Midbrain tumor

Most midbrain and medulla oblongata focal tumors are low grade astrocytomas, and the prognosis of these tumors can be significantly improved by operation [1].

see Midbrain glioma.

Clinical features

Patients with a focal midbrain tumor usually exhibit either symptoms and signs of raised intracranial pressure caused by an obstructive hydrocephalus (50%) or symptoms and signs caused by pressure on the tegmentum and cerebral peduncles.

The lesions are confined to the tectal plate or tegmentum with possible extension upward to the thalamus and downward to the pons, displacing but not invading these structures. The edges of the tumor are well defined, and the large majority have a solid consistency with intense regular enhancement after intravenous contrast [2].

Treatment

In the Department of Neurosurgery, University of Vienna Medical School, Austria, of 41 patients with midbrain lesions, 25 underwent definitive surgical exploration. In 16 patients surgical exploration was not warranted, since the patients had only slight neurological deficits and longstanding histories or consent was not given. The infratentorial supracerebellar approach proved to be the ideal method of exposure in 20 patients, in whom the lesion was located in the more dorsal aspect of the midbrain. In 6 of these patients the mass lesion extended from the cerebellum into the midbrain and, therefore, a transcerebellar route was also needed for exposure. In 5 patients the subtemporal approach was chosen. Three patients died as a result of the operation, but in the other 22 patients no increase in morbidity after surgery was apparent and the immediate postoperative course was normal. Five patients with malignant tumors died from recurrence despite radiotherapy. The remaining 17 patients have been doing well up to 14 years after surgery, but 3 had only limited follow-up. This experience with surgical exploration and total resection or evacuation of midbrain lesions in 25 patients should prove the safety of modern microsurgical techniques. Emphasis is placed on the benefit of microtopographic considerations in the choice of the most suitable approach to these deep-seated lesions [3].

Outcome

They are generally considered as diseases with a poor prognosis, because surgery nearby such eloquent structures within the brain stem is a great challenge for many neurosurgeons and complete resection can be achieved in only a small number of selected patients [4].

Case series

1995

The presentation, radiographic findings and course of 17 children with MRI-documented intrinsic midbrain lesions are reviewed. The anatomic centers of all the lesions were tectal, peritectal, or tegmental. Lesions centered at the pineal gland were excluded. Signs of increased intracranial pressure from hydrocephalus requiring shunt placement were present in 14 patients. Histopathological diagnosis was confirmed in three tumors; these were low grade astrocytomas and all received focal irradiation, as did one unbiopsied tumor. The remaining 13 patients with no histopathological diagnosis received no therapy other than shunt placement in 11. All but one of the lesions have remained clinically and radiographically stable, with a 4-year progression-free and total survival of 94 and 100%, respectively. We conclude that mass lesions originating in the upper midbrain are a subset of intrinsic brainstem tumors with a relatively benign course, usually presenting with hydrocephalus after infancy. They may remain stable for considerable periods and may require no further therapy after treatment of hydrocephalus. Surgical biopsy and/or resection can usually be reserved for progressive or atypical lesions which may also require further adjuvant therapy [5)].

1992

The clinical and neuroradiological features of focal midbrain tumors in 12 children are described, and the results of their surgical management are presented. Patients with a focal midbrain tumor usually exhibit either symptoms and signs of raised intracranial pressure caused by an obstructive hydrocephalus (50%) or symptoms and signs caused by pressure on the tegmentum and cerebral peduncles. The lesions are confined to the tectal plate or tegmentum with possible extension upward to the thalamus and downward to the pons, displacing but not invading these structures. The edges of the tumor are well defined, and the large majority have a solid consistency with intense regular enhancement after intravenous contrast. Radical resection is hardly ever feasible in brain stem tumors, but in this series, significant reduction of the tumor mass was obtained in 75% of the patients, with no surgical mortality and minimal surgical morbidity and with the majority of patients showing clinical improvement postoperatively. All tumors were nonpilocytic, low-grade astrocytomas. Six patients received adjunctive radiotherapy. The mean follow-up period is 2.5 years, and all patients are alive and doing well. We conclude that focal midbrain tumors in children appear to be a distinct subgroup of brain stem tumors and are very amenable to surgical resection with an excellent long-term prognosis [6)].

