MANAGEMENT OF CRANIPHARINGIOMAS IN CHILHOOD

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Abstract

A 7 year old patient known from his medical history with visual impairment from the age 2 years and 6 months, which have progressed once the child began school. Careful examination revealed the presence of a tumor formation with selar location, which proved to be craniopharyngioma. Postoperative evolution was relatively good, but a redoubtable complication appeared, namely diencephalic obesity.

Key words: craniopharingiomas, child

Introduction

Craniopharyngioma is a partially cystic embryogenetic malformation localized sellar or parasellar. The incidence is 0.5-2 new cases / year / 1000000 in the general population; 30-50% of these cases are found in children (1). Central Brain Tumor Register (USA) 0.13 / 100,000 with a peek at 5-9 years with incidence 0.2 / 100,000 cases. In terms of pathogenesis there are two types: adamantinomatous and papillary. The first form implies the neoplastic transformation of the embryonic squamous cell involving the craniopharingeal duct which connects Rathke's cleft with the stomodeum. Trough the proliferation and rotation process, Rathke's cleft is contributing in the formation of the adenohypophysar cells (3). This origin explains the extension to the suprasellar region. Clinic, symptoms are nonspecific, most often occur as a nonspecific headache, visual abnormalities, severe short stature, polyuria, polydipsia and sometimes weight gain. Rational approach is surgical removal by transsphenoidal or transcranial approach depending on the location and extension and irradiation at high age groups - teenagers, adults (conventional radiotherapy, intracavitary irradiation). Reportedly tumor recurrence is more common in patients whose onset has occurred under the age of 5 years. No gender discrepancies in terms of the frequency of relapses have been noticed. Recorded post-surgical after-effects are pituitary hormone deficiency; some impairments are present before surgery with postsurgical emphasis, requiring replacement on that line. If tumors are very large and affects the optic chiasm it is likely to experience post-surgical visual disturbances and even amblyopia. Hypothalamic dysfunction as sleep disorders and circadian rhythm abnormalities and obesity are also known to appear (3). Mortality in patients with craniopharyngioma is 4 times higher than in the general population. As opposed to craniopharyngioma with an onset in adulthood, the onset in childhood can lead to hydrocephalus in patients less than 5 years old. Recent studies report decreased cognitive performances in pediatric patients with large tumors that require resection (5).

Case presentation

SRL, 7-year old patient with visual disorders onset in September 2014 with the beginning of the school year. The ophthalmologic examination performed in this period highlights dyschromatopsia (already known from the age of 2 years and 6 months) and decreased visual acuity with gradual progression from AVOD = 80% and AVOS = 30% (September 2014) to the AVOD = 10% and AVOS = 30% in November. In december, to exclude a possible damage to the eye, a cranial MRI investigation is performed and revealed a sellar and suprasellar tumor with dimensions of 33/35/27 mm. Physical exam reveals a height of 111.5 cm, height of age : HA = 119.87+/- 5.18 (SDS = -2.34) - according Prader scale, W = 20 kg , weight of age :VH = 18.66+/-2.53, harmonic. External genitalia, well configured, stage 1 puberty (according Prader scale). The patient does not present cephalalgic syndrome, polyuria or polydipsia. RX Vo = 3.6 - 4 years. Biochemical investigations highlights central hypothyroidism TSH = 1.69 mmol / nl, FT4 = 7.29 pmol / L (low) and hypocortisolism (7.25 umol/dl). IGF1 = 39.56 ng / ml. the child was sent to chirurgical department. Preoperative MRI revealed in March 2015 a voluminous expansive process increased in size compared to previous examination 41.5 / 32.5 / 29 cm, developed into the suprasellar region, with a compressing effect on the optic chiasm and ventricle III, with intraemispheric expansion, clear contour, irregular, polilobulated, suggestive of craniopharyngioma, well vascularized and forming adherences to the infundibul and sellar diaphragm (Fig No. 1).

