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NEUROIMAGING MARKERS OF AGGRESSIVENESS OF MACRO- AND GIANT PITUITARY ADENOMAS

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Resume

This article deals with the results of analysis in 3 Centers in Tashkent (RSSPMC of Endocrinology named by acad. Ya.Kh. Turakulov, Scientific Center for Neurosurgery and Scientific Center for Emergency Medical Aid of the Ministry of Health of the Republic of Uzbekistan), according to which for 3 years (from 2015 to 2017) 156 patients with macro- and giant pituitary adenomas (of which 76 were men, 80 were women), middle age: men were 37.12 years, women were 38, 15 years, were examined.

The authors researched the peculiarities of MRI data for pituitary gland and concluded that various variants of its supra cellular growth can serve as a neuroimaging marker of tumor aggressiveness, namely: supra-infra-late cellular growth, supra-infra cellular growth were observed in 68 patients (43.5%) and invasive tumor growth (69.2%).

Key words: macro- and giant pituitary adenomas, MRI, tumor recurrence

МАКРО- ВА ГИГАНТ ГИПОФИЗ АДЕНОМАЛАРИНИНГ НЕЙРОВИЗУАЛИЗАЦИОН ХАРАКТЕРИСТИКАСИ

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Резюме

Ушбу мақолада Тошкент шаҳридаги 3 та марказга(Эндокринология Республика Эндокринология Ихтиосослаштирилган илмий-амалий тиббиёт маркази,Эндокринология илмий маркази ва ЎзР ССВШошилинч тиббий ёрдам илмий маркази) ётқизилган беморларнинг таҳлил натижалари келтирилган. Унга кўра, 3 йил давомида (2015-2017 йиллар) макро- ва гигант гипофиз аденомалари билан огриган 156 нафар бемор (шундан 76 нафари эркак,80 нафари аёл) даволанган. Беморларнинг ўртача ёши: эркакларда 37,12 ; аёлларда -38,15 ёшни ташкил этди.

Муалиффлар беморларнинг МРТ натижаларини ўрганиб чиқиб шундай хулосага келишди: ўсимтанинг агрессив нейровизуализацион маркери бўлиб унинг супраселляр ўсишининг турли вариантларини хизмат қилиши мумкин, хусусан: супра-инфралатероселляр ўсиш, супра-инфраселляр ўсиш (68 беморда учраган (43,5%) ва ўсимтанинг инвазив ўсиши (69,2%).

Калит сўзлар: гипофизнинг макро- ва гигант аденомалари, МРТ, ўсимтанинг қайта ўсиши

НЕЙРОВИЗУАЛИЗАЦИОННАЯ ХАРАКТЕРИСТИКА МАКРО - И ГИГАНТСКИХ АДЕНОМ ГИПОФИЗА

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Резюме

В данной статье представлены результаты анализа госпитализированных в 3 Центра г Ташкента (РСНПМЦ Эндокринологии, Научный Центр Нейрохирургии и Научный Центр Экстренной Медицинской Помощи МЗ РУз), согласно которым за 3 года (период 2015-2017 гг.) было пролечено 156 больных с макро - и гигантскими аденомами гипофиза (из них мужчины – 76, женщины -80). Средний возраст: мужчин составил 37,12 лет, женщин - 38, 15 лет.

Авторы изучили особенности данных МРТ гипофиза и пришли к заключению, что нейровизуализационным маркером агрессивности опухоли могут служить различные варианты ее супраселлярного роста, а именно : супра-инфралатероселлярный рост, супра-инфраселлярный рост, наблюдавшиеся у 68 пациентов (43,5%) и инвазивный рост опухоли (69,2%).

Ключевые слова: макро и гигантские аденомы гипофиза, МРТ, рецидив роста опухоли

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Introduction

Adenoma of the pituitary gland (PG) is a tumor of the endocrine system, the manifestation of which is the hyper- or hypo secretion of hormones of the anterior pituitary gland, as well as the clinical symptoms caused by the effect of the neoplasm on the surrounding annular region of the anatomical structure.

The problem of studying the characteristics of giant adenomas (GA) of the pituitary gland is relevant due to «silent» aggressive tumor growth, often confronting the patient with the threat of blindness or other complications, as well as a small number of studies, lack of triple studies of this cohort of patients and lack of knowledge of the early symptoms of the disease. [3-10].

