

The Incidence of Epilepsy After Posterior Fossa Surgery

Arka Çukur Cerrahisinden Sonra Epilepsi Sıklığı

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Abstract: Contrary to supratentorial operations, seizure after posterior fossa surgery is uncommon. Few reports have been published about the incidence of seizure after posterior fossa surgery. Electrolyte imbalance, hypoxia, hypoglycemia, acidosis or intracranial hematoma may be the cause of seizures. We reviewed 105 posterior fossa lesions treated surgically between 1984 and 1994. Bilateral suboccipital craniectomy was performed in 37 cases (35 %) and unilateral suboccipital craniectomy was performed in 68 cases (65 %). Seizure occurred in 3 cases within 24 hours after surgery (2.9 %). Seizures were generalized in two cases and partial in one. Unilateral suboccipital craniectomy was performed in all cases with postoperative seizure and intraoperative ventriculostomy was performed in two. In few cases with posterior fossa lesions, seizure may develop after surgery. If causes of seizure after posterior fossa surgery are determined, the hazardous effect of seizures may be prevented.

Key Words: Posterior fossa, seizure, suboccipital craniectomy

Özet: Supratentoryal ameliyatlardan tersine arka çukur cerrahisinden sonra nöbet nadirdir. Kaynaklarda arka çukur ameliyatlarından sonra nöbet görülme sıklığı ile ilgili sadece birkaç bildiri yayınlanmıştır. Nöbetlerin nedenleri, elektrolit dengesizliği, hipoksi, hipoglisemi, asidoz veya kafa içi hematoma olabilir. Kliniğimizde 1984-1994 yılları arasında arka çukur lezyonları nedeniyle ameliyat edilen 105 olgu gözden geçirildi. Otuz yedi olguya (% 35) bilateral suboksipital kranyektomi, 68 olguya (% 65) tek taraflı suboksipital kranyektomi yapıldı. Üç olguda (% 2.9) girişim sonrasında ilk 24 saat içinde epileptik nöbet izlendi. Nöbetler, iki olguda yaygın iken 1 olguda kısmi idi. Girişim sonrası nöbet geçiren tüm olgularda tek taraflı suboksipital kranyektomi ve iki olguda girişim sırasında ventriküler eksternal drenaj uygulandı. Arka çukur lezyonlu az sayıda olguda, girişim sonrası nöbet gelişebilir. Arka çukur cerrahisi sonrasında gelişen nöbetlerin nedenleri belirlenebilirse, nöbetlerin tehlikeli etkileri önlenir.

Anahtar Sözcükler: Arka çukur, nöbet, suboksipital kranyektomi

INTRODUCTION

The incidence of seizure in patients after posterior fossa surgery is a rather uncommon phenomenon (2,5,6,12) whereas seizures after supratentorial surgery or intracranial operations in general are widely reported (1,3,5,6,8,9,12,13). Although, some retrospective series suggests that seizure can occur after suboccipital craniotomy for posterior fossa lesions (10).

MATERIALS AND METHODS

We reviewed 105 consecutive patients with posterior fossa lesion who underwent suboccipital craniectomy at Dokuz Eylül University School of Medicine during the last ten years. Data were collected retrospectively regarding various factors, including age at craniectomy, sex, type of suboccipital craniectomy, diagnosis and location of the lesion in the posterior fossa, the surgical

procedure, operative positioning, intraoperative ventriculostomy, preoperative and postoperative neuroradiological findings, and systemic disease. Anticonvulsant drugs were not administered to patients before or after the posterior fossa surgery. General anesthesia was maintained with nitrous oxide and oxygen supplemented by halothane and enflurane. All patients were routinely observed in an intensive care unit for at least 3 days after surgery. Postoperatively, prophylactic antibiotics were used in all patients. In addition to blood gas, blood glucose and serum electrolyte analysis, postoperative computerized brain tomography were routinely performed in patients with posterior fossa lesion who underwent surgery. The electroencephalograms (EEGs) of three cases with postoperative seizure did not reveal any abnormality.

RESULTS

Of the 105 patients, 54 (51.4 %) were male, and 51 (48.6 %) were female, and the male-to-female ratio was 1.05/1. The youngest patient was 1 year old and the oldest patient was 74 years old. Table I lists the conditions requiring posterior fossa surgery. All operations were performed via suboccipital craniectomy and were intradural except two cases of epidural hematoma. Bilateral suboccipital craniectomy was performed in 37 of cases (35.2 %) and unilateral suboccipital craniectomy was performed in 68 of cases (64.8 %).

Table I: Summary of Pathological Conditions in 105 Posterior Fossa Lesions.