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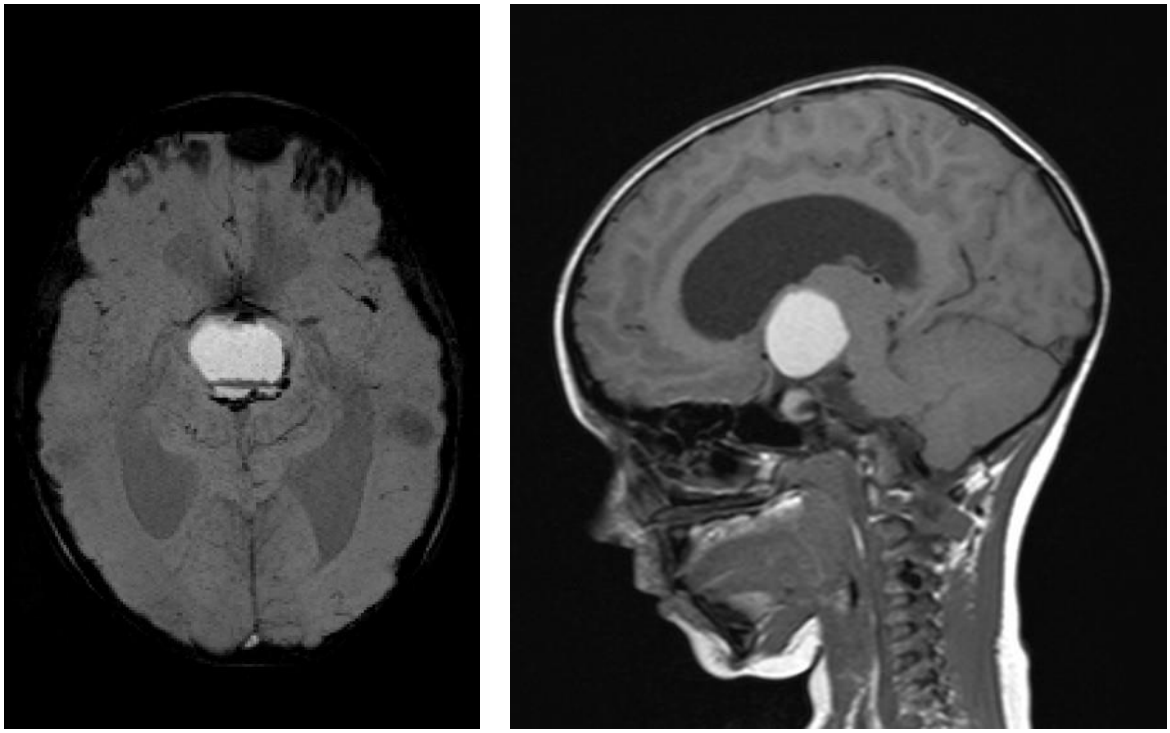

Fig . 1. SRL - MRI before surgery.

The solid portion of the tumor is poorly represented with yellowish microcalcifications. The complete resection of the tumor was achieved; the resected piece is sent for histology and immunohistochemistry. Microscopic findings revealed squamous epithelial cell proliferation in nests and trabeculae with peripheral arrangement in polisade, central stellate cells in an edematous fibrovascular stroma and cystic degeneration; "wet keratin" deposits, microcalcifications, granular cholesterol deposits and polymorph inflammatory infiltrate; adjacent brain tissue with reactive astrocytal gliosis.

The conclusion of the histopathological examination is adamantinomatos craniopharyngioma. Preoperative, the patient received Euthyrox 25 ug, 1/2 cp / day po 30 minutes before a meal and Hydrocortisone powder 7.5 mg, 2.5 mg every 8 hours (8-14-22). Biological investigations revealed moderate cytolysis ALT = 64 U / l (VN <39 U / l) cholesterol = 7.65 mmol / l, increased (VN <5.2 mmol / L), LDL cholesterol = 5.13 mmol / l (VN = 0-3.35 mmol / l), increased total lipids = 8.33 g / l (VN = 5-8 g / l) increased dose; cortisol = 22.91 (VN = 171-536), low FT3 = 2.30 pmol / l (VN = 4.1-7.9 pmol / l) decreased. The rapid weight gain of 1.5 kg in two months post surgical intervention, led us to investigate the metabolism of carbohydrates: glucose = 4.24 (VN), insulinemia = 2.13 uiu / mL, HOMA = 0.4, C peptide= 0.66. The substitution were Hydrocortisone 7.5-5-5 mg /day ,Euthyrox 1-0-0 hp 25 hp ug / day and Minirin Melt in the same dosage; at the same time a hypocaloric hypoglucidic and hypolipidic diet was established. Fours months after the surgery, a performed neurosurgical control indicated MRI; It highlights: pterion bone flap law; little fluid accumulation bilateraly, fronto-parietal subdural pericerebral with hyper T2 and T1 hyposignal, well-defined with hygroma aspect, with maximum thickness of about 10 mm associating minimal gadolinophyl thickening of 3 mm of the convexitar meninges; no pathological locoregional contrast prize, sellar or suprasellary, without MRI visible signs of tumor rest; the widend aspect of the turkish saddle, chiasm tank, suprasellar region, supraoptic recess respectively interpeduncular fossa; symmetrical ventricular system on the midline, with increased lateral ventricle size, relatively unchanged to postoperative examination; midline structures in normal position. The substitution treatment is continued, but the auxological parameters Cr A Height 111,5cm, Ha = 124+/- 5.20 (SDS = -2.44) increased, Weight = 26.7 kg, Wh = 18.66+/-2.53, BMI = 21.67 highlight a rapid weight gain; the hypercaloric diet administered by the mother contains 2000 calories instead of 1400-1500 calories and this led to an accelerated increase in weight. Sleep disorders were present, which highlighted a mixed form of apnea / hypopnea with AHI = 404. Biological hypercholesterolemia. In September 2015, seven months after surgery, the patient is 7 years and 5 mo with the same Height 111.5 cm, increased Weight 30.5 kg, BMI = 24.75 with, Abdominal perimeter 72.5 cm. A diet excluding concentrated carbohydrates and limitation of those with long period of adsorption was indicated together with increase of physical activity.

