

# Ophthalmology Division

## Introduction

The Ophthalmology Division was established in 1964 by Dr. M. Kiribuchi who was the first ophthalmologist to develop systematic eye-preservation therapy for retinoblastoma in Japan. Following him, Dr. A. Kaneko has been working for the past 30 years as a leading ocular oncologist with a great national reputation. Since 2002, Dr. S. Suzuki participated in this division. Currently more than 70% of patients with retinoblastoma and choroidal melanoma throughout the country are referred to the division. Patients from other Asian countries are also occasionally referred to the division.

## Routine Activities

Our outpatient service is open for three days a week. Every week five major operations under general anesthesia and one small surgery under local anesthesia are performed in our division. Our treatment strategies for ocular tumors are as follows:

### 1) Retinoblastoma

In our division, unless the patient's family has anxiety to preserve the affected eye, or the eye is already suffered from complication such as uveitis or secondary glaucoma, or extraocular extension of retinoblastoma is strongly suspected, we can offer the family eye-preserving treatment. We employ following strategies for the initial treatment nowadays; local chemotherapy combined with local therapy for a child under age of 12 month, or external beam irradiation for a child over 12 months. If the tumor is localized in peripheral retina, plaque brachytherapy radiation using ruthenium-106 is also available. Transpupillary thermotherapy or cryotherapy is also utilized in cases with localized small tumors. Unfortunate patients with extraocular recurrence or metastasis who need systemic chemotherapy are treated by

dedicated support of Pediatric Oncology Division.

### 2) Uveal melanoma

Uveal melanoma is a rare disease in Japan. Recent statistics in western countries do not demonstrate the evidence that enucleation provides better prognosis with medium-sized tumors. Therefore, we offer eye-preserving treatments to patients since 1980 unless they suffer from complications of advanced uveal melanomas. Transpupillary thermotherapy (TTT) by diode laser is effective for choroidal melanoma at early stage. For tumors at advanced stage, plaque radiotherapy will be the first choice. Ruthenium-106 applicator is effective for tumors up to 5mm thick. The sandwich treatment, a combination of plaque radiotherapy and TTT, is the standard strategy for tumors thicker than 5mm. Plaque brachytherapy is only available in our institute throughout Japan. Patients with much larger tumor are referred to National Institute of Radiological Science, Research Center for Charged Particle Therapy for carbon ion therapy. Uveal melanomas often metastasize to the liver and it is invariably fatal. Life-long follow-up with liver imaging is routinely conducted for our patients. Patients with liver and systemic metastases are treated by the Dermatology Division.

### 3) Conjunctival tumors

Conjunctival malignant tumors are treated by excisional resection with safety margin combined with cryotherapy at the resection margin. Carbon dioxide gas laser irradiation is available in some cases.

### 4) Orbital tumors

Most of the orbital tumors in childhood are benign, however, rhabdomyosarcoma is a malignant tumor requiring systemic chemotherapy and radiation after biopsy. The most common orbital tumors in adults include cavernous hemangioma, lacrimal

gland tumors, lymphoma, metastasis, and inflammatory pseudotumor. Patients with orbital lymphoma after biopsy are referred to Hematology Division. Total resection by orbitotomy, or sometimes orbital exenteration, is employed for lacrimal gland tumors. Recurrent lacrimal gland cancers are referred to National Institute of Radiological Science, Research Center for Charged Particle Therapy, for carbon ion therapy.

### 5) Eyelid tumors

The most common malignant eyelid tumors include basal cell carcinoma, sebaceous gland carcinoma, and squamous cell carcinoma. They are treated by excisional resection with reconstruction. Radiotherapy using electron is another strategy. Exenteration is selected in case of orbital invasion.

## Research Activities

One of the unique techniques in our Division is local chemotherapy for retinoblastoma eye via selective ophthalmic artery infusion using a balloon

catheter, developed by Dr. M. Moorri from Keio University in 1980s. Injection of melphalan (7.5mg/m<sup>2</sup> for the initial dosage, 5mg/m<sup>2</sup> for the usual dosage) directly into the affected side of ophthalmic artery can be performed for two patients a week. From 1991 to 2002, 246 retinoblastoma eyes in 212 patients were treated with selective ophthalmic artery infusion in our Division.

Injection of diluted melphalan (0.008mg/0.1ml) into the vitreous cavity is performed for cases with vitreous seeding of retinoblastoma.

Neoadjuvant chemotherapy for eye-preservation of retinoblastoma is available in selected patients in collaboration with Dr. T. Yanagisawa who belongs to Department of Pediatrics, The Jikei University School of Medicine.

In case of enucleation, Medpor orbital implant is available for the purpose of orbital conservation and movement of ocular prosthesis.

● S. Suzuki ●

Table 1. Number of patients

Retinoblastoma	40
Choroidal melanoma	39
Orbital tumor	20
Eyelid tumor	16
Conjunctival tumor	31
Others	5
<b>Total</b>	<b>151</b>

Table 3. Operative morbidity and mortality

Major complications (massive hemorrhage, blind, etc)	0%
Minor complications (ptosis, corneal damage, visual disturbance, etc)	15%
Operative and postoperative death	0%

Table 2. Type of procedure (times)

Enucleation of eyeball	35
Selective ophthalmic artery injection	91
Ruthenium brachytherapy	24
Laser therapy	61
Vitreous injection	17
Local resection	61
Orbital exenteration	4
Fundus examination under general anesthesia	41
<b>Total</b>	<b>334</b>

Table 4. Survival rates

Retinoblastoma: 5yr survival: 93.9% (including 2nd cancer), 96.4% (excluding 2nd cancer), independent of initial staging.