The 10th
Aichi Cancer Center
International Symposium

Diagnostic & therapeutic advances in radiology

President of Aichi Cancer Center: Ryuzo Ohno

Organizing Committee of the 10th Aichi Cancer Center International Symposium
Yasuaki Arai (Chairperson)
Nobukazu Fuwa
Kanji Ishizaki
Yoshitaka Inaba
Hidekazu Yamaura
Takehito Hayano
Takeshi Kodaira
Kazuhisa Furutani
Kenji Tomigashi
Akira Yamada
Takanori Umeda

February 14, 2004
Aichi Cancer Center, Nagoya, Japan
PROGRAM OF SYMPOSIUM

9:30-9:35 Opening Remarks: Ryuzo Ohno

New modalities for diagnosis & treatment

Chairperson: Kozo Morita (Aichi Cancer Center), Kanji Ishizaki (Aichi Cancer Center)

9:40-10:10 Kyousan Yoshikawa (National Institute of Radiological Sciences)  
PET/CT, a new dimension in diagnostic imaging power

10:10-10:40 Tatsuya Higashi (Kyoto University)  
Diagnostic advances in FDG-PET oncology

10:40-11:10 Jun-etsu Mizoe (National Institute of Radiological Sciences)  
Carbon Ion Radiotherapy for Head and Neck Cancer

11:10-11:40 Takashi Ogino (National Cancer Center Hospital East)  
Overview of Proton Beam Therapy

11:40-12:40 Lunch

Chemoradiation therapy for head & neck cancer

Chairperson: Mamoru Tsukuda (Yokohama City University), Iwai Tohnai (Nagoya University)

12:40-13:05 Nobukazu Fuwa (Aichi Cancer Center)  
Which is the most effective method of chemoradiotherapy for head and neck cancer: concurrent, sequential or alternating method?
13:05-13:45 David I. Rosenthal (M.D. Anderson Cancer Center, USA)
Recent Advances of Chemoradiation for Head and Neck Cancer

13:45-14:10 Kazuhisa Furutani (Aichi Cancer Center)
Superselective Intra-Arterial Chemotherapy in Combination with Radiotherapy for Locally Advanced Carcinoma of the Tongue

14:10-14:50 Parvesh Kumar (University of Southern California, USA)
Treatment of Advanced Head and Neck Squamous Cell Carcinoma with Supradose Intra-Arterial Cisplatin and Concurrent Radiation Therapy: The RADPLAT Protocol

14:50-15:10 Kenji Mitsudo (Nagoya University)
Daily Concurrent Preoperative Chemoradiotherapy with Docetaxel (DOC) and Cisplatin (CDDP) using New Superselective Intra-Arterial Infusion via Superficial Temporal Artery for Stage III, IV Oral Cancer

15:10-15:40 Coffee Break

**Interventional radiology**

Chairperson: Jae Hyung Park (Seoul National University College of Medicine, Korea)
Nobushige Hayashi (Interventional Radiologist)

15:40-16:20 William W. Mayo-Smith (Brown University School of Medicine, USA)
New Treatments Using Radiofrequency Ablation for Cancer Management

16:20-17:00 Jae Hyung Park (Seoul National University College of Medicine, Korea)
Interventional Radiology in Korea

17:00-17:25 Yasuaki Arai (Aichi Cancer Center)
Interventional Radiology in Japan

17:25-17:30 Concluding Remarks: Tomoyuki Kato
Welcome Remarks

Ryuzo Ohno
President, Aichi Cancer Center

On behalf of the organizing committee, I am pleased to welcome you to the 10th Aichi Cancer Center International Symposium. My special thanks are to the speakers, chairpersons and participants who have traveled a long distance to join us here in Nagoya.

Our first international symposium was held in 1994 when Aichi Cancer Center celebrated its 30th anniversary and the International Conference Center was newly built. Since then the symposium has been held annually, and the organizing committee has selected timely topics on basic research, translational research, prevention, diagnosis and treatment on cancer.

The main theme of this year’s symposium is “Diagnostic & therapeutic advances in radiology”. This topic was selected since considerable progress has been made in this area in recent years. The symposium consists of 3 sessions; the first session is “New modalities for diagnosis & treatment”, the second is “Chemoradiation therapy for head & neck cancer” and the third “Interventional radiology”.

I sincerely hope that this meeting will be an excellent opportunity to learn the current status and future perspectives in the radiology oncology. I also wish that this symposium will contribute toward the victory in the war against cancer in Japan and all over the world.
MEMO
PET/CT, a new dimension in diagnostic imaging power

Kyousan Yoshikawa
Clinical Diagnosis Section, Hospital, Research Center for Charged Particle Therapy, National Institute of Radiological Sciences, Chiba, Japan

In patients with cancer, CT and MRI that provide anatomical and morphological information are performed. But morphological information alone could not accurately distinguish characteristics of abnormalities as benign or malignant. And accurate tumor staging is essential for providing the appropriate treatment strategy and prognostic information in general.

In recent years positron emission tomography (PET) has widely gotten acceptance in clinical oncology for the detection of metabolic and functional abnormalities. It can demonstrate increased metabolic demand as visual images, and it provides alternative information for diagnosis that can be used to complement morphological observations. PET has been shown to be an accurate imaging modality that complements conventional studies in evaluating patients with cancers. The usefulness of PET for imaging the primary tumor, regional lymph nodes, and distant disease has been shown in many previous studies. Whole-body PET imaging in particular used successfully in staging newly diagnosed cancer, and it is more accurate than bone scintigraphy and CT or MR imaging in staging cancer.

Sensitivity and specificity of PET is higher than CT for the detection and staging of cancer. The combination of PET and CT, the combined PET/CT, could provide more accurate information than either modality alone in the initial diagnosis and for therapy management. In lung and upper abdominal region, however, there is potential misregistration from differences in the breathing pattern between PET and CT data sets. Some breathing protocols for CT scans should reduce this kind of artifacts using a dual-modality PET/CT.

