C E R E B E L L O P O N T I N E A N G L E L E S I O N S : M A N A G E M E N T

Thesis

Submitted to Faculty of Medicine – Ain Shams University in partial fulfillment of the requirements of M.D. Degree in

Neurosurgery

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2006

CEREBELLOPONTINE ANGLE LESIONS: MANAGEMENT

Introduction

Because it is strategically located and harbors a conglomeration of vitally important structures, the posterior skull base region poses a unique challenge for the neurosurgeon and the surgical access requires considerable familiarity with its complex anatomic components. Numerous surgical approaches to the complex posterior skull base region have been described. Each approach provides access to a specific area. *(Chandranath Sen., 1997 and Yang ET al, 1999.)*

In the beginning of this century, almost all the approaches to the skull base that bear significance had already been described by authors of different specialties and successfully used in single cases. *(Samii M. and Tatagiba M., 1996.)*

Although neurosurgeons may assert that their results with the retrosigmoid operation are at least as good as those obtained by the proponents of the transtemporal technique, Ear, Nose and Throat surgeons control the supply of material and can dictate where it will go. *(King T. And O'conner AF, 1995.)*

The Cerebellopontine Angle, being included in the posterior skull base, it is that space within the posterior cranial fossa that corresponds anatomically to the cerebellopontine subarachnoid cistern. It is lined with an arachnoidal membrane and bordered superiorly by the tentorium and it is continuous inferiorly with the cerebellomedullary cistern. Medially, it is bounded by the anterolateral surface of the pons. Laterally, it is bounded by the posterior surface of the petrous pyramid dorsolateral to the trigeminal nerve. Those tumors located anteromedial to the trigeminal nerve are classified as petroclival. The differential diagnosis of the Cerebellopontine Angle Lesions (CPA) includes,

meningiomas, acoustic neurinomas, epidermoids, dermoids, arachnoid cysts, lipomas, metastatic tumors, schwanomas of the other CPA nerves, teratomas, epithelial cysts and choroid plexus papillomas. *(El Mefty O. and Kanan, 2000.)*

Cerebellopontine angle lesions {CPA} account for 5-10 % of all intacranial tumors. Acoustic nueroma occupies 85-92 % of all CPA lesions. CPA is the eighth most common site for meningiomas to occur, and meningiomas are the second most common tumor of the CPA (9-25%), after acoustic neurinomas. Meningiomas of the CPA represent 30-50% of all posterior fossa meningiomas. It's common at the fifth decade and women are most liable to be affected than men (two to four times), while the sex distribution in acoustic neurinomas is equal. *John T. et al., 1996. (And El Mefty O. 2000.)*

The first surgical removal of acoustic neuroma was performed in 1894. The surgical technique has improved dramatically in this century, with the advent of the operating microscope, neuroanaesthesia and intraoperative monitoring. Bilateral tumors are usually present in type II Neurofibromatosis, are transmitted in an autosomal dominant fashion, and have a deletion in the long arm of chromosome 22, probably representing inactivation of a tumor- suppressor gene. *(Lawrence H. Pitts and Robert K. Jackler, 1998.)*

The evolution of the Magnetic Resonance Imaging {MRI} using Gadolinium and the Magnetic Resonance Angiography {MRA} showed excellent visualization of the inner ear and the cerebellopontine angle. *(Ferrara P. et al., 1998.)*

Meningiomas of the cerebellopontine angle constitute 5-8 % of all meningiomas and are the second most common tumors of the cerebellopontine angle accounting approximately for 10 % of all cerebellopontine angle tumors. As the Cerebellopontine angle is one of the

most "high traffic" intersections within the skull, the Cerebellopontine angle Meningiomas often lie adjacent to, compress, or envelop a large number of structures. *(Charles H. Tator, 1995)*

Severing of the seventh nerve sometimes complicates surgery of the cerebellopontine angle lesions or the internal auditory canal. Efforts are done to preserve these structures. Many procedures are available for facial reconstruction. Among these, primary facial-facial reanastomosis is considered the method of choice. *(Yammine FG. Et al., 1999.)*

Facial and hearing preservation are now goals and objectives for good management of CPA lesions, This is achieved through intraoperative monitoring during surgery, and the use of intrameatal extratympanic electrode has a significant role in hearing preservation while facial verve preservation has been achieved in 80-90% of cases by the use of real-time audio-amplified electromyography recorded from the orbicularis occuli and orbicularis oris with the use of subdermal needle electrodes. Surgical removal of Acoustic neurinomas via the posterior fossa route may enable anatomical preservation of the cochlear nerve and hearing capacity *(Mullati N. et al., 1999*, *Farhad Pirouzmand, 2000* and *Baldwin DL et al., 1990.)*

Aim of the Work

Study of:

- Clinical patterns of cases of cerebellopontine angle lesions.
- Pathological and neuroimaging varieties.
- Treatment; Operative, Radiosurgery and Conservative.
- Outcome.

Patients and methods

Patients with cerebellopontine angle lesions admitted to the Neurosurgery Department, Tanta University Hospitals will be managed according to the following:

Clinical history; inquiry concerning the onset of symptoms, course and duration

Full neurological examination with special emphasis on the lower cranial nerves.

Complete preoperative audiological evaluation:

- Pure-tone audiogram: To differentiate between air-conduction and bone conduction where the air conduction threshold measures the function of the total auditory system by which the patient deviates from 0 dB of hearing loss (normal hearing) and second, that the threshold for bone conduction is primarily a measure of the integrity of the sensorineural auditory system.

