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CASE REPORT

Endoscopic transseptosphenoidal surgery for the reception of a pituitary tumor

Cirugía transeptoesfenoidal endoscópico para la recepción de un tumor de hipófisis

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ABSTRACT

The increasing use of imaging tests has led to the discovery of small "silent" adenomas of 2 to 3 mm in diameter, which occur in 10 to 20 % of the general population. Greater diagnostic sensitivity has been achieved using techniques such as computer axis diagnosis. Computed tomography (CT) or magnetic resonance imaging (MRI). The patient underwent a complete neurological examination and an axial computed tomography of the skull with the axial and anterior portions of the fossa turcica. The exam includes measuring visual acuity (VA), testing pupillary reflexes and eye movements. With the objective of describing the case of a 48-year-old patient who presents health changes caused by a pituitary adenoma, this work is presented, with the description of the patient's follow-up and the surgical procedure for its solution.

Keywords: Pituitary Adenoma; Computed Axial Tomography; Endoscopic Transeptosphenoidal Surgery.

RESUMEN

El uso cada vez mayor de pruebas de imagen ha llevado al descubrimiento de pequeños adenomas "silenciosos" de 2 a 3 mm de diámetro, que ocurren en 10 a 20 % de la población general. Se ha logrado una mayor sensibilidad de diagnóstico utilizando técnicas como el diagnóstico de ejes por computadora. Tomografía computarizada (TC) o resonancia magnética (RM). Se presenta un caso donde se le realizó al paciente un examen neurológico completo y una tomografía computarizada axial de cráneo con las porciones axial y anterior de la fosa turca. El examen incluye medir la agudeza visual (AV), probar los reflejos pupilares y los movimientos oculares. Con el objetivo de describir el caso de un paciente de 48 años que presenta alteraciones de salud causadas por un adenoma de hipófisis se presenta este trabajo, con la descripción del seguimiento al paciente y el proceder quirúrgico para su solución.

Palabras clave: Adenoma de Hipófisis; Tomografía Axial Computarizada; Cirugía Transeptoesfenoidal Endoscópica.

INTRODUCTION

Pituitary adenomas (PA) are clonal proliferations of pituitary cells that can cause a variety of clinical syndromes due to the production of one or more hormones or secondary localized growth.[1,2]

GA accounts for 10 to 15 % of intracranial tumors, although careful examination of the pituitary gland at autopsy reveals their presence in 30 % of cases.[3]

The increasing use of imaging tests has led to the discovery of small 'silent' adenomas measuring 2 to 3 mm in diameter, which occur in 10 to 20 % of the general population. Greater diagnostic sensitivity has been achieved using techniques such as computerized axis diagnosis, computed tomography (CT), or magnetic resonance imaging (MRI).[4,5]

Some authors say it is the third most common primary intracranial tumor after gliomas and meningiomas. It is the intracranial tumor that most frequently affects the visual system, taking into account errors in the early diagnosis of chiasmatic disease, which threatens the patient's life and limits the possibility of visual recovery. This study was the motivation that threatened the patient's life and limited the possibility of visual recovery. The objective is to present a case with significant neuro-ophthalmological changes secondary to the development of a specific tumor. Pituitary adenomas are intracranial tumors that most commonly affect the visual system. They occur in 15 % of all intracranial tumors.[6,7]

Because the pituitary gland is located near the visual pathways, changes in visual function are often detected and reflected in neurophysiological and psychophysical tests such as perirhinal measurements and visual evoked potentials (VEPs).

Visual evoked potentials (VEPs) reflect electrical activity in the central visual field. This activity is transmitted to the occipital lobe from the retina, so if we place electrodes in this area of the skull, we will obtain the activity of cortical cells when exposed to visual stimuli. Given the above, any alteration of the visual pathway will manifest itself in VEPs.

Morphological changes and prolongation of VEP wave latency have been reported in the optic pathway compression lesions. Its asymmetry is a specific feature found in tumors that overlap the optic chiasm in the pituitary region.

Recent imaging studies have shown that visual changes occur when the optic chiasm moves 8 mm above the posterior arch and more than 13 mm above the surface of both internal carotid arteries.[9,10,11]

This paper describes the case of a 48-year-old patient with health problems caused by a pituitary adenoma, including a description of the patient's follow-up and the surgical procedure used to resolve the issue.