Precisely co-registered anatomical and functional images can be acquired using combined PET/CT scanner, offering the potential for increased diagnostic accuracy. The anatomical structures are very complicated especially in Head and Neck region. MRI is often much preferable to CT images to show anatomical structure in Head and Neck region, and MRI-PET fusion has desired to available for clinical diagnosis and treatment in this region. We devised a new, simple, easy and precise method to co-
register MRI and PET images with the help of PET/CT fusion images. In patients with Head and Neck tumor, we aligned CT images of PET/CT and MRI acquired on different scanners using a co-registration computer algorithm of Dr.View software (AMIR: Automatic Multimodality Image Registration Algorithm) on PC machine. And then we swapped CT images with MRI images to get MRI-PET fusion images. Due to the rich anatomical information of both CT and MRI images, our computer algorithm, AMIR, resulted in accurate MRI-CT fusion, and then precise MRI-PET fusion was successfully achieved by swapping CT images with MRI images. MRI-PET fusion images rather than CT-PET fusion images showed clearly tumor extent or invasion into surrounding tissue, especially muscles and soft tissues, and it played a significant role in diagnosis, staging and treatment.

**Kyousan Yoshikawa, M.D., Ph.D.**

Chief Medical Doctor, Clinical Diagnosis Section  
Hospital, Research Center for Charged Particle Therapy  
National Institute of Radiological Sciences  
Chiba, Japan

1977      Tokyo Institute of Technology, B.A.  
1986      Chiba University School of Medicine, B.A.  
1986      National Licens as a medical doctor  
1986 - 1993 Medical doctor, Department of Therapeutic Radiology and Oncology of the Chiba University Hospital  
1994      Chiba University, Ph.D. (Medicine)  
1993 - 1997 Medical doctor, Treatment and Clinical Diagnosis Division  
National Institute of Radiological Sciences  
1997 - 2001 Chief Medical Doctor, Treatment and Clinical Diagnosis Division  
National Institute of Radiological Sciences  
2001 -    Chief Medical Doctor, Clinical Diagnosis Section  
Hospital, Research Center for Charged Particle Therapy  
National Institute of Radiological Sciences
Diagnostic advances in FDG-PET oncology

Tatsuya Higashi
Department of Nuclear Medicine and Diagnostic Imaging, Kyoto University Faculty of Medicine, Kyoto, Japan

This lecture will provide an overview of the literature concerning the FDG PET diagnosis of cancer and summarized findings from our experience from 1991. FDG PET can effectively differentiate cancer from benign lesion with high accuracy. The latest PET scanners can detect small cancers, up to 5 mm or less in diameter, by their high resolution, which could make a great contribution to the early detection of cancers. FDG PET is useful and cost-beneficial in the pre-operative staging in many cancers because an unexpected distant metastasis can be detected by whole-body PET in about 40% of the cases, which results in avoidance of unnecessary surgical procedures. FDG PET is also useful in evaluation of the treatment effect, monitoring after the operation and detection of recurrent cancers. However, there are some drawbacks in PET diagnosis. A relatively wide overlap has been reported between semiquantitative uptake values obtained in cancers and those in inflammatory lesions. As for false-positive cases, active and chronic inflammatory lesion sometimes show high FDG accumulation and mimic cancer. The usefulness and the limitation of dual-phase FDG-PET (DP-PET) in the differentiation between cancer and benign lesion will be evaluated.
Tatsuya Higashi, M.D.

Instructor
Department of Nuclear Medicine and Diagnostic Imaging,
Kyoto University Faculty of Medicine,
Kyoto, Japan

1983 - 1989  Medical School, Kyoto University Faculty of Medicine, Kyoto, Japan
1989 - 1992  Residency, First Department of Internal Medicine, Osaka, Teishin Hospital, Osaka, Japan
1992 - 1994  Fellowship, First Department of Internal Medicine, Osaka Teishin Hospital, Osaka, Japan
1994 - 1998  Graduate School, Department of Nuclear Medicine and Diagnostic Imaging, Kyoto University Faculty of Medicine, Kyoto, Japan
1998 - 2000  Post-doctoral Fellow, Nuclear Medicine, Internal Medicine, University of Michigan, Ann Arbor, MI, USA
2000 - 2000  Instructor, Department of Nuclear Medicine and Diagnostic Imaging, Kyoto University Faculty of Medicine.
Carbon Ion Radiotherapy for Head and Neck Cancer

Jun-etsu Mizoe
Hospital, Research Center for Charged Particle Therapy, National Institute of Radiological Sciences (NIRS), Chiba, Japan

Based on the results of Phase I/II dose escalation studies from June 1994 to February 1997, we have started phase II clinical trials in order to determine the effectiveness of carbon ion radiotherapy for head and neck cancer.

Patient eligibility for data collection was determined by whether the patients had histologically proven, new, or recurrent cancer in the head and neck region. All patients were to be at age between 18 to 80 years old, with a Karnofsky Performance Index over 60% and a projected life expectancy of more than 6 months. All patients provided written informed consent prior to enrollment in the study. In the 3D treatment planning, clinical target volume was defined with an adequate safety margin for the tumor and metastatic lymph nodes. In this protocol, we used a dose fractionation method of 64.0 GyE through 16 fractions for 4 weeks. For the patient, whose irradiated volume of the skin was larger and who was prospected to show severe skin reaction, treatment dose was reduced to 57.6 GyE/16 fractions/4 weeks.

