Posterior Fossa mid-line Space Occupying Lesions Diagnosis and Surgical Outcome

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ABSTRACT

Background: posterior fossa tumors are more common in children than in adults. Between 54% and 70% of all childhood brain tumors originate in the posterior fossa. About 15-20% of brain tumors in adults occur in the posterior fossa. Certain types of posterior fossa tumors, such as medulloblastoma, pineoblastoma, ependymomas, primitive neuroectodermal tumors, and astrocytomas of the cerebellum and brain stem, occur more frequently in children.

Aim of the Work: the aim of this study was to review the preoperative diagnostic modalities, surgical procedures, and outcome for different midline posterior fossa space occupying lesions.

Patients and Methods: this is a retrospective study has been conducted on 50 patients with posterior fossa midline space occyping lesions during the period from March 2013 to October 2015, at Department of Neurosurgery, Ain Shams University. All patients have been subjected to preoperative clinical assessment: thorough history taking, complete general and neurological examination according to Ain Shams University neurosurgical sheet.

Results: this study was conducted on 50 patients with midline posterior fossa space occyping lesions. All of them underwent a midline suboccipital approach. The pre and post-operative data were collected and analyzed. This study included 50 patient, 26 female (52%) and 24 male (48%) patients. The mean age ranges from 1 year to 60 years.

Conclusion: surgery is the treatment of choice for the cases of posterior fossa mid line lesions especially in children and adolescents to decreases the risk of disabilities and increases the survival.

Keywords: Posterior Fossa Mid-Line Space, Occupying Lesions Diagnosis, Surgical Outcome

Introduction

Introduction

Posterior fossa tumors are more common in children than in adults. Between 54% and 70% of all childhood brain tumors originate in the posterior fossa. About 15-20% of brain tumors in adults occur in the posterior fossa. Certain types of posterior fossa tumors, such as medulloblastoma, pineoblastoma, ependymomas, primitive neuroectodermal tumors (PNETs), and astrocytomas of the cerebellum and brain stem, occur more frequently in children **(*Badhe PB et al, 2004)***

The posterior fossa contains the cerebellum, pons, and medulla oblongata. The foramen magnum is located centrally and inferiorly, surrounded by deep grooves containing the transverse sinuses and sigmoid sinuses ***(Cushing H, 1930)***

No specific causes for posterior fossa tumors exist. However, genetic factors, such as dysfunction of some tumor suppressor genes (*p53* gene) and activation of some oncogenes, may play a role in their development. Environmental factors such as irradiation and toxins may also play a role ***(Chauhan PP et al., 2004)***

Cerebellar astrocytoma comprises about 33% of all posterior fossa tumors in children. It represents 25% of all pediatric tumors. Average age at presentation is 9 years. Typically, cerebellar astrocytoma presents as a laterally located cyst with a well-defined solid component. The tumor may be solid or cystic and may be located medially in the vermis or laterally in the cerebellar hemisphere ***(Wind JJet al., 2011)***

Primary neuroectodermal tumors ,PNETs include medulloblastomas, medulloepitheliomas, pigmented medulloblastomas, ependymoblastomas, pineoblastomas, and cerebral neuroblastomas. Medulloblastoma initially arises in the inferior medullary velum and grow to fill the fourth ventricle ***(Wind JJet***

al., 2011) Ependymomas are derived from ependymal cells. They occur more frequently in females, with 50% presenting in children younger than 3 years.

Dermoid tumors arise from incomplete separation of epithelial ectoderm from neuroectoderm at the region of the anterior neuropore; this usually occurs during the fourth week of gestation. Hemangioblastoma represents about 7-12% of all posterior fossa tumors. About 70% of hemangioblastomas occurring in the cerebellum are cystic. Age of presentation is 30-40 years old. Hemangioblastomas are more common in males. Hemangioblastoma may be associated with von Hippel-Lindau disease (***Wind JJet al., 2011)***

Metastatic tumors occur in the brainstem and 18% occur in the cerebellum. Originating sites include breast, lung, skin, and kidney. Solitary metastasis is better treated by surgical removal before radiation therapy. Surgery also should be considered in case of radiosensitive original tumors or when the primary source is unknown ***(Rath Gp et al.,2007)***

The clinical presentation depends on the site of the tumor, biological behavior and aggressiveness of the tumor, and the rate of growth. At the time of presentation, the patient may be very ill from severe headache or frequent vomiting due to associated hydrocephalus. ***(Arriada N et al.,*****2004)**

Symptoms may be caused by focal compression of the cerebellum or brain stem centers and increased intracranial pressure .Symptoms due to focal brainstem compression include cranial nerve dysfunction. This commonly involves the nuclei or tracts of the third, fourth, or sixth cranial nerves, resulting in ocular palsies and diplopia and long tract signs) hemiparesis .(Symptoms due to focal compression of the cerebellum include characteristic eye findings and vermian syndrome .Truncal ataxia is a common finding in midline tumors, such as

medulloblastomas ،ependymomas ***(Chauhan PP et al.,2004)*** and vermian astrocytomas

Hemi-cerebellar syndrome involves limb ataxia ،nystagmus ،and dysmetria . Tumors that occur in the cerebellar hemisphere, such as metastases ،cerebellar astrocytomas ،or cystic hemangioblastomas ،may present by ataxia of the contralateral limbs .Nystagmus usually occurs late in the disease. Vertical nystagmus suggests a lesion in the anterior vermis ،periaqueductal region, or craniocervical junction. Horizontal nystagmus implies involvement of the cerebellar hemisphere***(Wells EM et al.,2010).***

In cases of pilocytic cerebellar astrocytoma, the 25-year survival rate exceeds 94%.Patients with medulloblastoma are classified into good-risk and bad-risk categories based on the following: Age of presentation,Extension of surgical resection,Leptomeningeal dissemination or metastasis ***(Akay KM et al., 2004)***

Complications of posterior fossa tumor surgery include lower cranial nerve dysfunction, Facial nerve palsy, deafness, long tract deficits, hemiplegia, hemiparesis and sensory abnormalities. Other postoperative complications include infection, prolonged coma, shunt obstruction or malfunction, chest infection, deep venous thrombosis, pulmonary embolism, cerebrospinal fluid leak and cerebellar mutism syndrome ***(Rath GP et al,2007).***

Patients who present with posterior fossa tumors undergo surgery for the following goals: .to decompress the posterior fossa for the purpose of relieving pressure on the brain stem and/or to release intracranial pressure and avert the risk of herniation ,To diagnose the tumor based on histopathology,To determine further plan of management depending on the nature of the tumor,When indicated, to treat hydrocephalus by shunting cerebrospinal fluid (CSF) to the peritoneal cavity (External CSF drainage or even no drainage is considered in

some cases. Still, many disagree regarding the ideal shunting procedure.) ***(Arriada N et al.,2004)***.

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The aim of this study is to review the preoperative diagnostic modalities, surgical procedures, and outcome for different midline posterior fossa space occupying lesions