Pathological conditions	Number of cases
Intrinsic tumors	
astrocytoma	27
metastasis	16
medulloblastoma	7
hemangioblastoma	1
other	2
Extrinsic tumors	
neurinoma	29
meningioma	4
epidermoid tumor	5
Arachnoid cyst	1
Aneurysms	7
Abscess	3
Epidural hematoma	2
Arteriovenous malformation	1
Total procedures	105

The incidence of seizure after posterior fossa surgery was 2.9 % in our department. Seizures were observed within 24 hours after surgery in all cases. In two of three patients, the seizures were of generalized tonic-clonic type; the other patient had partial seizures with motor signs. Table II shows the detailed features of these cases. The incidence of seizures was variable for different posterior fossa lesions. Intraoperative ventriculostomy was performed in two cases with cranial nerve neurinomas who had seizures within 24 hours of unilateral suboccipital craniectomy. Two patients exhibited hypernatremia and the other hyponatremia before the seizure. Blood gas analysis and blood glucose levels were normal. Immediate postoperative computed tomography (CT) showed only minimal ventricular enlargement and no pneumocephalus in patients with seizure. In spite of three different operative positions used in patients with postoperative seizure, there was no evidence of air embolism detected by precordial Doppler monitoring during surgery.

The most likely underlying cause of seizure was electrolyte imbalance in these cases.

DISCUSSION

Few reports have been published about the incidence of seizure after posterior fossa surgery. The transtentorial or combined transtentorial-translabyrinthine approach to the posterior fossa has been associated with a high incidence of postoperative seizure due to obligatory temporal lobe retraction (7). Although the suboccipital approach has been associated with a very low incidence of immediate postoperative seizure due to electrolyte imbalance, hypoxia, abnormality of blood glucose level, acidosis or increased intracranial pressure (10,11). Stendefor et al. reported no postoperative seizures in a series of 234 suboccipital craniectomies (14). Cabral et al. and Janetta reported no postoperative seizures related to direct approach to the posterior fossa through a translabyrinthine route to remove acoustic neurinomas or through a suboccipital craniectomy for microvascular decompression (2,7). Matthew et al. reported no postoperative seizures within first postoperative week in patients who underwent posterior fossa surgery (12). In contrast, three of the patients with posterior fossa tumors reported by Fukamachi et al. had seizures within 48 hours postoperatively (6). Lee et al. reported thirteen patients (1.8 %) who underwent suboccipital craniectomy and had early

Table II: Clinical Summary of Three Cases with Postoperative Seizures

Features	Case 1	Case 2	Case 3
Age (years)	59	30	47
Sex	Female	Male	Male
Diagnosis	Acoustic neurinoma	Acoustic neurinoma	Medulloblastoma
Surgical procedure	Total excision	Total excision	Total excision
Localization	Right CPA*	Left CPA*	Right cerebellar
Operative position	Lateral	Prone	Sitting
Intraoperative ventriculostomy	Performed	Performed	Not performed
Type of seizure	General	General	Partial
Time to onset of seizure	12 hours	3 hours	10 hours
Laboratory findings	Hypernatremia	Hyponatremia	Hypernatremia

*CPA : cerebellopontine angle

postoperative seizures within two weeks of surgery (10). The incidence of seizures after suboccipital craniectomy in our study was 2.9 % (3 cases). When compared with the literature, our seizure rate seems to be higher. Lee et al. reported that incidence of seizure in medulloblastoma after surgery was the highest (10). Our series were not large enough to make a correlation between seizure and histopathology of the lesions.

Lee et al. reported that intraoperative ventriculostomy was performed to eight of 13 cases with early postoperative seizure (10). In our series, intraoperative ventriculostomy was performed in two cases. This result is not statistically significant as in the literature.

According to laboratory and computerized tomography findings, electrolyte imbalance, hypoxia, hypoglycemia, acidosis, intracranial hematoma may cause seizures in the early postoperative period. All patients who developed seizures within 24 hours after surgery in our study, two had hypernatremia due to fluid restriction and one had hyponatremia due to inappropriate secretion of antidiuretic hormone. In our study, the patients with immediate postoperative seizures had no abnormalities of blood gas or serum glucose abnormalities and early postoperative computerized tomography scans in these patients showed no intracranial hematoma.

The EEGs are normal in approximately 45 % of tumors situated in the cerebellopontine angle and in

18 % of those situated in the midline of the posterior fossa, or cerebellar hemispheres (4). Therefore, the EEG has not the advantage for detection the cause of seizure development.

The surgical procedures of supratentorial lesions seem to be associated with significant risk of postoperative seizures. The incidence of seizure after posterior fossa surgery is uncommon, but possible. Further studies are needed to determine inducing factors of postoperative seizures and prophylactic anticonvulsant drug requirement in lesions situated in the posterior fossa. If causes of seizure development after posterior fossa surgery will be determined, the hazardous effect of seizures may be prevented.

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