Between April 1997 and August 2003, a total of 182 patients were entered into a phase II study of carbon ion radiotherapy. Of them, 173 patients (175 sites) were treated between April 1977 and February 2003 and were candidates for this analysis. A total of 134 cases were irradiated by 57.6 GyE/16 fractions and a total of 20 cases were irradiated by 64.0 GyE/16 fractions. A grade 3 skin reaction was observed in 8.6% and a grade 3 mucosal reaction was observed in 12.3%. There was no grade 4 or greater acute reaction. A grade 2 late skin reaction was seen in 5.3% and a grade 2 late mucosal reaction in 3.1%. No grade 3 or greater late reaction was seen before the time of analysis. The local control rate of 57 patients with malignant melanoma was 82%, 36 adenoid cystic carcinoma 57%, 15 adenocarcinoma 92% and 10 squamous cell carcinomas 61% at 5 years.

Preliminary results of Phase II clinical trial for head and neck cancer are showing acceptable acute and late morbidity with excellent local control of the tumors. These results observed in carbon ion radiotherapy appear promising compared with those achieved by low-LET irradiation.
Jun-etsu Mizoe, M.D., Ph.D.

Director
Hospital, Research Center for Charged Particle Therapy
National Institute of Radiological Sciences (NIRS)
Chiba, Japan.

1972  Hokkaido University, M.D.
1989  Hokkaido University, Ph.D. (Medicine)
1973 - 1974  Department of Gynecology and Obstetrics
             Aomori Prefectural Central Hospital
1975 - 1984  Department of Radiology
             Hokkaido University Hospital
1985 - 1989  Chief of Department of Radiology,
             Obihiro Kosei Hospital
1989 - 1991  Assistant Professor of Radiology, Hokkaido University
1991 - 2002  Head of Clinical Oncology Section,
             Hospital, Research Center for Charged Particle Therapy, NIRS
2003 -      Director,
             Hospital, Research Center for Charged Particle Therapy, NIRS
Overview of Proton Beam Therapy

Takashi Ogino
Division of Radiation Oncology and Proton Radiation Medicine,
National Cancer Center Hospital East, Kashiwa, Japan.

Proton beam therapy (PBT) has high potential for substantial improvements in the efficacy of radiation therapy due to the physical characteristics of the beams. Namely, the range of the protons is finite and is dependent on the particle energy. This permits the design of beams, which penetrate just sufficient to irradiate the target but to give no dose to the deeper non-target tissues. As a consequence, there can be important reductions of treatment volumes for some anatomic sites. The benefit from the smaller treatment volumes is that patient tolerance is increased and accordingly, dose to the target is raised with a resultant higher tumor control probability. As lesser volumes of normal tissues will be irradiated, the frequency and severity of radiation injury will be decreased.

PBT was initiated in 1954 at the Lawrence Berkley Laboratory. As of December 2002, total of about 35,000 cases have been reported as having had treatments with proton beams in 21 centers worldwide. The historic change to this therapy occurred in the 1990s, when the Loma Linda University Medical Center (LLUMC) began clinical activity as the first hospital in the world to utilize a medically dedicated proton therapy facility. In 1998, the second hospital-based medically dedicated proton therapy facility was opened at the National Cancer Center Hospital East, Kashiwa, Japan. LLUMC was the model of other new facilities, such as full-time availability, energies as high as 230 MeV, and equipped with rotational gantries. Since then, six such facilities are in operation in the world, and four of them are in Japan.

Results from around the world have shown the therapeutic superiority of PBT over alternative treatment options for ocular melanoma, skull base sarcoma, head and neck cancer, lung cancer, esophageal cancer, hepatocellular carcinoma, and prostate cancer. Some results of PBT will be discussed. PBT is expected to achieve further advancement both clinically and technologically.
**Takashi Ogino, M. D.**

Chief

Division of Radiation Oncology,

National Cancer Center Hospital East

Kashiwa, Japan

1982 Chiba University, M.S.
1990 Chiba University, M.D.
1982 - 1983 Department of Radiology,
    Chiba University Hospital
1983 - 1985 Resident, Department of Radiology,
    Kimitsu Central Hospital
1985 - 1992 Staff, Division of Radiation Oncology,
    National Cancer Center Hospital
1992 - 2000 Head, Division of Radiation Oncology,
    National Cancer Center Hospital East
2000 - Chief, Division of Radiation Oncology & Proton Radiation Medicine
    National Cancer Center Hospital East
Which is the most effective method of chemoradiotherapy for head and neck cancer: concurrent, sequential, or alternating method?

Nobukazu Fuwa
Department of Radiation Oncology, Aichi Cancer Center Hospital
Nagoya, Japan

Various combinations of radiotherapy and chemotherapy for locally advanced head and neck cancer, such as concurrent chemoradiotherapy, neoadjuvant therapy, adjuvant therapy, and alternating therapy, have been attempted to date. Improved local-regional control and disease free or overall survival have been shown in several randomized trials using a concurrent or an alternative approach. Induction chemotherapy (neoadjuvant chemotherapy), however, has not been shown to improve local-regional control or survival. Induction chemotherapy followed by definitive radiotherapy may be useful in the selection patients who are likely to benefit from non-surgical organ preservation treatment schemes.

Currently, most clinical trials of radiotherapy and chemotherapy are evaluating the therapeutic values of concurrent combination therapy. Theoretically, the combination of concurrent radiotherapy and chemotherapy shows the highest anti-tumor effects. However, normal tissue impairment induced by concurrent chemoradiotherapy sometimes becomes a great problem. Moreover, a decreased dose of chemotherapy and radiotherapy may result in a decreased therapeutic value, although the frequency of normal tissue impairment is decreased. Compared to concurrent chemoradiotherapy, sufficient doses of anti-tumor agents and radiation can be administered during alternating chemoradiotherapy, because alternating chemoradiotherapy scarcely injures the normal tissue.

Since 1987, we initiated alternating chemoradiotherapy using CDDP and 5-FU. Although the number of subjects was limited, our previous non-randomized study showed excellent therapeutic results. The present study evaluated the therapeutic results of alternating chemoradiotherapy, together with its usefulness and controversial points.
Nobukazu Fuwa, M.D., Ph.D.

