

## 化学修飾剤による普及型放射線治療法の高度化 腫瘍増感・正常組織防護型治療法

鍵谷 勤

### CHEMICAL MODIFICATION OF CONVENTIONAL CANCER RADIOTHERAPY —TUMOR SENSITIZATION COMBINED WITH NORMAL TISSUE PROTECTION—

Tsutomu KAGIYA

(Received 22 March 2006, accepted 16 June 2006)

**Abstract:** Nitrotriazole radiosensitizer, Sanazole (AK-2123, N-(2'-methoxyethyl)-2-(3''-nitro-1''-triazolyl)acetamide) developed by Kyoto University group was studied by 18 groups of 7 countries on fundamental aspects and clinical studies by 30 groups of 12 countries, and reported its effects on tumor sensitization of conventional cancer radiotherapy. On the other hand, the glucosides of vitamin C (Ascorbic acid glucoside, (AsAG) and water soluble derivative of vitamin-E ( $\alpha$ -tocopherol glucoside, TMG) developed by Kyoto University group were studied fundamentally by 4 groups of 4 countries and clinically by 2 groups of 2 countries, and reported their effects on normal tissue protection in cancer treatments. These two studies of tumor sensitization and normal tissue protection were proposed as an advanced strategy of conventional cancer radiotherapy.

Key words: Radiotherapy, Sensitization, Normal tissue protection

## CyberKnife IIにおける治療中の頭部回転に起因する照射誤差の検討

井上 光広<sup>\*1</sup>, 佐藤 健吾<sup>\*2</sup>, 小池 泉<sup>\*3</sup>

## STUDY OF IRRADIATION ERROR WITH THE CYBERKNIFE II DUE TO HEAD ROTATION DURING TREATMENT

Mitsuhiro INOUE<sup>\*1</sup>, Kengo SATO<sup>\*2</sup>, and Izumi KOIKE<sup>\*3</sup>

(Received 2 November 2006, accepted 4 June 2006)

**Abstract:** Purpose: CyberKnife II (CK) enables stereotactic radiation therapy with frameless by a unique technology, and achieves an excellent treatment result. CK can recognize with 6D but correct with 3D on the treatment. Therefore CK users make threshold value of rotation with head, and CK will stop automatically when patient move over the threshold value. This study evaluates the irradiation error due to this threshold value.

Methods: The tumor distances from TLS's center were analyzed in 50 patients treated our center. To calculate the displacement distance of the tumor as head rotated based on the data. To re-create of rotating patient condition on the TPS and we evaluated the radiation dose and distribution.

Results: The more distance from TLS's center the tumor has, the more displacement the tumor has. The model rotating 0.7 degree and translating (total movement was less than 1 mm) were almost similar, and they had over 20% dose error in the maximum. The dose error were over 30% with rotating 1.0 degree and over 70% with rotating 2.0 degree in the maximum.

Conclusion: CK users should understand that the irradiation error increases according to the head rotation. Therefore we need to pay attention to decide the threshold value of the head rotation.

Key words: CyberKnife, Radiosurgery, Quality assurance, Accuracy

<sup>\*1</sup> 医療法人社団新緑会横浜サイバーナイフセンター放射線治療管理部 (〒241-0014 神奈川県横浜市旭区市沢町574-1)  
Division of Quality Management with Radiotherapy, Yokohama CyberKnife Center (574-1 Ichisawa-cho, Yokohama, Kanagawa 241-0014, JAPAN)

<sup>\*2</sup> 医療法人社団新緑会横浜サイバーナイフセンター脳神経外科  
Department of Neurosurgery, Yokohama CyberKnife Center

<sup>\*3</sup> 横浜市立大学附属病院放射線科 (〒236-0004 神奈川県横浜市金沢区福浦3-9)  
Department of Radiology, Yokohama City University Hospital (3-9 Fukuura, Kanazawa-ku, Yokohama, Kanagawa 236-0004, JAPAN)