METHOD

The patient underwent a complete neurological examination and an axial computed tomography scan of the skull with the axial and anterior portions of the sella turcica. The examination included measuring visual acuity (VA) and testing pupillary reflexes and eye movements. Ophthalmoscopy was performed using direct halogen light and an Aneritra ophthalmoscope. The visual fields were examined using static perimetry (SP) and Goldmann kinematics (GK), both computerized. The Perimat device was used to perform the SP, which allowed the changes in retinal sensitivity above the stimulation threshold to be determined in each patient. PC analysis of the internal, central, and external isotopes, performed with the Perikón device, revealed different changes in the visual field in these cases.

A positive diagnosis is made based on a history of clinical symptoms such as headache, vision loss, or, sometimes, disturbances of consciousness, including loss of peripheral vision.

The results of perioperative and PEV-P tests allow the impact of this tumor on the visual pathway to be assessed. It was decided to operate on the patient who had undergone endoscopic transsphenoidal surgery. Average visual acuity (VA) remained within normal limits. The cause of the visual disturbances is due to partial atrophy of the optic nerve.

DEVELOPMENT

Presentation of a 48-year-old male patient who reports:

Personal medical history: benign pituitary tumor diagnosed 2 years ago, treated with 0,5 milligrams of cabergoline orally per day; hypothyroidism treated with 50 micrograms of levothyroxine orally per day; pituitary tumor with a 2-year history.

Personal surgical history: none reported

Family medical history: none reported

Allergies: none reported

Reason for consultation: headache

Current illness: A 48-year-old male patient presents at this health center complaining of a headache with an intensity of 6/10 on the VAS scale, which does not respond to analgesic treatment, which is why he has come to the clinic.

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Physical examination: patient conscious, alert, afebrile, Glasgow 15/15, ocular 4, verbal 5, motor 6. No meningeal signs, no neck stiffness, no neurological facility. Right eye with total loss of vision, left eye with blurred vision, pupils isochoric and reactive to light, no meningeal signs, no neck stiffness

The patient's evaluation by complementary tests was as follows:

19/11/2024

Hematology: hemoglobin 15,2, hematocrit 48, platelets 321 000, white blood cells 4,76, lymphocytes 40,6, neutrophils 50,4

Blood chemistry: glucose 100,7, urea 33,3, creatinine 0,91

21/11/2024

Electrolytes: sodium 143,14, potassium 4,41, chlorine 107,49.

22/11/2024

Hematology: hemoglobin 16,2, hematocrit 47,8, platelets 332, white blood cells 4,76, lymphocytes 41,1, neutrophils 49,9

Blood chemistry: glucose 84,8, urea 35,4, creatinine 1,1.

Coagulation: PT 11,9, INR 1,09, TTP 24,7.

Diagnosis:

Benign pituitary tumour D352

Unspecified hypothyroidism E039

RESULTS

Clinical evolution of the patient

19/11/2024: a 48-year-old male patient with a history of hypothyroidism treated with 50 micrograms of levothyroxine orally per day, 0,50 milligrams of cabergoline per day, and a 2-year history of pituitary tumor reports headache of intensity 6/10 on the EVA scale for several days, which is the reason for his visit. At admission, he was conscious, alert, afebrile, Glasgow 15/15, ocular 4, verbal 5, motor 6. No meningeal signs, no neck stiffness, no neurological facility. Right eye: total loss of vision; left eye: grade 1 pterygium and total loss of peripheral vision; pupils isochoric and reactive to light.

20/11/2024- 21/11/2024: patient with a history of benign pituitary tumor, scheduled for surgery, under neurological observation, no deterioration in the level of consciousness, no motor defects. He is assessed by an ENT specialist who indicates monitoring for warning signs and requests a simple CT scan of the paranasal sinuses. The patient is evaluated by an anaesthesiologist who suggests that four units of packed red blood cells and four units of fresh frozen plasma should be prepared, requests coagulation times, placement of a central line, and nothing by mouth 8 hours before surgery. The patient is being monitored by an endocrinologist, who indicates that he should be contacted on the day of the surgical procedure and that hydrocortisone should be administered on the day of tumor resection. The patient was assessed by intensive care specialists, who indicated that they should be contacted on the day of the surgical procedure to reserve space. They also request a pre-surgical assessment by anaesthesiology and a surgical risk assessment by internal medicine.