Chief
Department of Radiation Oncology,
Aichi Cancer Center Hospital
Nagoya, Japan

1981 Graduated from Mie University School of Medicine, M.D.
1981 Resident, Mie University Hospital
1981 - 1982 Resident, Hamamatsu Medical University Hospital
1982 - 1984 Medical Instructor, Department of Radiology, Hamamatsu Medical University Hospital
1984 - 1998 Senior Medical Staff, Department of Radiation Oncology, Aichi Cancer Center Hospital
1998 - Chief, Department of Radiation Oncology, Aichi Cancer Center Hospital
Recent Advances in Chemoradiation for Head and Neck Cancer

David I. Rosenthal
Head and Neck Translational Research, Department of Radiation Oncology, The University of Texas M.D. Anderson Cancer Center, Houston, USA

Head and neck squamous cell carcinoma (HNSCC) is a major world-wide public health problem. The annual incidence of new cases exceeds 500,000. The majority of patients present with locally and/or regionally advanced disease characterized by advanced primary tumors and/or nodal metastases, but no distant metastases. The functional, cosmetic and social consequences caused by these cancers and their treatment(s) can be amongst the most devastating. The primary risk factors for HNSCC are tobacco and alcohol use, and we must never forget the important role for primary prevention. As a result of these risk factors, many patients have significant pulmonary, cardiovascular, renal and hepatic co-morbidities that may limit their ability to tolerate some aggressive therapies. There are three main competing causes for mortality in HNSCC: 1. The common risk factors for HNSCC and associated co-morbidities lead to death by intercurrent disease in up to one-quarter of patients. 2. The greatest mortality risk for patients with locally advanced disease is the index cancer. 3. The greatest mortality risk for patients with earlier primary and nodal stage disease is frequently a second primary tumor.

Locoregional control has traditionally been considered to be the greatest challenge in most patients with newly diagnosed HNSCC. As local control has improved, however, more frequent isolated systemic failures have clarified that HNSSC is a multidimensional disease requiring multidisciplinary care. There have been two major advances in the local treatment of head and neck cancer over the past decade. Altered radiation fractionation has led to real but modest gains in local control without improvement in survival, and at the expense of increased acute toxicity. The use of concurrent radiation therapy and chemotherapy as a radiosensitizer has led to substantial enough gains in cancer control that they are associated with a survival advantage. The frequency and severity of toxicity can be ever greater, however, and we are now seeing patients with more protracted or permanent morbidities, most prominently significant dysphagia and feeding-tube dependence. We have taken the first step, but must improve the therapeutic
ratio for the treatment of head and neck cancer.

There is currently much excitement about the potential role for cytoprotective agents and targeted therapies based on the emerging biologic, or, more precisely, molecular, understanding of the underlying neoplastic processes. These current potential therapies are not thought likely to replace current modalities, but it is hoped that they might augment current local and systemic therapies with the addition of little or no additional toxicity. It is incumbent on us to design thoughtful and well designed clinical trials to bring these new and exciting agents to our patients sooner rather than later. While many such therapies are in development, inhibitors of the epidermoid growth factor receptor (EGFR) are in various stages of Phase III development.

David I. Rosenthal, M.D.

Associate Professor
Director, Head and Neck Translational Research
Department of Radiation Oncology
The University of Texas M.D. Anderson Cancer Center
Houston, USA

Education
1977 Duke University, B.A.
1979 Duke University, M.A.
1984 University of Miami School of Medicine, M.D.
1984 - 1985 PG1 General Surgery, University of Miami
1985 - 1988 Otolaryngology Residency, University Hospitals of Cleveland
1988 - 1991 Radiation Oncology Residency, University of North Carolina

Faculty Appointments
1992 - 1996 Assistant Professor in Radiation Oncology
The University of Texas Southwestern Medical Center at Dallas
1996 - 2002 Assistant and Associate Professor in Radiation Oncology
University of Pennsylvania
2002-present Associate Professor in Radiation Oncology
The University of Texas M.D. Anderson Cancer Center
Superselective Intra-Arterial Chemotherapy in Combination with Radiotherapy for Locally Advanced Carcinoma of the Tongue

Kazuhisa Furutani
Department of Radiation Oncology, Aichi Cancer Center Hospital
Nagoya, Japan

Intra-arterial chemotherapy for head and neck cancers has been attempted for many years. However, its indications, the clinical significance, and the adequate anti-cancer agents is unrevealed. But we think intra-arterial chemotherapy is an attractive method to achieve high drug concentration in the tumor tissue, and we believe this treatment method has clinical benefit from our past clinical experiences.

In 1985, Dr. Hattori developed a selective and continuous intra-arterial infusion method using hook-shaped angiographic catheter for head and neck cancers. The catheter is inserted and dwelled from the superficial temporal artery to the target artery selectively. We adopted this method and started a clinical study of combined modality therapy of radiotherapy and intra-arterial chemotherapy in September 1992. In this study we used carboplatin (CBDCA) for infusion drug, and targeted the locally advanced head and neck cancers that were considered uncontrollable by conventional radiotherapy alone. This study was planned as phase I/II study, and demonstrated the adverse effects, the optimal dose of CBDCA.

Technical aspects will be discussed. Traditional technique of non-selective method is easy to perform catheter insertion, but drug concentration level in the tumor tissue will surely become low, therefore we think selective method is very important. But original selective method using hook-shaped catheter was likely to migrate from the target artery. Accordingly, we had modified the method in some ways. That modified method using tapered “ANTHRON P-U” catheter lead to high stability of the dwelled catheter, and it made stable continuous infusion. In this session we will present our method by the animation.