Pituitary adenomas (PA) are classified according to morphological characteristics, hormonal activity, degree of distribution. The size of the pituitary tumor is divided into micro adenomas (less than 1 cm in diameter) with intrasellar growth and macro adenomas with suprasellar dissemination (diameter more than 2 cm). In the world literature periodically systematization and revision of various classifications of pituitary adenomas and methods of their treatment is carried out. [1,2].

However, in the literature there is no unambiguous classification of pituitary tumors by size. Goel A., (1996) previously considered giant tumors more than 30 mm, and now more than 40 mm.

Kurokawa Y., (1998) considers large and gigantic tumors to be more than 30 mm and 40 mm, respectively, and in the opinion of Patsko JV, (1989), tumors more than 50 mm should be considered giant.

According to Gruppetta M, Vassallo J [5]. the prevalence for macroadena was 40–67/100 000 people and the sow was between 1–90 / 100 000 / year. Giant pituitary adenomas (more than 40 mm) accounted for 4-8% of the whole cohort.

The radiological characteristic of aggressive GA was given by Zakir J.C., Casulari L.A, Rosa JW [15]. According to their data, parasellar invasion prevails as a strong predictor of tumor recurrence. Pronounced suprasellar growth should be considered as a parameter of invasion and could affect the prognosis of the disease [15]. It was established that invasive-proliferative growth was associated with a worse outcome of the disease.

The original study was performed by Espinosa E, Sosa E, Mendoza V. [2]., which in 2016 published their data comparing giant prolactin with macroprolactinomas.

At the same time, the causes of the continued growth of the tumor and its determining factors, as well as the tactics of surgical treatment, are not clarified. All of the above was the reason for conducting the present study.

The purpose of the study is neuro-visualization markers of aggressiveness of macro- and giant pituitary adenomas according to the appealability data.

Material and methods

We studied data from 3 Tashkent Centers (RSSPMC of Endocrinology named by acad. Ya.Kh. Turakulov of the Ministry of Health of the Republic of Uzbekistan, Scientific Center for Neurosurgery and Scientific Center for Emergency Medical Aid of the Ministry of Health of Uzbekistan), according to which for 3 years (2015-2017 period) 156 patients with macroscopic conditions were treated in them - and giant pituitary adenomas (of which men are 76, women are 80). Middle age: men were 37.12 years old, women - 38, 15 years old. The duration of the disease ranged from 2 months to 25 years.

In our study, we relied on the classification of Kurokawa Y., (1998), who considers gigantic tumors to be more than 30 mm and 40 mm, respectively.

A total of 137 (87.8%) TAGs (transnasal pituitary adenomectomy or TAGs) were performed in both groups of patients at three Centers in Tashkent (Dr. med. Fayzullaev RB, Akbutaev, Prof. Makhkamov K.I. , rof. michael powell from uk). Repeated operations on the pituitary gland were performed in 8 patients (5.1%) of both groups. Radiation therapy was received by 6 (3.8%) patients and 1 by chemotherapy.

Research methods included: 1) general clinical (endocrine and neurological status studies), 2) instrumental (perimetry for all colors, fundus, visual acuity, 3) ECG, CT / MRT of the Turkish saddle and adrenal glands, 4) internal ultrasound and genital organs, etc.), 5) hormonal blood tests (STH, IGF-1, LH, FSH, PRL, TSH, ACTH, prolactin, testosterone, estradiol, progesterone, cortisol (RIA studies of blood serum were performed on counters «Gamma -12 «and» Strantg 300 «). In addition, the postoperative material was subjected to histological diagnostics in RSNPMTS E MZRUz (histology room).

Statistical calculations were carried out in the Microsoft Windows software environment using Microsoft Excel-2007 and Statistica version 6.0, 2003 software packages. The data obtained are reflected in the thesis as M ± m, where M is the mean value of the variation series, m is the standard error of the mean. The significance of differences between independent samples was determined by the method of Mann-Whitney and Student.

Results

Depending on the size of the pituitary adenoma, detected on CT / MRI, the patients were divided into two groups: group 1 patients - macroadenomas (from 20 to 30 mm) - 70 (44.8%), and group 2 patients - gigantic - (more 30 mm) - 86 (55.1%) cases.

Table 1 shows the distribution of patients by sex and age.

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Table 1 . The distribution of patients by sex and age.

The age, years	The number of men		The number of women	
	1 gr	2 gr	1 gr	2 gr
13	-	-	1	1
16 – 29	8	14	10	11
30-44	6	18	13	10
45-59	6	15	12	11
60-74	3	5	4	9
75 and >	-	-	1	2
Total : n = 156	24	52	41	39

Distribution of patients according to the topographic-anatomical classification of the side of growth of the pituitary adenoma by Kadashev B.A. (2007) showed that pituitary adenomas were observed with a total growth variant - 38 cases (24.4%), and also with endo- and suprasellar growth 5 (3.2%), for which the chiasmous syndrome was characteristic.