22/11/2024: Male patient admitted for surgical resolution. Currently asymptomatic, Glasgow 15/15, ocular 4, verbal 5, engine 6. No meningeal signs, no neck stiffness, no neurological facility. Right eye: total loss of vision; left eye: grade 1 pterygium and total loss of peripheral vision; pupils isochoric and reactive to light. Assessment requested by ENT, ophthalmology, endocrinology, anaesthesiology, and intensive care unit for comprehensive management

23/11/2024: patient awaiting surgical resolution. Currently asymptomatic, Glasgow 15/15 ocular 4, verbal 5, engine 6. No meningeal signs, no neck stiffness, no neurological facility. Right eye: total loss of vision; left eye: grade 1 pterygium and total loss of peripheral vision, isochoric pupils reactive to light.

24/11/2024: 48-year-old male patient awaiting surgical resolution, currently asymptomatic, Glasgow 15/15 ocular 4, verbal 5, motor 6, pupils isochoric and reactive to light, no meningeal signs, no neck stiffness, no neurological facility.

25 - 26/11/2024: patient awaiting surgical resolution, currently asymptomatic, Glasgow 15/15, isocoric pupils reactive to light, no meningeal signs, no neck stiffness, no neurological focality, cranial nerves I – XII: II pair. Right eye: total loss of vision; left eye: total loss of peripheral vision.

DISCUSSION

The clinical and biochemical phenotype of pituitary tumors depends on the type of cell from which they arise. They may originate from the same cell type or include cells with different functions within the same tumor. Hormonally active tumors are characterized by autonomic secretion and poor response to normal physiological inhibitory pathways.[12]

A. DATOS DE ESTABLECIMIENTO Y USUARIO / PACIENTE

INSTITUCIÓN DEL SISTEMA	UNICÓDIGO	ESTABLECIMIENTO DE SALUD	NÚMERO DE HISTORIA CLÍNICA ÚNICA	NÚMERO DE ARCHIVO
MSP	359	HGL	0502268808	414300

PRIMER APELLIDO	SEGUNDO APELLIDO	PRIMER NOMBRE	SEGUNDO NOMBRE	SEXO	EDAD	CONDICIÓN EDAD (MARCAR)			
						H	D	M	A
ORTEGA	TOASA	CARLOS	ANDRES	H	48				X

B. DIAGNÓSTICOS

			CIE
Pre Operatorio:	1.	TUMOR BENIGNO DE HIPOFISIS	D352
	2.		
Post Operatorio:	1.	TUMOR BENIGNO DE HIPOFISIS	D352
	2.		

C. PROCEDIMIENTO

Electiva		Emergencia	X	Urgencia	

Proyectado:	EXERESIS DE TUMOR DE HIPOFISIS
Realizado:	ABORDAJE ENDOSCOPICO A BASE DE CRANEO MAS CIERRE DE FISTULA DE LIQUIDO CEFALORRAQUIDEO
	EXERESIS DE TUMOR DE HIPOFISIS

D. INTEGRANTES DEL EQUIPO QUIRÚRGICO

Cirujano 1:	DR. RUBEN PILALUMBO	Instrumentista:	LIC. CHIMBORAZO / LIC. ALDAZ
Cirujano 2:	DR. ALEX LARA	Circulante:	LIC. POAQUIZA
Primer Ayudante:	MD. MARIA JOSE ORBEA	Anestesiologo/a:	DRA. DUQUE / DR.NAVAS
Segundo Ayudante:		Ayudante Anestesia:	
Tercer Ayudante:		Otros:	

E. TIPO ANESTESIA

General	X	Raquidea		Sedación		Otros	

F. TIEMPOS QUIRÚRGICOS

FECHA DE OPERACIÓN	DIA	MES	AÑO	HORA DE INICIO	HORA DE TERMINACIÓN
	27	11	2024	09H15	13H50

Dieresis	INCISION HEMITRANSFIXIANTE IZQUIERDA / EN APOFISIS UNCIFORME Y FRONTO ETMOIDAL BILATERAL
Exposición y Exploración:	RINOSCOPIO / OPTICA DE 0 GRADOS
Hallazgos Quirúrgicos:	

1. SEPTO MEDIAL
2. HIPERTROFIA TURBINAL GRADO IV BILATERAL
3. SENO ESFENOIDAL IZQUIERDO CON PRESENCIA DE TUMOR CON EXTENSION A CAVUM FARINGEO AL IGUAL QUE EN LADO DERECHO
4. SE EXTRAE TUMOR QUE INVADE SENOS ESFENOIDALES CON EXTENSION HACIA SUPRASELAR Y SE DIRIGE A REGION INTRACRANEAL
5. LESION OCUPATIVA DE ESPACIO EXTRAAXIAL EVINDECIADO DENTRO DEL VALLE SILVOANO DERECHO QUE SE EXTENDIA HACIA BASE CRANEO Y REGION SELAR Y SUPRASELAR DE CONSISTENCIA FIBROSA CON CAPSULA DE BORDES BIEN DEFINIDOS QUE PERMITIA ADECUADO PLANO DE CLIVAJE