At this time definite indications of this therapy cannot be referred, because the number of cases we treated is limited, but our treatment results seemed to be particularly favorable for locally advanced cancer of the tongue and tongue base that were uncontrollable by conventional radiotherapy alone.
Now we are applying this therapy to medically inoperable cases or medically operable but refused surgery cases. Functional preservation and organ preservation is very important in the treatment of head and neck cancers, and patients’ demands of non-surgical therapy are increasing recently. We think our combined modality therapy is very beneficial for such patients.

Kazuhisa Furutani, M.D., Ph.D.
Chief Physician
Department of Radiation Oncology,
Aichi Cancer Center Hospital
Nagoya, Japan

1993 M.D., Hamamatsu University School of Medicine
1993 - 1994 Intern, Department of Radiology,
Hamamatsu University School of Medicine Hospital
1994 - 1996 Clinical Staff, Department of Radiology,
Seirei Hamamatsu General Hospital, Hamamatsu, Japan
1996 - 1999 Clinical Staff, Department of Radiology,
Hamamatsu University School of Medicine Hospital
1999 - 2001 Resident, Department of Radiation Oncology,
Aichi Cancer Center Hospital
2001 Ph.D., Hamamatsu University School of Medicine
2001 - Chief Physician, Department of Radiation Oncology,
Aichi Cancer Center Hospital
Treatment of Advanced Head and Neck Squamous Cell Carcinoma with Supradose Intra-Arterial Cisplatin and Concurrent Radiation Therapy: The RADPLAT Protocol

Parvesh Kumar
Department of Radiation Oncology, Keck School of Medicine at University of Southern California, Los Angeles, U.S.A.

The prognosis of patients presenting with advanced unresectable head and neck squamous cell carcinoma using “standard” treatment approaches, such as surgery followed by radiotherapy (RT), chemoradiation therapy or RT alone, remains poor. Additionally, patients often lose their voice or swallowing function when a primary surgical approach is used. Although systemic chemotherapy, when combined concurrently with radiotherapy, appears to be superior to radiation alone, the use of neoadjuvant or adjuvant systemic chemotherapy has not improved survival when combined with either surgery or radiotherapy. Even with the use of concurrent systemic chemotherapy and radiotherapy, which is associated with high toxicity, the majority of the patients still succumb to their disease, usually failing locoregionally. Among the newer strategies being explored is the use of supradose intra-arterial (IA) chemotherapy (i.e., cisplatin) with current radiotherapy. Acronymed “RADPLAT,” this novel therapeutic approach delivers supradoses of weekly cisplatin (150 mg/m²) with intravenous sodium thiosulfate and concurrent radiotherapy (70 Gy at 2.0 Gy/fraction given once daily). Multiple studies involving the RADPLAT approach have been conducted in patients with advanced unresectable head and neck squamous cell carcinoma as follows: a phase I trial, a single institution phase II feasibility and efficacy protocol, and a phase II multi-institutional national trial (Radiation Therapy Oncology Group Protocol 9615). The phase II single and multi-institutional trials have shown that the RADPLAT approach is feasible and very efficacious, with high rates of local control and very good survival outcomes. Long term 5 year analysis of our single institution experience revealed local control rate of 75% and disease specific survival of 54%. The RTOG trial confirmed that the “RADPLAT” approach is feasible in a multi-institutional setting with 2-year local control rates of 60% and overall survival of almost 65%. In comparison to “historical” studies using systemic chemotherapy combined with
RT, the “RADPLAT” approach is superior in achieving durable local control of disease as well as survival outcome. In addition, the RADPLAT approach allows for the preservation of organ function. A phase III trial comparing RADPLAT to systemic chemotherapy and radiation therapy is being planned.

Parvesh Kumar, M.D.

Professor and Chairman
Department of Radiation Oncology
Keck School of Medicine at University of Southern California
Los Angels, U.S.A.

1981 - 1986 University of Kansas School of Medicine, M.D.
1986 - 1989 Resident, Department of Radiation Oncology and Nuclear Medicine Thomas Jefferson University Hospital
1989 - 1990 Chief Resident, Department of Radiation Oncology and Nuclear Medicine, Thomas Jefferson University Hospital
1990 - 1995 Assistant Professor, Department of Radiology, Section of Radiation Oncology, University of Tennessee
1995 - 1998 Associate Professor, Department of Radiation Oncology, University of Tennessee
1996 - 1998 Tenured Associate Professor, Department of Radiation Oncology University of Tennessee
1998 - 2002 Tenured Associate Professor at Robert Wood Johnson Medical School/University of Medicine and Dentistry of New Jersey
1998 - 2003 Chairman, Department of Radiation Oncology, Robert Wood Johnson Medical School/University of Medicine and Dentistry of New Jersey
Associate Cancer Center Director for Radiation Oncology, Cancer Institute of New Jersey
2002 - 2003 Tenured Professor, Robert Wood Johnson Medical School/University of Medicine and Dentistry of New Jersey
2003 - Professor and Chairman, Department of Radiation Oncology, Keck School of Medicine of University of Southern California
Daily Concurrent Preoperative Chemoradiotherapy with Docetaxel (DOC) and Cisplatin (CDDP) using New Superselective Intra-Arterial Infusion via Superficial Temporal Artery for Stage III, IV Oral Cancer

Mitsudo K., Tohnai I., Shigetomi T., Ueda M., Fuwa N.; Nagoya University, Nagoya, Japan and Aichi Cancer Center Hospital, Nagoya, Japan

Purpose: Recently, combined radiotherapy and intra-arterial chemotherapy using the Seldinger method was performed for oral cancers. However, chemotherapy and radiotherapy cannot be performed simultaneously every day, because long-term catheterization is not possible. Therefore, we developed a new method of superselective intra-arterial infusion via the superficial temporal artery and preoperatively performed daily concurrent radiotherapy and chemotherapy with DOC and CDDP using this method for stage III, IV oral cancer.