Discussions

Craniopharyngioma, benign trough histology but malignant because of relapse rate and location, is a relatively rare tumor in childhood. Adamantinomatous forms can occur at any age but are most common in childhood. As a

location, craniopharyngioma can occur anywhere along the craniopharingeal channel but most cases are located in the region with these frecvcente saddlery and paraselara supraselar (20-41% pure suprasellar and 53-75% sellar and subsellar). Intrasellar localizations are rare (5-7%) (6). Depending on the tumor location and size, time elapsed since the occurrence until symptoms occur varies between 1 week and 372 months (7). Clinical signs include tumor evocative headache by some authors (8) or visual disorders by newer studies (6), memory loss, ataxia and cognitive dysfunction. Our patient presented progressive visual anomalies. Regarding hormonal dysfunction at the time of diagnosis the literature mentions that 85% of patients have between 1 and 3 hormonal dysfunctions (7), with a rate of 35-95% GH, LH / FSH ratio of 38-82 %, 21-26% ACTH, TSH 21-42% and 6-38% diabetes insipidus (6.9). Our patient falls in the cathegory of patients with repeated TSH hormone deficiency and growth hormone according to the evolution of height. Preoperative steroids were administered to prevent hypocortisolism side effects occurring after surgery. Postsurgical, transient diabetes insipidus can be found in 80-100% of children (10), while the percentage of 40-93% children present a permanent form (11,12), compared to adults. Our patient's permanent diabetes insipidus appeared immediately after surgery. Regarding the histological form of the disease, squamous epithelial cells, trabeculae and uneven lumps of "dry keratin" established the adamantinomatous form. The papillary form cell comprises monomorphic masses arranged in polisade. The adamantinomatous form of our patient associates in 70% cases beta catenin mutations (13,14). The most common mutation is found in exon 3. Tumor removal was followed by substitution treatment implementation with Euthyrox, Hydrocortisone and Minirin Melt; under stress (physical, infectious etc.), the indication is to increase the dose of Hydrocortisone. Our patient had a relatively smooth postoperative course, but rapid increase in weight of about 10 kg in six months raised suspicion of diencephalic obesity risk of the metabolic syndrome and cardiovascular complications at an early age. Currently a pharmacological treatment of diencephalic obesity with dextroamphetamine administered at 10 months, maximum 24 at operation, especially in young people, is discussed. Sibutramine has been used as a treatment for obesity achieving a 7-10% weight loss in combination with diet (15). The mechanism of action is to reduce serotonin norepinephrine and dopamine reuptake. Post- intervention, diencephalic obese patients with craniopharyngioma have predominant parasympathetic autonomic nervous system activity. Parasympathetic system induces insulin secretion stimulated by direct action on pancreatic beta cells and promovating adipogenesis. Octreotide, a somatotropin analog was proposed in order to limit insulin secretion. In our case the patient will benefit from diet, exercise and weight monitoring. The risk of recurrence is high according to data from literature. The patient will be monitored three times a year, biologically and AV in order to prevent any recurrence and diencephalic obesity.

Conclusions

Compared with craniopharyngioma with onset in adulthood, children have different clinical, biological and evolutionary features. The patient monitoring should be done by a team of, pediatric endocrinologist, dietician, ophthalmologist, neurologic surgeon and radiologist.

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