## 胃悪性リンパ腫における照射方法の検討

小岩井慶一郎, 佐々木 茂, 鹿間 直人

## RADIATION TREATMENT PLANNING FOR GASTRIC LYMPHOMA

Keiichiro KOIWAI, Shigeru SASAKI Naoto SHIKAMA

*(Received 28 April 2006, accepted 25 July 2006)*

**Abstract:** Purpose: To examine the methods of radiation treatment planning for gastric lymphoma. Materials and Methods: Twenty-six patients who underwent radiotherapy for gastric lymphoma between February 2000 and April 2005 were included in the study. Radiation doses were 30–40.5 Gy (median: 30) with a daily fraction size of 1.5 Gy. We considered that the volume irradiated with 20 Gy or more in the bilateral kidneys (K-V20) may be reduced to 50% or less. Anterior-posterior/posterior-anterior parallel-opposed fields (AP/PA) were compared retrospectively with the 4-field technique in 12 patients whose simulation data could be reconstructed in the radiation treatment planning system. Results: Twenty-four patients were treated with AP/PA, one patient with 4-field and one patient with 3-field. The predefined rules in margin-setting were not observed in 7 patients (27%) to reduce the irradiated volume of the kidney. Twenty-two patients achieved complete remission, and the overall 2-year survival rate was 95%. No late adverse events were seen. Our retrospective comparison of AP/PA with the 4-field technique in the radiation planning system indicated that K-V20 became more than 50% in 4 patients treated with AP/PA, but in none of those treated with the 4-field technique. In all 8 patients with K-V20 of less than 50% with AP/PA, the caudal side of the stomach was located above the mid-slice of the left kidney on abdominal CT. Conclusion: The outcome of gastric lymphoma after radiotherapy is excellent. When the position of the stomach is low relative to that of the left kidney, the 3D-based 4-field technique may allow realization of optimal radiation therapy ensuring sufficient margins of the target and increased safety for the kidney.

Key words: Gastric Lymphoma, Radiation therapy, Toxicity

## 耳垂ケロイドの術後照射

横川 徳造, 白井 辰夫, 川崎 努, 古井 滋

## POSTOPERATIVE IRRADIATION OF EARLOBE

Tokuzou YOKOKAWA, Tatsuo SHIRAI, Tsutomu KAWASAKI and Shigeru FURUI

*(Received 31 March 2006, accepted 21 August 2006)*

**Abstract:** For keloid, postexcisional radiotherapy has been shown to reduce the recurrence rate. We investigated 25 earlobe keloids from piercing in 22 patients treated with radiotherapy immediately following excision between April 1998 and December 2004. The median follow-up time was three years and two months. Radiotherapy was given as a total doses ranging from 4 to 12 Gy using electron beam irradiation; 12 sites received a dose of 4 Gy in a single fraction and 13 received 8-12 Gy per one to three fractions. The overall recurrence rates were 40.0% (10/25), and 41.7% (5/12) when 4 Gy was delivered and 38.4% (5/13) when 8-12 Gy was given.

The recurrence rate was 80.0% (8/10) for cases with prior keloid history or diameter over 2 cm, and 13.3% (2/15) for other cases. There were statistically significant differences ( $P=0.0014$ ). We have found a high risk group of recurrence based on the volume of keloid tissue and history of keloid elsewhere. The high risk group was contained to 53.8% (7/13) in the 8 to 12 Gy and 25% (3/12) in the 4 Gy. Therefore this was considered to be the reason why no difference was observed in the total dose for 4 Gy versus 8-12 Gy. On the other hand, the recurrence rate for other cases except the high risk group given 4 Gy was 22.2% (2/9). The results suggested that we should change the treatment plans according to risk factor, such as that keloid with high risk of recurrence should receive escalated radiation doses and dose reduction may be possible to the cases without risk factor. In addition, there were no cases of radiation toxicity.

Key words: Earlobe keloid, Radiation therapy, Risk factor

## 外耳道癌の放射線治療

木根淵 裕子, 北原 規, 久保田 勇人

### EVALUATION OF THE RESULT OF RADIOTHERAPY FOR EXTERNAL AUDITORY MEATUS CARCINOMA

Yuko KINEBUCHI, Tadashi KITAHARA, and Hayato KUBOTA

(Received 25 May 2006, accepted 28 August 2006)

**Abstract:** Purpose: To evaluate the significance of radiotherapy for carcinoma involving the external auditory canal, the data of six patients were studied.

Materials and Methods: Six patients who received radiotherapy with squamous cell carcinomas in external auditory meatus were investigated. One patient was treated by radiotherapy following incomplete resection, one patient was treated by chemo-radiotherapy and four patients were treated only by radiotherapy. Total radiation dose was between 60 Gy and 69.6 Gy.

Results: The post-treatment survival period of five patients ranged from 2 years and 8 months to 5 years and 9 months, but it was unclear for one patient. Three patients can get complete remission only by radiotherapy.

Conclusion: The prognosis of patients with advanced cancer involving the external auditory canal is generally poor. In our cases, relatively superficial cancer revealed good results comparing with the results in other literatures. Radiotherapy was considered to be effective for the cancer located relatively in the superficial region.

Key words: External auditory meatus carcinoma, Irradiation