Department of Radiology

Kunihiko Fukuda, *Professor*
Junta Harada, *Professor*
Yukio Miyamoto, *Professor*
Mayuki Uchiyama, *Associate Professor*
Manabu Aoki, *Associate Professor*
Yoshimitsu Sunagawa, *Assistant Professor*
Takuji Mogami, *Assistant Professor*
Chihiro Kanehira, *Professor*
Toru Sekiya, *Professor*
Shunichi Sadaoka, *Associate Professor*
Hiroya Ojiri, *Associate Professor*
Norio Nakata, *Assistant Professor*
Masao Kobayashi, *Assistant Professor*

Research Activities

Division of diagnostic imaging

1. Clinical usefulness of diffusion-weighted imaging in patients with rheumatoid arthritis

The clinical usefulness of diffusion-weighted imaging (DWI) in the evaluation of the activity of inflammatory synovitis in patients with rheumatoid arthritis (RA) was assessed in comparison with fat-suppressed contrast-enhanced magnetic resonance imaging (MRI), which was defined as the gold standard. Correlation of 100% was obtained in all 60 regions of interest in 4 patients. Furthermore, DWI can be substituted for fat-suppressed contrast-enhanced MRI in patients in whom administration of contrast media is contraindicated.

2. Evaluation of the ankle joint with MRI and dual-source computed tomography

The combination of MRI and 3-dimensional display using dual-source (DS) computed tomography (CT), is superior to other modalities for evaluating the anatomical and pathological relationships between the tendons and osseous components of the ankle.

3. Coronary CT angiography using DS-CT: Comparison with fractional flow reserve (FFR) using flow wire-coronary CT angiography (CTA) using DS-CT shows high diagnostic accuracy for anatomical stenosis diagnosed with coronary angiography, even for patients with a high heart rate not being treated with a β-blocker, which increases the incidence of side effects of contrast media. For the functional evaluation of coronary artery stenosis, the FFR is measured with the flow wire. Coronary CTA in comparison with FFR, also shows a high correlation.

4. CT scoring system as a predictor of neck metastasis in patients with head and neck cancer

Nodal metastasis is the most important prognostic factor in patients with head and neck cancers. We established a CT scoring system that uses the criteria of size, shape, extracapsular spread, and focal defects and assessed its applicability in comparison with surgical specimens of neck dissection.

Division of Nuclear Medicine

1. Multicenter trial confirmed the effectiveness of strontium-89 for palliative pain relief in cases of multiple bone metastases

The bone-seeking radiopharmaceutical Sr-89 has been used as a palliative treatment for

patients with pain caused by metastases to bone. Sr-89 is a suitable isotope because it is a pure beta emitter. We obtained Sr-89 imaging with bremsstrahlung in patients 1 week after injection. Images of Sr-89 had not been published before our report.
2. Assessment of combination therapy with strontium-89 and iodine-131 for thyroid cancer metastatic to bone
Metastasis to bone in patients with thyroid cancer is an intractable condition. We have used I-131 therapy for thyroid cancer. A suitable protocol should be assessed for combination therapy with Sr-89 and I-131 targeting bone metastases.

Division of Interventional Radiology
1. Investigation of the physical properties of microcatheters smaller than 2.2 Fr
The physical properties of microcatheters with tip diameters of 1.8 to 2.2 Fr were reviewed. We measured tip hardness, the smoothness of the interior and exterior surfaces, the flow rate, flexibility of the guide wire, the ability to maintain shape, resistance to kinking, visibility, intensity of pulling, and pressure resistance. The apical flexibility of the catheters was good, but flow rate, visibility, and pressure resistance were problematic.