There were cases of endo-supra-infra-infra-antero-latero-retrosellar growth - 48 cases (30.7%), of which 3 - germination in the anterior cranial fossa, 5 - in the ventricles, 1 - in the cavernous sinus, 2 - in both cavernous sinus and middle cranial fossa. For patients of this group, the direction of tumor growth is characterized by various neuroendocrine disorders, as well as pyramidal symptoms due to affection of the motor path.

In addition, infra-suprastosellar growth occurred - 28 cases (17.9%), infra-suprasellar growth - 28 cases (17.9%). It was these cases that differed more vivid clinical symptoms, due to the direction of tumor growth. Disorders of nasal breathing and swallowing (dysphagia) are characteristic of patients in this group of tumor growth directions. Table 2 shows the distribution of patients according to the etiology of the formation of the sellar region.

Table 2. The distribution of patients according to the nature of the formation of the sellar area and treatment by groups.

The diagnosis	The number of patients		TPA		Radiotherapy	
	1 gr	2 gr	1 gr	2 gr	1 gr	2 gr
NFPA	43	53***** *!!!	31	45 (((((	1 (	8
Craniopharyngioma	3	9**(!!	3	6	-	1
Somatotropinoma	11	12**	8	10	-	2
Prolactinoma	12	8!***	11	5	-	-
Gemangioblastoma	-	1	-	1*(	-	2
Cushing disease	2	-	1	-	-	-
Astrocytoma	-	1*	-	1+CT	-	1+ChT
Meningioma	-	1	-	1	-	-

Note: TPA - transnasal pituitary adenomectomy, relapse growth,! - stromal hemorrhage, (- reoperation RT - the number of patients who received radiation therapy, ChT - chemotherapy, CT - combination therapy, NFPA - non-functional pituitary adenoma

From Table 2 it can be seen that NFPA was the most common - NFPA was the most common - 96 cases out of 156 (61.5%), 23rd place - somatotropinoma - 23 (14.7%), 3rd place craniopharyngioma - 12 (7.6%). Less common: BIC - 2 cases (1.3%).

According to the pituitary MRI, in 1 observation there was necrosis of the pituitary gland, in 6 (3.8%) - hemorrhage in the pituitary gland, and in 14 patients - continued growth after surgery to remove hypertension, while these complications were observed only in group 2 patients. At 2 was detected malignant type of NFPA.

Discussion

Based on MRI of the pituitary gland and X-ray radiological classification I.I. Dedov (1997) adenomas of the pituitary gland were distributed as follows: 1). Microadenomas - (intrasellar, d <10 mm) - no b's; 2) Macroadenomas - with suprasellar growth: a) group A (suprasellar growth within 10 mm above the pituitary fossa) - 40 bx; b) group B (supracellular growth within 20 mm, PA raises the anterior pocket of the Sh ventricle) - large PA - 30 b's; c) group C (suprasellar growth up to 30 mm, fills the anterior part of the third ventricle). Very large hypertension -

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50 cases; d) group D (suprasellar growth> 30 mm, rise above the level of the Monroe opening, or adenoma of group C with asymmetrical lateral or versatile growth) - Massive PA - 36 patients.

In total, for the period 2012-2017, in the three Centers of Tashkent, according to the appealability, 86 (55.1%) patients with giant pituitary adenomas and 70 (44.8%) patients with macroadenomas were treated. According to etiology, inactive pituitary adenoma was the most common - 96 cases out of 156 (61.5%) were common, 23% of the somatotropinoma ranked 23 (14.7%), craniopharyngioma ranked 3 (12.6%)).

Giant pituitary adenomas were accompanied by invasive growth in the surrounding anatomical structures (69.2%) and pituitary apoplexy (3.8%)

Conclusions

1. Giant pituitary adenomas are often accompanied by invasive growth in the surrounding anatomical structures (69.2%) and pituitary apoplexy (3.8%), which is the main factor limiting the radical nature of the surgery and increasing the number of relapses. 2. The neuroimaging marker of tumor aggressiveness can be different variants of its suprasellar growth, namely: supra-infra-latesellar growth, supra-infrasellar growth observed in 68 patients (43.5%) and invasive tumor growth (69.2%).

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