- Evaluation of speech discrimination: To assess the receptive communication ability of the patient and (2) to predict the site of the auditory lesion, (Cochlear or retrocochlear) the threshold is reported as the hearing level (in decibels) below which the patient cannot successfully recognize the two-syllable words.

- Acoustic impedance test: An abnormally elevated or absent acoustic reflex in the presence of less than 60 dB of hearing loss is audiological evidence supporting a retrocochlear site of the lesion.

Neuroimaging:

- Magnetic resonance Imaging (MRI study), which is necessary for all cases, preferably with Gadolinium, for assessment of the size, contralateral internal auditory canal and assessment of associated brain stem

compression and hydrocephalus. Magnetic resonance angiography (MRA), both arterial and venous phase may be needed for studying the tumor vascularity and the surrounding major vessels.

- Computed tomography; with intravenous contrast medium, shows bone definition (infiltration, hyperostosis and intra-lesional calcification), site of sigmoid sinus and jugular bulb and presence of tumor erosion of internal auditory canal.

Routine laboratory work up

Definitive treatment:

- Surgery: Retrosigmoid suboccipital approach is the main line of treatment.

- Radiosurgery: Elderly patients with small or medium sized Acoustic neuromas, a recurrent tumor or a tumor on the side of the only hearing ear.

- Conservative: Cases showing slow or no progressive growth, (less than 20% increase in size over a period of 6 months-one year), no hearing deterioration (less than 10DB) with regular monthly follow up.

Results

Will be tabulated and illustrated.

Discussion

Results will be analyzed, discussed and compared with the results of other workers.

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بسم الله الرحمن الرحيم

الملخص العربى
أورام الزاوية المخيخية الجسرية: التداول

إن المنطقة المخيخية الجسرية من المناطق المعقدة من الناحية الجراحية، وذلك لما تحتويه من أجزاء تشريحية مهمة بالنسبة للإنسان، وأصبحت تحديا هاما بالنسبة للجراحين. حيث أن مختلف الطرق الجراحية تتطلب خبرة وافية بالصفات التشريحية الدقيقة. وقد تطورت الطرق الجراحية فى الآونة الأخيرة وقد حققت نتائج أفضل من ذى قبل.

تمثل أورام الزاوية المخيخية الجسرية من ٥ إلى ١٠ ٪ من باقى أورام المخ، ويمثل ورم العصب السمعى من٨٥ إلى ٩٢٪ من أورام الزاوية المخيخية الجسرية ككل. وتشكل الأورام السحائية نسبة ٩ إلى ٢٥٪ من أورام الزاوية المخيخية الجسرية.

وقد تحققت أول جراحة لاستئصال ورم العصب السمعى عام ١٨٩٤، وكان لتصنيع المجهر الجراحى وتقدم الطرق التخديرية الحديثة أكبر الأثر فى سهولة إجراء تلك الجراحات الدقيقة، كما كان لظهور جهاز التشخيص بالرنين المغناطيسي أثرٌ بالغُ الأهمية فى دقةِ تشخيص تلك الأورام.

والآن أصبح الهدف الأعظم لجراحة أورام الزاوية المخيخية الجسرية هو الحفاظ على كلٍ من العصب الوجهىّ والسمعىّ وقد بدأ هذا يتحققُ بالفعل وخاصة بعد ظهور أجهزةِ قياسِ وظائف العصبِ الوجهىّ والسمعىّ أثناء الجراحة.

الهدف من البحث: هو دراسة مختلف الطرق التشخيصية وطرق التداول الحديثة " الجراحية والإشعاعية والتحفظية"

منهج البحث: يتم فحص جميع الحالات فحصا إكلينيكيا دقيقا وخاصةً فحص الأعصاب الجمجميةِ السفلية، ثم بعد ذلك يتم عمل إختبار لوظائف العصب السمعى ثم الأشعة المقطعية والأشعة بالرنين المغناطيسي على المخ وبالتحديد منطقة الزاوية المخيخية الجسرية ، وبناءا على ذلك يتم إختيار التقنية العلاجية سواء كان ذلك بالجراحة أو بالعلاج الإشعاعي أو بالعلاج التحفظى حسب الدواعى لكل مريض وبما يتناسب مع حالته العامة.

وقل رب زدني علما

صدق الله العظيم

ACKNOWLEDGEMENTS

I always feel indebted to ALLAH whose blessings on me cannot be counted.

I would like to express my deepest thanks and sincere appreciation to Prof. Dr. Adel Hussein El Hakim, professor and chairman, Neurosurgical department, Faculty of Medicine, Ain Shams University, for his kindness and valuable supervision, for his constructive advice, and valuable guidance. I'm really grateful and thankful to him.

I would like to express my deepest gratitude and sincere appreciation to Prof. Dr. Ahmed Nabil Khairallah, professor of Neurosurgery, Faculty of Medicine, Tanta University, who assigned to me the subject of this thesis, for his kindness and valuable supervision, for great support and meticulous guidance. I'm really grateful and thankful to him.

I owe special feelings of gratitude to Prof. Dr. Hossam Mohamed El Husseiny Khalil, professor of Neurosurgery, Faculty of Medicine, Ain Shams University, for his great help, experienced guidance and support. I owe him a lot for his kindness and gentleness.

Great thankfulness and indebtedness to Prof. Dr. Samy Mahmoud Tourky, professor and chairman, Neurosurgical department, Faculty of Medicine, Tanta University, for his great help, experienced guidance and indispensable assistance that helped me to accomplish this work.

Great thankfulness and appreciation to A. Prof. Dr. Magdy El Mahallawy, Assistant professor and Dr. Ahmed Abdel Salam Shakal, Lecturer, Neurosurgical department, Faculty of Medicine, Tanta University, for their great help and precious advice.

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