

Radiation Oncology Division

Introduction

Radiation therapy (RT) plays an essential role in the care of patients with cancer. It is used as curative treatment for many patients with malignant disease, as integrated therapy with chemotherapy and surgery, and as palliative treatment for those in whom curative treatment is not an option. The dose of radiation delivered to the tumor must be as high as possible, while being as low as possible to surrounding normal tissues.

The focus of The Radiation Oncology Division is to develop, evaluate and expand the role of RT in cancer treatment. Establishing optimal irradiation technique, including proton treatment, is also an important goal of the division.

Routine Activities

The Radiation Oncology Division includes five consultant physicians, eight radiation technologists, two medical physicists, one nurse, and one clerk. Conference of treatment planning and verification is held three times per week in the evening, journal club weekly, and work conference is held monthly.

Treatment has been mostly based on three-dimensional planning with isodose distributions, performed by newly installed RT-dedicated multi-detector-row helical scanning CT, to conform the dose to the tumor. More than 1,000 new patients were treated annually, and more than 30 clinical trials that involve RT as a sole or a combined treatment modality, for various cancers are ongoing.

The conventional (photon-electron) treatment division is equipped with four treatment machines (a Microtron, two linear accelerators and a high dose rate brachytherapy unit), a CT-simulator, three treatment planning computer workstations, and many other devices. The proton treatment division, the first such hospital-based treatment facility in Japan, is

equipped with a cyclotron capable of generating a 235 MeV proton beam. The proton beam is delivered to three treatment rooms (two isocentrically rotational gantries and one fixed horizontal beam line). Two rotational gantry treatment rooms were routinely used.

New Developments in 2004

1. Proton therapy was initiated in Nov. 1998 at our hospital. Proton therapy was approved as a "highly advanced medical technology" from the Japanese Government in July 2001. Until the end of 2004, we have treated almost 300 patients with the head & neck, lung, liver and prostate cancer.
2. Preliminary outcome of proton therapy for sino-nasal cavity cancer, stage I non-small cell lung cancer, and hepatocellular carcinoma was analyzed.
3. Multi-institutional phase II study for localized prostate cancer employing proton therapy is underway.
4. Proton beam on-line PET system to verify targeting accuracy is now developing.
5. Several clinical studies for the head & neck cancers have been conducted.
 - A)Phase I study of CDDP+S-1 for locally advanced head and neck cancer.
 - B)Late accelerated hyperfractionated RT combined with chemotherapy for locally advanced pharyngo-laryngeal cancer aiming larynx preservation.
6. Several clinical studies of chemoradiotherapy for esophageal cancer were completed. We are now conducting phase I study of chemoradiation therapy for stage II-III esophageal cancer.
7. Clinical trials for hepatobiliary and pancreatic cancer are underway.
 - A)Phase II study of external beam and intracavitary RT for extra-hepatic bile duct cancer.

- B)Phase III study of intraoperative RT for curatively resected pancreatic cancer.
 - C)Phase I study of RT+S-1 for locally advanced pancreatic cancer.
8. 8 Gy single fraction RT for painful osseous metastasis.

9. Radiotherapy quality assurance (QA) survey and audit were initiated in both Japan Radiation Oncology Group (JROG) and Japan Clinical Oncology Group (JCOG).

● T. Ogino ●

Number of Patients Treated with Radiation Therapy in recent 5-years

	2000	2001	2002	2003	2004
New Patients	814	875	936	1010	1124
New Treatments	1001	1066	1127	1200	1308
Head & Neck	187	186	229	199	238
Lung, Mediastinum	268	323	329	354	350
Breast	164	160	174	202	251
Gastrointestinal Tract	162	188	224	259	282
Hepatobiliary & Pancreatic Regions	105	83	50	63	37
Gynecological Regions	9	2	7	1	2
Urological Regions	35	57	48	60	70
Bone & Soft Tissue	17	12	6	4	11
Hematological Diseases	48	45	51	41	51
Others	6	10	9	17	16
Primary Site	470	574	571	647	644
Recurrent, Metastatic Site	437	398	450	393	469
Prophylactic Purpose	94	94	106	153	195
Intraoperative RT	13	6	1	6	6
Brachytherapy	13	8	4	5	1
Proton Therapy	19	59	64	69	

RT: Radiation Therapy