Lateral Horizontal Head Position Approach for the Lateral and Anterior Third Ventricles: A Subependymoma Clinical Case and Literature Review

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Abstract
Subependymomas are benign, slow-growing, noninvasive solitary lesions of World Health Organization Grade I cerebral ependymal origin that are rare compared with other types of ependymomas. Anterior third ventricle subependymomas are usually detected during autopsies in cases of sudden death due to acute or intermittent obstruction of the cerebrospinal fluid passage. Different surgical approaches are used for these cerebral lateral and third ventricular lesions. Serious complications can occur, either because of brain edema and acute intracranial pressure due to the lesion itself or the chosen head position and continuous use of brain retractors during the surgical procedure.

Keywords
- third ventricle
- transcallosal interhemispheric
- subependymoma

Introduction
Subependymomas are rare noninvasive benign lesions of ependymal origin and were first described by Scheinker and Scheinker 1945.1 Previous studies reported that of all World Health Organization (WHO) grade I subependymomas, 50 to 60% occur in the fourth ventricle and 30 to 40% occur in the lateral ventricles, but those in the third ventricle are rare.2-5 In addition, grade I subependymomas are extremely rare in adults, whereas ependymomas in the fourth ventricle are more common in children.6 In the literature, serious complications have been reported in the early postoperative period because of the characteristics of the tumor or continuous use of brain retractors for the transcallosal interhemispheric approach used to reach the lateral ventricle.7

In the present study, we discuss the advantages of the lateral horizontal head position and transcallosal interhemispheric approach using two cotton pads in a case of acute hydrocephalus anterior third ventricle subependymoma with clinical and surgical findings consistent with those reported in the relevant literature.
Case Report

On March 15, 2021, a 40-year-old male patient was brought to the emergency department of our hospital. Physical examination revealed stable vital signs, but the patient was highly confused, had meaningless speech, and convulsions, with a Glasgow Coma Scale (GCS) score of 7. Non-contrast-enhanced brain computed tomography in the emergency department revealed unilateral asymmetric acute hydrocephalus and a suspicious lesion at the level of the foramen of Monro in the left lateral ventricle (Fig. 1). Emergent ventriculostomy was performed. In the 18th hour of cerebrospinal fluid (CSF) drainage, the patient’s GCS score increased to 13 to 14 on neurological examination (NE). Brain magnetic resonance imaging (MRI) revealed a contrast-enhancing lesion extending from the third ventricle to the left lateral ventricle, with a diameter of 22 × 28 mm, and acute hydrocephalus (Fig. 2). Surgery was performed on March 17, 2021, via the transcallosal interhemispheric approach.

Surgical Position and Technique

The patient was anesthetized and placed in the supine position. Then, the patient was turned to the left lateral decubitus position at a ratio of 2:3 from the supine position. Next, the head was lifted 45 degrees, turned 20 to 30 degrees to the left, and the neck was brought to 0 to 5 degrees flexion. The patient was then fixed with a skull-pin head holder (Fig. 3). Free craniotomy was performed in the left frontoparietal region, with two-thirds of the 3 × 3 cm free craniotomy flap on the left side encompassing the superior sagittal sinus (SSS). The dura mater base was opened in a C shape with the same length of the SSS. Upon entering the interhemispheric corridor with the falx, two 2 × 2 cm round cotton pads, which would replace intermittent brain retractors, were placed in front of and behind the craniotomy flap. With the help of the two cotton pads placed in the surgical area, the corpus callosum was reached easily by dissecting the cingulate gyrus at the free edge of

Fig. 1 Preoperative head computed tomography in the axial plane showing acute hydrocephalus and a suspicious lesion at the level of the foramen of Monro in the left lateral ventricle (red arrow).

Fig. 2 Preoperative contrast-enhanced T1-weighted axial brain magnetic resonance imaging scan showing a mild, contrast-enhancing, well-demarcated solid lesion extending from the third ventricle to the left lateral ventricle, with a diameter of 22 × 28 mm, and unilateral acute hydrocephalus (red arrow).

Fig. 3 Surgical position: The head is raised 45 degrees, turned 20 to 30 degrees to the left, and the neck is brought to 0 to 5 degrees flexion. The patient is fixed with a head holder.
A 1.5 cm callosotomy was performed in the foramen of Monro by using an intraoperative neuronavigation control. After the left lateral ventricle was opened, the following tumor surgery procedures were continued with the surgical view provided by the cotton pads that were placed on the field (►Fig. 4). Thereby, we minimized any additional trauma caused by continuous use of brain retractors. The lesion in the left lateral ventricle was clear and dirt-white in color and was at the level of the foramen of Monro, extending into the third ventricle with prominent capillaries and a cream-white-colored surface (►Fig. 5). After confirming that it was solitary and pedunculated, the small connection was cut, and en bloc resection was performed (►Fig. 6). After the lesion was removed, the CSF passage was found to be provided by the third ventricle, and the ventriculostomy catheter was removed. Histopathological examination revealed that the lesion was a WHO grade I subependymoma (►Fig. 7A, B). The patient’s control postoperative contrast-enhanced brain MRI scan showed that the left lateral ventricle was asymmetrically larger than the right lateral ventricle (►Fig. 8). The patient did not have neurological deficits in the early postoperative period and was discharged on the 10th postoperative day. No neurological deficits were observed in the NE performed in the third and sixth month.

**Discussion**

The WHO grade I anterior third ventricle subependymomas are usually detected during autopsies in cases of sudden death due to acute or intermittent obstruction of the CSF passage, sometimes when neuroimaging is performed during NE for complaints of headache, amnesia, behavioral...
Subependymomas are rare benign, slow-growing, solitary, and pedunculated intraventricular lesions. With correct diagnosis and urgent surgical treatments, as in our patient, the prognosis is excellent. We believe that by applying the principles of our preferred surgical approach (use of two cotton pads, gravity assist, lateral horizontal head position, and nonuse of continuous brain retractors), an alternative method can be created for reducing the risks of perioperative brain edema, additional postoperative neurological deficits, and complications, which are more common in standard approaches for third ventricle lesions.
Authors’ Contributions
Hüseyin Doğu was involved in conceptualization, designing, definition of intellectual content, literature search, clinical studies, data analysis, manuscript preparation and editing. Hidayet Akdemir was involved in conceptualization, definition of intellectual content, clinical studies, data analysis, and manuscript preparation. Sirma Çetin contributed to clinical studies and data acquisition. Hüseyin Doğu and Hidayet Akdemir provided guarantee.

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Conflict of Interest
None declared.

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