Division of Radiation Therapy
1. Evaluation of relationship between bronchiolitis obliterans organizing pneumonia and adjuvant therapy (hormonal therapy/chemotherapy) for early breast cancer treatment
We have encountered several cases of radiation-induced bronchiolitis obliterans organizing pneumonia syndrome in patients treated for early breast cancer and analyzed the relationship between the development of this syndrome and adjuvant therapy (hormonal therapy/chemotherapy).
2. Evaluation of the efficacy of chemoradiotherapy for local control in patients with local advanced esophageal cancer refractory to docetaxel, cisplatin, and 5-fluorouracil
The triple-drug combination chemotherapy of docetaxel, cisplatin, and 5-fluorouracil (DCF) before surgery is effective for advanced esophageal cancer. However, cases refractory to DCF likely have a poor prognosis. We evaluated the efficacy of chemoradiotherapy DCF for local control in patients with DCF-refractory local, advanced esophageal cancer.
3. Application of intensity-modulated radiotherapy for adjuvant and salvage radiotherapy after radical prostatectomy
Conventional radiotherapy has long been used as an adjuvant and salvage therapy after radical prostatectomy. However, these treatments are not effective enough to cure residual prostate cancer. We evaluate the effectiveness and adverse events of intensity-modulated radiotherapy in which the prostate bed and the pelvic lymph nodes have been irradiated.

Publications

Kurosaka D, Hirai K, Nishioka M, Miyamoto Y, Yoshida K, Noda K, Ukichi T, Yanagimachi M, Furuya K, Takahashi E, Kingetsu I, Fukuda K, Yamada A. Clinical significance of serum levels

of vascular endothelial growth factor, angiopoietin-1, and angiopoietin-2 in patients with rheumatoid arthritis. *J Rheumatol* 2010; **37:** 1121–8.

Miyamoto Y, Onoue K, Nishioka M, Nakata N, Matsuura T, Asakura T, Ohkawa K, Tsuchiya K, Itani K, Konno T, Sasaki H, Abe M. Experimental study of the stability of sonazoid. *Jikeikai Med J* 2010; **57:** 55–60.

Zeniya M, Yokoyama K, Imamura N, Murai S, Ishikawa T, Hokari A, Koike K, Takahashi H, Sadaoka S. Significance of interferon-beta for the treatment of hepatitis C virus infection in hemodialyzed patients. *Hepatol Res* 2010; **40:** 862–9.

Kobayashi M, Takagi S, Shirahama J, Aoki M, Sunakawa Y, Honda C, Oowaki K, Nakagawa M, Kanehira C. Clinical evaluation of 5 cases with simultaneous triple cancer (oropharynx, hypopharynx, esophagus) (in Japanese). *Rinsho Hoshasen* 2010; **55:** 1639–45.

Kitaoka M, Miyamoto Y, Fukunari N, Omoto K, Kameyama K, Shimura H, Suzuki S, Miyagawa M, Miyabe R, Murakami T. Draft of ultrasound diagnostic criteria for thyroid nodule (Mass) (in Japanese). *Choonpa Igaku* 2011; **38:** 27–30.

Yoshida M, Irie T, Inagawa T, Yamashita Y, Takamura K, Yamakawa H, Sadaoka A, Naruo K, Saigusa H, Miyamoto Y. Treatment of iatrogenic femoral artery pseudoaneurysms with US-guided low-dose thrombin injection (in Japanese). *Choonpa Igaku* 2011; **38:** 13–7.

Hirai K, Kurosaka D, Nishioka M, Miyamoto Y, Fukuda K, Yamada A. Clinical significance of Wrist joint synovial blood-flow signals on Doppler ultrasonography in patients with rheumatoid arthritis. *Jikeikai Med J* 2010; **57:** 21–6.

Reviews and Books

Kanehira C. Radiotherapy of bone and soft tissue tumors (in Japanese). *Gan Chiryou Lecture* 2011; **2:** 169–74.

Munakata K, Miyamoto M, Nishioka M, Onoue K, Nakata N. The latest topic of the contrast ultrasonography (in Japanese). *Shin Iryou* 2010; **37:** 156–60.

Aoki M. The definition of Biochemical failure in prostate cancer (in Japanese). In: Kakei Y, editor. Zenritusengan shinryo. Tokyo: Chugai Igakusha; 2010. p. 151–3.

Kanehira C. Bone and Soft Tissue Sarcomas (in Japanese). In: Onishi H, Karasawa K, Karasawa K, editors. Gan houshasenryouhou 2010. Tokyo: Shinohara Shuppann Shinsha; 2010. p. 1035–9.