Patients and Methods: 33 patients with stage III, IV oral cancer were treated. The new catheter was prepared by modifying an angiographic catheter measuring (1.35mm) in diameter. It was inserted superselectively to the feeding artery of the tumor via the superficial temporal artery using a guide wire. Radiotherapy (total dose: 40Gy) and superselective intra-arterial infusion chemotherapy using DOC (total dose: 60mg/m²) and CDDP (total 100mg/m²) were concurrently performed daily, followed by surgery.

Results and Conclusion: 31 patients succeeded, the other 2 did not because of arterial anomalies. The clinical effects were CR in 24 patients and PR in 7, and histopathological effects of resected tumor after surgery were grade IIb (severe destruction of tumoral structures, that is, “few viable tumor cells remaining) in 3 patients, and grade III (only non-viable tumor cells present) or grade IV (no tumor cells present in any section) in 28 by the Oboshi-Shimosato classification. The 3-year cumulative survival rate was 82.3%. This survival rate is higher than the rate of therapy using conventional intra-arterial infusion. This superselective intra-arterial infusion allows of long-term catheterization unlike the Seldinger method, so that chemotherapy can be performed simultaneously with radiotherapy. This method promises to be the strategy of choice for the treatment of stage III, IV oral cancer.
Kenji Mitsudo, D.D.S., Ph.D.

Assistant Professor
Department of Oral and Maxillofacial Surgery,
Postgraduate School of Medicine, Nagoya University
Nagoya, Japan

1973 - 1979 Hokkaido University, School of Dentistry, D.D.S.,
1995 Nagoya University School of Medicine, Ph.D.,
2001 - 2003 Research Fellowship: Department of Head and Neck Surgery, The University of Texas M.D. Anderson Cancer Center
New Treatments Using Radiofrequency Ablation for Cancer Management

William W. Mayo-Smith
Brown University School of Medicine, Rhode Island Hospital
Providence, RI, USA

Radiofrequency (RF) ablation is a technique which uses alternating radiofrequency current to generate local heat and induce tissue necrosis. Radiofrequency electrodes placed in the tumor cause local ion agitation and heat which results in focal tissue destruction. Image guided RF ablation shows great promise in treatment of focal neoplasms, or as a palliative treatment of metastatic disease.

The majority of RF ablation literature has focused on hepatic malignancies, hepatocellular carcinoma and to a lesser extent, metastases. Image guided RF ablation has been shown to be comparable to hepatic resection and percutaneous alcohol injection for treatment of focal hepatocellular carcinoma. The role of hepatic RF is evolving and may be used in conjunction with other treatments such as chemoembolization.

RF ablation is now being used in other organ systems as well. In the musculoskeletal system, RF ablation is the primary treatment for osteoid osteomas in the United States. It is also being used to as a palliative treatment for patients with painful bone metastases not responsive to radiation therapy or narcotics. Early reports on image guided renal RF ablation are promising. We have treated over 50 patients with solid renal masses with a high response rate and minimal recurrences. The procedure can be performed using conscious sedation on an outpatient basis. Adrenal RF ablation can also be performed to treat isolated metastases or biochemically active tumors such as aldosteronomas or pheochromocytomas.

A new role of RF ablation is the treatment of non-resectable lung carcinoma. We have performed RF ablations in over 70 patients with non-resectable non small cell tumors with minimal morbidity and no mortality. In addition we are investigating use of RF ablation in conjunction with external beam and brachy therapy. Pulmonary RF is currently investigational, but holds promise due to the high prevalence of this disease and the lack of other viable treatments.

At our institution, patients referred for a RF have a dedicated visit to our service in
advance of the treatment and a chest abdomen and pelvis CT performed before the RF ablation to stage the patient. We do not administer prophylactic antibiotics before or after the procedure. All patients have the procedure performed using conscious sedation (droperidol, midazolam and fentanyl) administered by dedicated nursing personnel. We use CT fluoroscopic guidance for most treatments.

In summary, we have found that image guided percutaneous radiofrequency ablation shows great promise in treating solid malignancies. The procedure can be performed on an outpatient basis with minimal morbidity. Long term follow-up will need to be performed and appropriate patient selection criteria will need to be determined for each organ system treated.
William W. Mayo-Smith, M.D.

Associate Professor of Radiology,
Brown University School of Medicine
Director of Computed Tomography,
Rhode Island Hospital,
Providence, Rhode Island
USA

Education and Academic Appointments

1978 University of Vermont, B.A.
1984 Cornell University Medical College, M.D.
1984 - 1986 Surgery Resident, New York Hospital-Cornell Medical Center
1988 - 1992 Radiology Resident, Massachusetts General Hospital
1991 - 1992 Chief Resident in Radiology, Massachusetts General Hospital
1992 - 1993 Fellow, Abdominal Imaging and Intervention, Massachusetts General Hospital
1992 - 1995 Instructor in Radiology, Harvard Medical School, Assistant Radiologist, Massachusetts General Hospital
1995 - 1998 Assistant Professor of Radiology, Brown University School of Medicine
1995 - 2003 Director of Cross Sectional Imaging Fellowship. Brown University, Rhode Island Hospital
1998 - 2003 Associate Professor of Radiology, Brown University School of Medicine

Professional Licenses and Board Certification

1985 Diplomate, National Board of Medical Examiners
1986 New York State Medical Licensure
Massachusetts State Medical Licensure
1992 Diplomate, American Board of Radiology
Interventional Radiology in Korea

Jae Hyung Park
Department of Radiology, Seoul National University College of Medicine,
Seoul, Korea

-Clinical Practice in Interventional Radiology:
Various vascular and non-vascular interventional radiological procedures are performed in daily clinical practice in Korea. Vascular interventional procedures such as percutaneous angioplasty, and stent implantation, stent-graft applications for aortic aneurysms are widely accepted as the primary procedure. Recently venous intervention such as regional thrombolysis of deep vein thrombosis is frequently performed with venous stenting at left iliac vein to treat May-Thurner syndrome. Chemoembolization is widely indicated in patients with hepatocellular carcinoma with underlying liver cirrhosis.