Procedimiento Quirúrgico:
1. ASEPSIA Y ANTISEPSIA
2. COLOCACION DE CAMPOS
3. ABORDAJE TRANSEPTAL
4. INFILTRACION CON LIDOCAINA + ADRENALINA A NIVEL SEPTAL
5. DECOLAMIENTO SUBMUCOPERICONDICO Y SUBMUCOPERIOSTICO PARA FORMACION DE CUATRO TUNELES
6. DECOLAMIENTO HASTA QUILLA ESFENOIDAL

SNS-MSP/HCU-form. 017/2021

PROTOCOLO QUIRÚRGICO (1)

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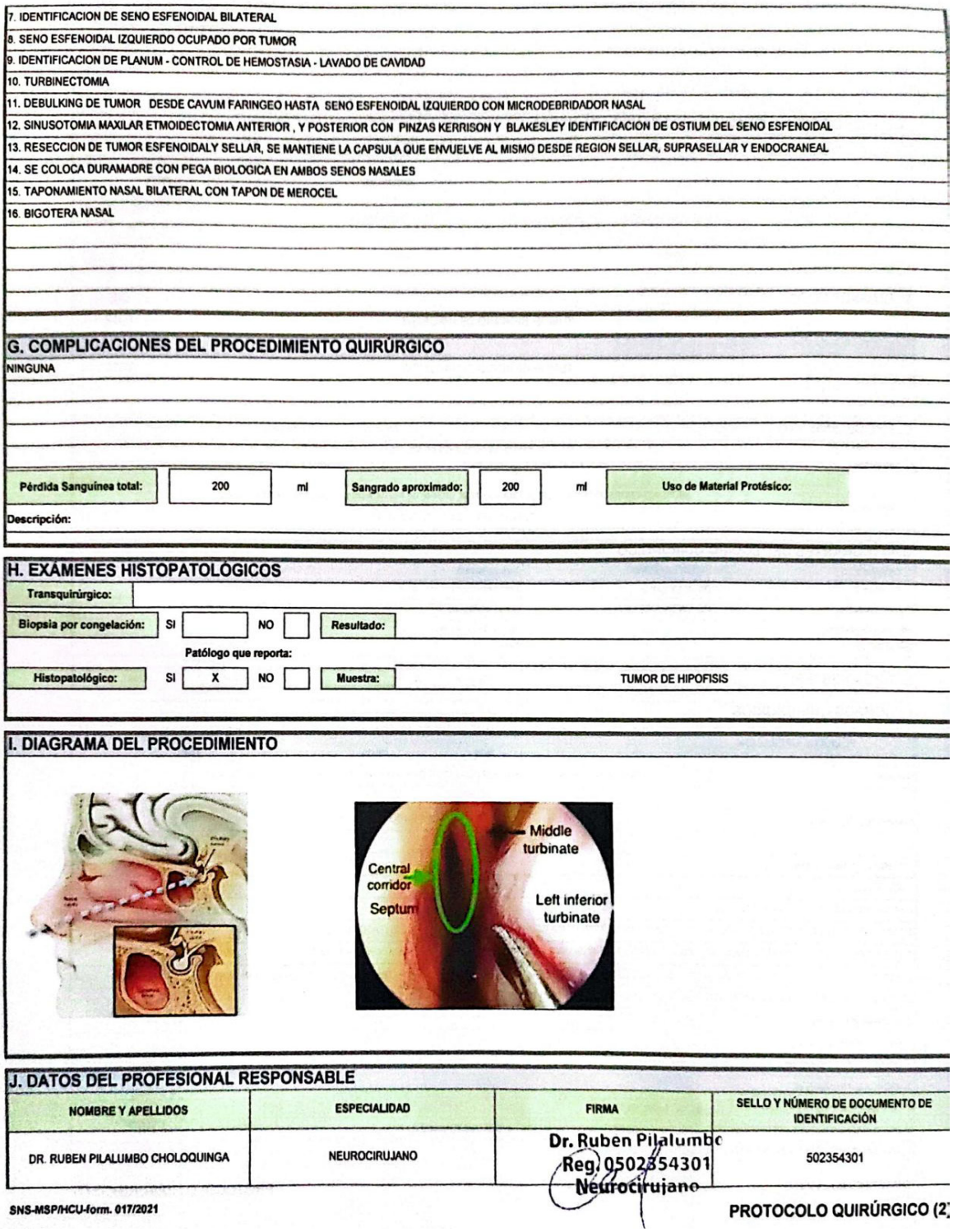