1990

Of 41 patients with midbrain lesions, 25 underwent definitive surgical exploration. In 16 patients surgical exploration was not warranted, since the patients had only slight neurological deficits and longstanding histories or consent was not given. The infratentorial supracerebellar approach proved to be the ideal method of exposure in 20 patients, in whom the lesion was located in the more dorsal aspect of the midbrain. In 6 of these patients the mass lesion extended from the cerebellum into the midbrain and, therefore, a transcerebellar route was also needed for exposure. In 5 patients the subtemporal approach was chosen. Three patients died as a result of the operation, but in the other 22 patients no increase in morbidity after surgery was apparent and the immediate postoperative course was normal. Five patients with malignant tumors died from recurrence despite radiotherapy. The remaining 17 patients have been doing well up to 14 years after surgery, but 3 had only limited follow-up. This experience with surgical exploration and total resection or evacuation of midbrain

lesions in 25 patients should prove the safety of modern microsurgical techniques. Emphasis is placed on the benefit of microtopographic considerations in the choice of the most suitable approach to these deep-seated lesions [7].

Case reports

2016

Endoscopic Aspiration of a Cystic Midbrain Tumour through the 4th Ventricle [8].

2002

A 66-year-old woman presented with a 3-year history of progressive right-sided hemiparkinsonism manifested by a right-hand resting tremor and right-sided bradykinesia. Magnetic resonance imaging (MRI) of the brain revealed a non-enhanced polycystic mass in the left midbrain. (11)C-methylspiperone (11)C-NMSP) and (18)F-fluorodopa (18)F-DOPA) positron emission tomography (PET) revealed a striatal hypometabolism that was restricted to the left side. These findings are consistent with a dysfunction in the left nigrostriatal dopaminergic pathway that is presumably induced by the cystic mass in the left midbrain. This case is significant due to the paucity of reports regarding the occurrence of a relatively pure parkinsonism that is associated with a mesencephalic space-occupying lesion [9].

1)
https://cnjournal.biomedcentral.com/articles/10.1186/s41016-015-0006-3
2), 6)
Vandertop WP, Hoffman HJ, Drake JM, Humphreys RP, Rutka JT, Amstrong DC, Becker LE. Focal midbrain tumors in children. Neurosurgery. 1992 Aug;31(2):186-94. PubMed PMID: 1308661.
3), 7)
Pendl G, Vorkapic P, Koniyama M. Microsurgery of midbrain lesions. Neurosurgery. 1990 Apr;26(4):641-8. PubMed PMID: 2330086.
4)
https://link.springer.com/chapter/10.1007/978-3-319-11274-9_32
5)
Robertson PL, Muraszko KM, Brunberg JA, Axtell RA, Dauser RC, Turrisi AT. Pediatric midbrain tumors: a benign subgroup of brainstem gliomas. Pediatr Neurosurg. 1995;22(2):65-73. PubMed PMID: 7710975.
8)
Sgouros S, Tsitouras V, Papaevangelou G. Endoscopic Aspiration of a Cystic Midbrain Tumour through the 4th Ventricle. Pediatr Neurosurg. 2016;51(5):276-8. doi: 10.1159/000445898. Epub 2016 May 19. PubMed PMID: 27193127.
9)
Yoshimura M, Yamamoto T, Iso-o N, Imafuku I, Momose T, Shirouzu I, Kwak S, Kanazawa I. Hemiparkinsonism associated with a mesencephalic tumor. J Neurol Sci. 2002 May 15;197(1-2):89-92. PubMed PMID: 11997073.