-Development of New Devices
There are some new designs of nitinol stent, stent-graft and covered stent for vascular and non-vascular intervention in Korea. Niti-S is one of the nitinol vascular stent. Separate type stent-graft is a unique type of percutaneous stent-graft, which enables percutaneous insertion of the stent-graft through 9F arterial sheath. There are many flexible GI stent covered with polyurethane with improved designs to prevent migration of the stent. Those GI stents may be used in benign and malignant stricture of esophagus, outlet of stomach, duodenum and colon. A retrievable type of covered stent is also developed for temporary insertion of stent in benign stricture of esophagus, bronchus and urinary tract.

-Korean Society of Interventional Radiology
We have about 120 acting members around the nation in our society. We have case discussion meeting every month in Seoul and some other areas. We have also a morbidity and mortality case discussion in the end of the year. The annual meeting of the Society is usually in April to present original paper and to discuss interesting cases.
Jae Hyung Park, M.D., Ph.D.

Professor & Chairman
Department of Radiology
Seoul National University College of Medicine &
Seoul National University Hospital
Seoul, Korea

Education
1966 - 1968 Premedical School, College of Humanity and Science, Seoul National University, Seoul.
1968 - 1972 College of Medicine, Seoul National University, Graduated with M.D. degree
1975 - 1981 Postgraduate School, Seoul National University, Graduated with PH.D. degree

Training
1972 - 1973 Rotating Internship, Seoul National University Hospital, Seoul
1973 - 1977 Residency in Department of Radiology, Seoul National University Hospital
1983 - 1984 Research Fellow, Department of Radiology, Brigham & Women's Hospital, Boston, MA 02115, U.S.A.

Professional Background
1977 - 1980 Military Service as medical corps in Republic of Korea Navy, with the rank of lieutenant commander
1980 - 1983 Instructor, Seoul National University College of Medicine
1983 - 1987 Assistant Professor, SNUMC
1987 - 1992 Associate Professor, SNUMC
1992 - Professor, SNUMC
2002 - Chairman, Department of Radiology, Seoul National University College of Medicine

Licensure
1972 Medical Doctor (Licensure number: 12868)
1977 Korean Board of Radiology (Licensure number 164)
Interventional Radiology in Japan

Yasuaki Arai
Department of Diagnostic & Interventional Radiology, Aichi Cancer Center Hospital, Nagoya, Japan

1) Daily routine works of interventional radiology in oncology field

As the regional anti-cancer therapy, the arterial chemoembolization for hepatocellular carcinoma is the most common, and the percutaneous catheter & port placement for repeated infusion chemotherapy for liver metastases is common and recognized as the field of interventional radiology. Radiofrequency tumor ablation is performed for the treatment of hepatocellular carcinoma and others, but has not been covered by the health insurance. As the treatment for symptom relief of cancer patients, stent placement is widely used for biliary, bronchial, vena-caval and esophageal stenoses. CT-guided needle biopsy and various interventions covering post-operative complications are also performed as the routine works.

2) Development of New techniques in oncology field

The technique making anastomosis between intestine, stomach, bile duct and colon by magnetic compression was developed by Dr. Yamanouchi. This unique technique has been still now under investigation, but will become popular and give a big impact for the management of patients with obstruction of alimentary tract. The technique of percutaneous insertion of a drainage tube via the cervical esophagus (P-TEG) is developed by Dr. Ohishi. This technique can relieve patients of terminal stage with obstruction of alimentary tract from a nasal tube. The technique of transjugular transhepatic peritoneal-venous shunt (TTPVS) is developed by Arai. This technique is placing a one-way catheter into the peritoneal cavity via the hepatic vein to drain ascites from peritoneal cavity to the right atrium, and may be useful for the management of patients with uncontrolled ascites.

3) Clinical trials

JIVROSG (Japan Interventional Radiology in Oncology Study Group) has been organized in 2002 supported by the Japanese Society of Interventional Radiology (JSIR) and the Ministry of Welfare & Labor. The group is composed of active 27 institutes, and now 10 clinical trials (phase I/II 7, phase II 2, phase III 1) including new techniques are on going. All protocols are made by repeated group discussion, supported by a
biostatistician, and approved by the ethics review committee of JSIR. The results of these clinical trials of JIVROSG will be reported in near future.

Yasuaki Arai, M.D.

Chief
Department of Diagnostic & Interventional Radiology,
Aichi Cancer Center Hospital,
Nagoya, Japan

Education, Training and Professional Backgrounds

1979 Jikei University School of Medicine, M.D.
1979 - 1983 Resident, Department of Internal Medicine, The 2nd Tokyo National Hospital
1984 - 1996 Staff, Department of Diagnostic & Interventional Radiology,
Aichi Cancer Center Hospital
1990 - 1995 Chairman, Japan Hepatic Arterial Infusion Study Group (J HAISG)
1994 - 1997 Chairman, Interventional Radiology Group of Ministry of Health & Welfare
1997 - Chief, Department of Diagnostic & Interventional Radiology,
Aichi Cancer Center Hospital
1998 - Executive committee, International Society of Regional Cancer Treatment
2002 - Chairman, Japan Interventional Radiology in Oncology Study Group (J IVROSG)
List of Speakers and Chairpersons

Yasuaki Arai, M.D.  
Chief  
Department of Diagnostic and Interventional Radiology  
Aichi Cancer Center Hospital  
1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681  
Japan  
Phone: 052-762-6111  
Fax: 052-764-2966  
E-mail: arai-y3111@mvh.biglobe.ne.jp

Kazuhisa Furutani, M.D., Ph.D.  
Chief Physician  
Department of Radiation Oncology  
Aichi Cancer Center Hospital  
1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681  
Japan  
Phone: 052-762-6111  
Fax: 052-764-2923  
E-mail: 990015@aichi-cc.jp