Figure 1. Surgical protocol

Pituitary adenomas tend to move rather than invade the surrounding healthy tissue. The size of the tumor and the direction of its development determine many symptoms, this time of a neurological nature, depending on the structures encountered. As the pressure in the pituitary fossa increases, it can cause headaches and pressure on the pituitary gland and further affect the hypothalamus, which can affect the nerve cells that control the gland's hormonal function and the pathways that communicate with it.[12,13]

Macroadenomas are tumors that develop in the pituitary gland, a pea-sized organ located behind the nose. They are usually not cancerous. Macroadenomas are pituitary adenomas (tumors) that measure 10 mm or more. Pituitary adenomas smaller than 10 mm are called microadenomas.

Many are very small (microadenomas), while some grow very large (macroadenomas) and can press on the visual pathways. Many people with pituitary adenomas may not have symptoms and may not realize they have

them, mainly because vision loss can occur slowly over a long period.

Vision loss may occur due to the pressure that the enlarged gland exerts on the optic nerve, which passes over the pituitary gland. At first, vision loss only affects both eyes' upper outer part of the visual fields.

A pituitary adenoma is a pituitary gland tumor located on the sella turcica; just below this structure is the optic chiasm, which is part of the visual pathway. If the growth of the cancer compresses this structure, the visual fields begin to have campimetric defects, which affect the outer parts and leave tunnel vision. As the tumor grows, it can compress and invade, leaving the patient with amaurosis or complete blindness. Therefore, it is essential to see a specialist in nervous system tumors and an ophthalmologist to perform a visual field test and thus determine the campimetric defect more accurately.

In fact, pituitary adenoma is one of the tumours of the brain and its appendages that causes the most damage to the visual fields (area of vision) and, ultimately, visual acuity (due to compression of the optic nerve). It can lead to blindness or, in cases of extreme invasion or thinning, compromise the anatomy of the eye or the nerves that move the eyes.

Suppose the tumor spreads through the base of the skull (also rare) forward or laterally, affecting the frontal or temporal lobes of the brain, respectively. In that case, it can, among other things, change the brain's electrical activity and cause seizures.

In special cases, it can also press on or penetrate the brain and cause mental changes. Patients experienced some symptoms described in the literature, such as headaches, general loss of vision in one eye, and loss of peripheral vision in the other.

Oculomotor paralysis is the initial symptom of adenomas, and blepharoptosis is the most common initial symptom of cavernous sinus lesions.

Perimetric lesions associated with pituitary tumors also depend on the anatomical context of the optic chiasm. An anteriorly located optic chiasm may be found. In this case, the pituitary adenoma begins to affect the posterior part of the optic chiasm, resulting in a fusion syndrome of the optic chiasm and optic nerve pathways.

On the other hand, when the optic chiasm becomes posterior, the hypothalamic tumor begins to invade the anterior part of the optic chiasm, causing optic chiasm-optic nerve fusion syndrome.

Depending on the thermalization of the tumor, bilateral height, and homonymous hemianopia may be observed in patients with macroadenomas and suprasellar growths.

Dynamic perimetry can detect temporal and central hemipic scotomas and, in some cases, visual field reduction and increased blind spots. Four thousand four hundred forty-four visual evoked potentials have been recorded in canal compression lesions, whose asymmetry is a special feature.

CONCLUSIONS

The clinical picture of pituitary adenomas is variable and depends on the size of the lesion, its configuration, and pituitary hormone secretion. Non-functioning adenomas are usually asymptomatic and are examined in the context of imaging tests to detect headaches or head trauma. As the tumor grows, symptoms involve massive tumor invasion of adjacent structures.

Headaches are a common symptom, but there is not always a correlation between tumor size and headache severity. As the tumor grows, it compresses the pituitary gland, the pituitary stalk, the optic chiasm, and the cavernous sinus structures.

From an epidemiological perspective, the incidence of these lesions has increased in recent decades, mainly due to the increase in the number of imaging tests, especially magnetic resonance imaging, and their subsequent diagnosis in the subclinical stages of the disease.

Endoscopic transsphenoidal surgery removes pituitary tumours, treats patients' conditions, and improves their quality of life.

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FINANCING

None.

CONFLICT OF INTEREST

None.

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