

Neurosurgery Division

Introduction

Patients with primary and metastatic brain tumors are treated by four neurosurgeons and one resident in the Neurosurgery Division. Three hundred and fifty-five patients were admitted and 99 craniotomies were carried out in 2004 including 30 gliomas, 34 metastatic brain tumors, and 18 meningiomas. (Table) Twenty-three minor surgeries such as placement of Ommaya's reservoir (14 patients) and ventriculo-peritoneal shunt (4 patients) were performed and most of them were emergency operations. Every craniotomy was assisted by the surgical navigation system (Stealth station) which had been introduced in 2001. The site of craniotomy and the extent of tumor removal were pointed out on the CRT of this system in real time. It contributed to safer and more precise surgery. Postoperative radiotherapy and chemotherapy were carried out for malignant tumors, but it is still hard to obtain complete response. In order to design a more effective chemotherapy regimen, molecular biological studies for drug resistance, growth factors and cell kinetic studies on individual tumors as well as several clinical trials are ongoing.

Routine Activities

A weekly conference is held with doctors of Radiation Oncology Division on diagnosis and treatment of the patients with brain tumors. Usually 14 patients are hospitalized and two or three of them undergo surgical treatment every week. Stealth navigation system is used for surgical planning during every craniotomy. The patients with malignant brain tumors receive postoperative radiotherapy and chemotherapy. Statistical analysis revealed that surgical removal of as much of the tumor as possible yielded better survival even for the most malignant glioblastomas. However, they usually recur soon after the surgery without radiotherapy. Concomitant use

of chemotherapy is considered to enhance the anti-tumor effect of radiotherapy. Intravenous administration of ACNU (nimustin hydrochloride) is carried out during radiotherapy and repeated every two months for 2 years. One-year and 5-year survival rates of the patients with anaplastic astrocytomas were 80.3% and 36.6%, which were better than those of Brain Tumor Registry of Japan. But the five-year survival rate of patients with glioblastomas is still less than 5%.

Decision on the indication for surgery of metastatic brain tumors is not simple. Multiplicity of brain metastasis, stage of primary malignancy and performance status of patients should be taken into careful consideration.

Research Activities

Patients with brain tumors have been registered in Brain Tumor Registry of Japan (BTRJ) since 1969. More than 100,000 patients were registered and followed up. Neurosurgery Division of National Cancer Center Hospital contributes as a managing office of BTRJ and developed a computer-assisted input system in 2004.

An analysis of gene expression profiles in malignant gliomas is being carried out in order to determine specific genes that influence on the effects of chemotherapy and radiation therapy in cooperation with the Genetics Division of the National Cancer Center Research Institute. Tumor samples of malignant gliomas are collected from collaborating institutions and are analyzed by DNA microarray to establish the genomic database of malignant gliomas

Clinical Trials

Japan Clinical Oncology Group (JCOG)-Brain Tumor Study Group was organized in 2002 and a multi-institutional randomized controlled trial entitled "A randomized controlled phase II/III study of

chemoradiotherapy using ACNU versus procarbazine and ACNU for astrocytoma grade 3 and 4" was started. The overall survival and response rates will be compared between the patients treated with ACNU and those treated with ACNU plus procarbazine. Another JCOG clinical trial will be started soon to establish the standard therapy for metastatic brain tumors. Efficacy of gamma knife

will be compared to that of whole brain irradiation. These studies, under the surveillance of JCOG, aim to set a standard protocol for treating malignant brain tumor patients. Moreover, a proper methodology for performing randomized studies will be established in the field of neuro-oncology.

● S. Shibui ●

Table 1. Number of patients

Metastatic brain tumor	34
Glioma	30
Meningioma	18
Other brain tumor	13
Spinal tumor	2
Others	25

Table 2. Type of procedure

Craniotomy	
Total removal of the tumor	55
Subtotal removal of the tumor	13
Partial removal of the tumor	29
Placement of Ommaya's reservoir	13
V-P shunt	5
Others	7

Table 3. Operative morbidity and mortality

Major complications (hematoma, paresis)	2.5%
Minor complication (wound infection)	3.4%
Operative death within 30 days	0%
Postoperative hospital death	2.5%

Table 4. Survival rates

Diagnosis	No. of pts	5yr survival (%)
Anaplastic astrocytoma	75	36.6
Glioblastoma	121	3.7
WHO classification		
Op.year: 1980-2004		