

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 60% of patients with retinoblastoma 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. One child patient of fundus examination under general anesthesia as a day-surgery is also performed since 2001. It is a great progress for children with retinoblastoma, because at least one patient every week can escape severe pain and fear during fundus examinations. 43 children were examined in 2003. 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. Photocoagulation or cryotherapy is also utilized in cases with localized small tumors. Among 44 eyes of 32 new patients with retinoblastoma in 2003, enucleation was performed in 18 eyes and eye-preserving therapy was performed in 26 eyes. 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. Enucleation has been thought to be the most effective method to prevent metastasis. However, recent statistics in western countries do not demonstrate the evidence that enucleation provides better prognosis. 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 6mm. 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 papilloma is treated by excision combined with carbon dioxide gas laser irradiation.

Conjunctival squamous cell carcinoma rarely metastasizes, but it can invade the eyeball. They require excision combined with cryotherapy. Most of the patients with conjunctival melanoma are treated by excision combined with evaporation by carbon dioxide gas laser irradiation.

4) Orbital tumors

Most of the orbital tumors in childhood are benign, however, rhabdomyosarcoma is a malignant tumor requiring systemic chemotherapy and radiation after incisional 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. The treatment options for eyelid tumors vary according to extension of the tumors. They include observation, incisional biopsy,

excision followed by eyelid reconstruction, radiotherapy using electron, chemotherapy and exenteration.

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. Moori from Keio University in 1980s. Injection of melphalan (7.5mg/m² for the initial dosage, 5mg/m² 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. Regarding ocular hyperthermia, we use a device generating 2,450 MHz microwaves with a special ocular applicator designed by Lagendijk in case of severe vitreous seeding.

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

● S. Suzuki ●

Number of Operations		2002	2003
Retinoblastoma	Fundus examination under general anesthesia	53	50
	Ophthalmic artery infusion	94	87
	Other operations	106	81
Choroidal melanoma		26	23
Orbital tumor		34	37
Eyelid tumor		10	13
Conjunctival tumor		27	22
Others		9	10
Total		359	323

Success rate of Eye-preservation Therapy in Retinoblastoma (1994-2001)		
Reese-Ellsworth classification	No of eyes	Success rate (%)
Stage I	31	96.7
Stage II	36	80.5
Stage III	31	93.5
Stage IV	26	65.4
Stage V	111	45