Nobukazu Fuwa, M.D., Ph.D.  
Chief  
Department of Radiation Oncology  
Aichi Cancer Center Hospital  
1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681  
Japan  
Phone: 052-762-6111  
Fax: 052-764-2923  
E-mail: nfuwa@aichi-cc.jp

Nobushige Hayashi, MD, Ph.D.  
Interventional Radiologist  
2-5-3 Ninomiya, Fukui 910-0015  
Japan  
Phone: 0776-25-9816  
Fax: 0776-25-0867  
E-mail: ivr@mx1.fctv.ne.jp

Tatsuya Higashi, M.D.  
Instructor  
Department of Nuclear Medicine and Diagnostic Imaging  
Kyoto University Faculty of Medicine,  
54 Kawahara-cho, Shogoin, Sakyoku,  
Kyoto 606-8507, Japan  
Phone: 075-751-3419  
Fax: 075-771-9709  
E-mail: higashi@kuhp.kyoto-u.ac.jp
Kanji Ishizaki, M.D.  
Chief  
Division of Central Laboratory and Radiation Biology  
Aichi Cancer Center Research Institute  
1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681  
Japan  
Phone: 052-762-6111  
Fax: 052-764-2985  
E-mail: kishizaki@aichi-cc.jp

Tomoyuki Kato, M.D.  
Director and Chief  
Department of Gastroenterological Surgery  
Aichi Cancer Center Hospital  
1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681  
Japan  
Phone: 052-762-6111  
Fax: 052-764-2963  
E-mail: tkato@aichi-cc.jp

Parvesh Kumar, M.D.  
Professor and Chairman  
Department of Radiation Oncology  
Keck School of Medicine at University of Southern California  
1441 Eastlake Avenue, NOR G356  
Los Angeles, California 90033-0804  
U.S.A  
Phone: 323-865-3072  
Fax: 323-865-3037  
E-mail: parveshk@usc.edu

William W. Mayo-Smith, M.D.  
Associate Professor of Radiology  
Brown University School of Medicine  
Director of Computed Tomography  
Rhode Island Hospital  
Main 3593 Eddy Street  
Providence, RI 02903  
U.S.A  
Phone: 401-444-5184  
Fax: 401-444-5017  
E-mail: WMayo-Smith@Lifespan.org
Kenji Mitsudo, D.D.S., Ph.D.  
Assistant Professor  
Department of Oral and Maxillofacial Surgery  
Postgraduate School of Medicine  
Nagoya University  
65 Turumai-cho, Shouwa-ku, Nagoya 466-8550  
Japan  
Phone: 052-744-2352  
Fax: 052-744-2348  
E-mail: mitsudo@med.nagoya-u.ac.jp

Jun-etsu Mizoe, M.D., Ph.D.  
Director  
Hospital, Research Center for Charged Particle Therapy  
National Institute of Radiological Sciences  
4-9-1, Anagawa, Inage-ku, Chiba 263-8555  
Japan  
Phone: 043-251-2111  
Fax: 043-256-6506  
E-mail: j_mizoe@nirs.go.jp

Kozo Morita, M.D.  
Honorary Director  
Aichi Cancer Center Hospital  
4-52-5 Fujimidai, Chikusa-ku, Nagoya 464-0015  
Japan  
Phone: 052-722-1576  
Fax: 052-722-1576  
E-mail: ketemrt@cameo.plala.or.jp

Takashi Ogino, M.D.  
Chief  
Division of Radiation Oncology  
National Cancer Center Hospital East  
6-5-1 Kashiwanoha, Kashiwa 277-8577  
Japan  
Phone: 04-7133-1111  
Fax: 04-7131-4724  
E-mail: togino@east.ncc.go.jp

Ryuzo Ohno, M.D., Ph.D.  
President  
Aichi Cancer Center  
1-1 Kanokoden, Chikusa-ku, Nagoya 464-8681  
Japan  
Phone: 052-762-6111  
Fax: 052-764-2963  
E-mail: director@aichi-cc.jp
Jae Hyung Park, M.D., Ph.D.  
Professor & Chairman  
Department of Radiology  
Seoul National University College of Medicine &  
Seoul National University Hospital  
28 Yungun-Dong, Chonno-Ku, Seoul, 110-744  
Korea  
E-mail: parkjh@radcom.snu.ac.kr

David I. Rosenthal, M.D.  
Associate Professor  
Director, Head and Neck Translational Research  
Department of Radiation Oncology  
The University of Texas M.D. Anderson Cancer Center  
1515 Holcombe Blvd, Houston, TX 77030  
U.S.A.  
Phone: 800-392-1611  
E-mail: dirosenthal@mdanderson.org

Iwai Tohnai, D.D.S., Ph.D.  
Associate Professor  
Department of Oral and Maxillofacial Surgery  
Postgraduate School of Medicine  
Nagoya University  
65 Turumai-cho, Shouwa-ku, Nagoya 466-8550  
Japan  
Phone: 052-744-2352  
Fax: 052-744-2348  
E-mail: tohnai@med.nagoya-u.ac.jp

Mamoru Tukuda, M.D., Ph.D.  
Professor  
Department of Biology and Function in the Head and Neck  
Yokohama City University Graduate School of Medicine  
3-9 Fukuura, Kanazawa-Ku, Yokohama 236-0004  
Japan  
Phone: 045-787-2687  
Fax: 045-783-2580  
E-mail: mtsukuda@med.yokohama-cu.ac.jp

Kyousan Yoshikawa, M.D., Ph.D.  
Chief Medical Doctor  
Clinical Diagnosis Section  
Hospital, Research Center for Charged Particle Therapy  
National Institute of Radiological Sciences  
4-9-1, Anagawa, Inage-ku, Chiba 263-8555  
Japan  
Phone: 043-251-2111  
Fax: 043-206-3370  
E-mail: kyo_yosi@nirs.go.jp