tic leakage in the present series. All the mediastinal complications reported previously could be avoided using the appropriate surgical techniques.

Mortality and morbidity associated with surgical treatment of hypopharyngeal carcinoma increases with the complexity of the operative procedure. The reconstruction should therefore be selected with reference to the type of defect and extent of tumour.

## 3

## Hyperthermia for Head and Neck Camcer ; Current Status

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### 1. Biological Basis of Hyperthermia

Heat kills cells in a predictable and repeatable way. Survival curves for cells exposed for various peroids of time to a range of temperature from 41.5℃ to 46.5℃ shows temperature dependent cell killing.

The age response function for heat complement that for selectively killed and radiosensitized by heat. On this basis, cycling tumor cells should be killed selectively by hyperthermia compared with the slowly turning over normal tissue responsible for late effects.

Cells that are nutrient deficient and/or at low PH are more sensitive to killing by heat. These are likely to be hypoxic tumor cells, which may well be out of cell cycle. It might be possible to amplify this effect in tumor in vivo by glucose infusion.

### 2. Aim of Hyperthermia for Head and Neck Tumors

The curative role of head and neck tumors is limited to small tumors, while advanced T3-T4 tumors frequently fail to respond to convential RT alone. Present management of advanced tumor consists of pre- or post-operative RT plus surgical resection or combined sequential or simultaneous RT-CHT. However, loco-regional recurrence is a common observation even after achieving a CR ; the failure rate in advanced tumors ranges between 25−50%. Local control of fixed, large and widely necrotic cervical neck nodes metastases is extremely difficult to achieve with conventional RT combined with either surgery and/or chemotherapy. The clinical data from the literature suggests that nodes with>5cm diameter require RT doses of at least 85 Gy to achieve at least a 50% CR rate. Thus, additional HT may well support the management of these tumors, since they are likely to posess a large portion of hypoxic cells and cells at low PH, which are rarely susceptable to RT alone.

### 3. Results of Hyperthermia for Head and Neck Tumors

Prospective and retrospective trials demonstrate that combined HT-RT has higher potential to control neck node than RT alone. Clinical experience with HT alone for head and neck tumors has been rather disappointing, which is in contrast to combined HT-RT trials. Only a few randomized studies has compared combined HT-RT versus RT alone involving both primary and recurrent head and neck cancers as well as neck node metastases. These studies show an isodose TER>1, and by comparison of dose-response data an isoeffect TER value of 1.6 was established.

### 4. Hyperthermia Equipment Used for Superficial Tumors

#### 1) BSD-1000 system(BSD Medical Corporation, USA)

The BSD-1000 system was developed in 1976 at BSD Medical Corporation of the United States. A horn-type applicator(MA-201) was used for exceeding 5cm in thickness. This device is driven at frequency of 80-90 MHz.

2) Thermotron RH-8(Yamamoto Vynitor Co., Ltd., Japan)

The RF energy was transmitted from a generator through two coaxial cables to disc electrodes. For superficial or shallow-seated tumors, diffenent sized electrodes were paired, with a small electrode at the tumor side. Frequency is 8 MHz.

3) HMS-020(Aloka Co., Ltd., Japan)

An indirect applicator has the advantage of being able to be used on uneven boys surfaces. It was used for tumors with a thickness of 2−3cm. Frequency is 2450 MHz

4) HTS-100(Tokimec Co., Ltd., Japan)

Characteristics of this equipment has the lens applicator. This lens applicator has metallic plates inside it, which control the phase of the electromagnetic field in the aperture. The distribution of the transverse electric field radiated from applicator that the maximum heating depth generated by the lens applicator was over two times the depth that could be obtained by conventional waveguide type applicator.

5) TAG MED 434(TAG MED Co., Ltd., USA)

Hyperthermia system TAG MED 434, a hyperthermic machine using 434 MHz microwave has three different size indirect applicators and also provided interstitial and intracavitary applicators.

6) Lund Buchler 4010(Lund Science Co., Ltd., Sweden)

This system consists of a microwave generator, a microcomputer, six applicators, a water circulation system, a water bolus and a thermometry unit. Frequencies of either 434 MHz or 915 MHz can be chosen according to the tumor depth.

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## 4

## A Group Study of Several Kinds of Combined Chemotherapy for Advanced Head and Neck Cancer

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Chemotherapy for head and neck cancer has been common since Bleomycin became available. And nowadays we have several other kinds of chemotherapy agents such as Bleomycin, Peplomycin, Cisplatinum, Methotrexate and 5-FU. Itis, however, an obvious fact that it is extremely difficult to treat and head and neck cancer with only a single agent.

As a result, a group study of combined chemotherapy for advanced head and neck cancer was launched and has been going on since 1984. This group was organized bby the 14 head and neck surgery departments of the cancer hospitals in Japan, and their number has recently increased to 15.

The first study was performed from 1984 to 1986 with two regimens for advanced head and neck cancer which are shown below :

Regimen A : CDDP 80mg/㎡ i.v.(day 1)
Peplomycin 15mg/body s.c. infusion or IVH(day 2−5)
MTX 40mg/㎡ i.v.(day 2)