

Department of Radiology

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General Summary

Department of diagnostic imaging

1. Clinical usefulness of diffusion-weighted imaging (DWI) in cases with rheumatoid arthritis (RA) Clinical usefulness of DWI in the evaluation of the activity of inflammatory synovitis in cases with RA was assessed in comparison with fat-suppressed contrast-enhanced MRI (FS-CE-MRI), which was set as the gold standard. Correlation of 100% was provided in all 60 regions of interest of four patients. It is thought that DWI can substitute FS-CE-MRI in the patient in whom administration of contrast media is contraindicated.
2. Evaluation of the ankle joint with MRI and dual-source CT (DS-CT) By combination of MRI and 3-dimensional display using DS-CT, anatomical and pathological relationship between the tendons and osseous components of the ankle are found to be better evaluated.
3. Coronary CTA using dual-source CT-comparison with fractional flow reserve (FFR) using flow wire-Coronary CTA using dual-source CT shows high diagnostic accuracy of anatomical stenosis diagnosed by coronary angiography, even for high heart rate patients without β -blocker which increases the incidence of side effects of contrast media. For functional evaluation of coronary artery stenosis, FFR is measured using 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 prognosticator in patients with head and neck cancers. We establish "CT scoring system" that mainly consists of criteria of size, shape, extracapsular spread and focal defect, and assess its availability in comparison with surgical specimen of neck dissection.

Division of Nuclear Medicine

1. Multicenter trial confirmed the effectiveness of strontium-89 for palliative pain relief treatment of multiple bone metastases.
 The bone-seeking radiopharmaceutical Sr-89 has been used as a palliative treatment for patients with bone pain caused by bone metastases. 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. Imaging of Sr-89 had not been notified before our report.
2. Assessment of strontium-89 combined therapy with iodine-131 for thyroid cancer with bone metastases.

Bone metastasis in patients with thyroid cancer is obstinacy disease. We have employed I-131 therapy for thyroid cancer. Suitable protocol should be assessed to administer Sr-89 combined therapy with I-131 targeted to bone metastases.

Department 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-Fr 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.

The division of radiation therapy

1. Clinical evaluation of simultaneous cancer with head and neck cancer
Simultaneous cancer is relatively difficult to treat. It is important to consider the site, degree of malignancy for each cancer, and past history, to determine treatment methods and strategies.

2. Clinical evaluation of shorter fraction radiotherapy after breast conserving therapy(BCT) Whole breast irradiation after BCT is necessary for treatment of breast cancer, but radiation period is long. Shortning fraction radiotherapy need only 3.5 weeks, and expected to effect the same local control and acute reaction comparing with standard schedule radiotherapy. Efficacy of shorter period radiotherapy evaluated.

3. RCT of Tri-modality with I-125 brachytherapy and EBRT and short or Long term Hormonal Therapy for High-risk localized Prostate Cancer Long term hormonal therapy has been regarded as inevitable in the treatment of high risk prostate cancer. So this randomized trial (TRIP study) has planned to show the effects of long term AHT with tri-modality radiotherapy. This study might reduce unnecessary side-effect by adjuvant hormonal therapy in patients with high-risk localized prostate cancer.

4. New strategy, IMRT for head and neck cancer IMRT could spare spinal cord, optic chiasm, and parotid gland without compromising target coverage, and improved the target dose distribution. Especially, for locally advanced head and neck cancer closed to organ at risk, IMRT is useful method due to its ability to spare adjacent normal tissues with acceptable target dose uniformity. This method may be useful in re-irradiation of previously irradiated area.

5. Effectivity of relative signal intensity in the diagnose of prostate cancer
We hypothesize that the relative signal intensity (rSI), defined as the ratio of signal intensity of prostate lesion to the signal intensity of the lesser pelvic space, have clearer image and is similar to pathological prostate. 17 patients with pathologically proven prostate cancer underwent DWI (b value 1,500) using a 1.5 T-system. We made rSI and fused rSI images with T2WI. Each rSI images depict tumor more clearly than conventional DWI. And $rSI > 3SD$ was more correlated to pathological prostate cancer area.

Publications

Hayashi D, Yonenaga T, Soshi S, Fukuda K. Progressively worsening paraesthesia of the left leg, gait disturbances and constipation in a 63-year-old man. *Skeletal Radiol* 2009; **38**: 1209-11; 1189-90.

Aoki M, Miki K, Sasaki H, Kido M, Shirahama J, Takagi S, Kobayashi M, Honda C, Kanehira C. Evaluation of vental bleeding factors associated with prostate brachytherapy. *Jpn J Radiol* 2009; **27**: 444-9.