brain Tumors

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Objective: Brain tumors in childhood carry a high risk for endocrine disorders due to direct effects of the tumor and/or surgery and radiotherapy. Somatotropes are vulnerable to pressure and radiotherapy, therefore growth hormone (GH) deficiency is the one of the most frequent abnormality. The aim of this study was to evaluate the endocrine disorders and GH therapy outcome in brain tumor survivors.

Methods: In this study, 65 (27 F) patients were classified as craniopharyngioma (n=29), medulloblastoma (n=17) and others (n=19) in three groups. Others were astrocytoma, ependymoma, germinoma, pinealoblastoma and meningioma. Anthropometric data and endocrine parameters of patients and their growth outcome with/without GH therapy were collected from medical records retrospectively. Radiotherapy and chemotherapy were given in 56.2% and 34.4% of the patients, respectively.

Results: Mean age at first evaluation in Endocrinology Department was 8.7±3.6 years (range:1.0-17.1 years). Height, weight and body mass index mean ± SD (median) values were -1.7±1.7 (-1.5), -0.8±1.9 (-0.8) and 0.2±1.5 (0.4), respectively. Brain tumors were diagnosed in nine patients (13.8%) during their endocrine evaluation for other reasons such as shorvt stature. Mean referral time of the patients diagnosed in Oncology/Neurosurgery (n=56) for endocrine evaluation was 1.2±1.5 years (median:0.8). Referral time in medulloblastoma group (mean 2.1±1.6, median 2.0 years) was significantly longer than in the other two groups (p<0.001). Mean follow-up time (n=60) was 6.3±4.0 years in our clinic. During follow-up, hypothyroidism (secondary 70.8%, primary 10.8%) was detected in 81.5% of patients. Primary hypothyrodism in medulloblastoma (29.4%) was significantly higher compared to other groups (p=0.002) and all patients with primary hypothyroidism were given radiotherapy. GH therapy was recommended to 33 patients. Parents of four patients (12%) did not accept GH therapy. Results are shown in the Table.

Conclusion: Endocrine disorders were frequently seen in patients with brain tumors. In craniopharyngioma cases, response to GH therapy was satisfactory. However, in medulloblastoma patients, there was no improvement in height prognosis during GH therapy.

Table 1. Evaluation of GH therapy results in childhood brain tumors

GH treatment	mean ± SD	Craniopharyngioma	Medulloblastoma	Others	All patients
At start	Age	12.0±3.5	10.7±2.0	11.8±1.3	11.6±2.9
	Height SDS	-2.9±1.4 (n=14)	-3.3±1.3 (n=7)	-1.8±1.4 (n=4)	-2.8±1.4 (n=25)
	BMI SDS	0.5±1.4	-0.3±1.0	-0.3±1.4	0.2±1.3
First year	Age	13.5±3.4	12.0±2.2	12.7±1.3	13.0±2.9
	Height SDS*	-2.2±1.4 (n=12)	-3.9±0.8 (n=4)	-1.4±1.1 (n=4)	-2.4±1.5 (n=20)
	BMI SDS	1.1±3.2	-0.8±2.0	0.0±1.6	0.5±2.8
Second year	Age	14.1±3.3	13.2±2.5	14.0±1.3	13.9±2.8
	Height SDS*	-1.6±1.5 (n=11)	-4.0±0.7 (n=4)	-1.3±1.4 (n=3)	-2.0±1.7 (n=18)
	BMI SDS	1.1±3.9	-0.3±1.0	0.8±0.9	0.7±3.1
Last evaluation	Age	18.3±5.1	16.5±1.6	16.6±2.5	17.5±3.9
	Height SDS	-1.2±1.5 (n=8)	-3.9±1.4 (n=4)	-1.4±1.3 (n=3)	-1.9±1.8 (n=15)
	BMI SDS	3.0±6.2	-0.3±1.0	0.0±1.6	1.5±4.7
Final height SDS		-1.5±1.5 (n=7)	-4.0±1.9 (n=3)	-2.0±0.4 (n=2)	-2.2±1.8 (n=12)

*p<0.05

GH: growth hormone, SDS: standard deviation score, BMI: body mass index