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Squamous Cell Carcinoma Antigen as Tumor Marker for Head and Neck Malignancy

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ABSTRACT. Serum concentrations of squamous cell carcinoma antigen (SCC), extracted from liver metastasis of uterine cervical squamous cell carcinoma and purified, were measured by radioimmunoassay in 85 patients with head and neck diseases (40 benign diseases, 37 squamous cell carcinoma and 8 malignancy of other histological types). Twenty-nine of 37 (78%) patients with head and neck squamous cell carcinoma showed high circulating SCC levels, while the positivity rates of SCC in patients with benign diseases or malignancy of other histological types were 2.5% (1/40) and 38% (3/8), respectively. Although this SCC assay was limited in the early diagnosis, it could provide a useful information for monitoring the response to treatment and for evaluating the prediction of the recurrence.

Key words : SCC antigen — tumor marker — head and neck tumor

Although the measurement of a tumor marker is of great value in the diagnosis and the management of patients with malignancy, there have been few reports about clinically reliable tumor marker for the head and neck tumor. Squamous cell carcinoma antigen (SCC, subtype of TA-4, MW 45,000), which was isolated from liver metastasis of human uterine cervical cancer and purified, has been used as a tumor marker for lung and esophageal cancer derived from squamous cell as well as uterine cervical cancer.[1-4] It is well known that 80% of head and neck malignancy is histologically squamous cell carcinoma. Therefore, in this study, SCC concentrations in patients with head and neck malignancy were measured and the usefulness of this tumor marker was evaluated.

MATERIALS AND METHODS

Serum SCC concentrations in 85 patients with histologically proven various head and neck diseases, including with 40 benign disease and 45 malignant disease (29 untreated and 16 recurrent patients; 37 squamous cell carcinoma and 8 malignancy of other histological types) were measured (Table 1).

The measurement of SCC was done by a radioimmunoassay kit (Dainabot Co.).[5] This assay system was described as follows: Highly purified SCC, obtained from liver metastasis of cervical uterine cancer, was used as both standard

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and ^{125}I-labelled antigen. Antibody against SCC was developed in a rabbit. Double-antibody method was used for the free from bound tracer. The assay was sensitive to 0.5 ng/ml. The recovery, dilution and reproducibility study in this assay were in good agreement. Serum SCC concentrations in normal subjects were distributed within 2.3 ng/ml.

The usefulness of the measurement of SCC, by this assay system, as to the discrimination between squamous cell carcinoma from benign disease or malignancy of other histological types, the evaluation of the response to treatment, and the prediction of the recurrence were studied.

TABLE 1. Subjects with head and neck diseases in this study.

	Cases	
	Untreated	Recurrent
Benign	40	0
Malignant		
Squamous cell carcinoma		
Neck	1	0
Lip	1	0
Gingiva	2	2
Tongue	3	1
Oral floor	1	0
Maxilla	4	3
Epipharynx	4	0
Mesopharynx	1	2
Hypopharynx	2	5
Larynx	4	1
Other histological type		
Adenosquamous cell carcinoma	1	1
Malignant melanoma	1	0
Malignant lymphoma	1	0
Plasmacytoma	1	0
Undifferentiated carcinoma	1	0
Adenocystic carcinoma	0	1
Transitional cell carcinoma	1	0

RESULTS

In benign head and neck diseases, 39 of 40 patients (98%) showed the normal serum SCC levels. By contrast, in 29 of 37 patients (78%) with head and neck squamous cell carcinoma the SCC levels were elevated (Fig. 1). Patients with squamous cell carcinoma originated primarily from gingiva, tongue, maxilla, hypopharynx and larynx showed a higher percentage with elevated serum SCC levels than those from other sites. Interesting enough, all 4 patients with epipharyngeal cancer showed the normal serum SCC levels. On the other hand, in head and neck malignancy of other histological types, only 3 (2 adenosquamous cell carcinoma and 1 adenocystic carcinoma) out of 8 patients showed the elevated serum SCC levels.

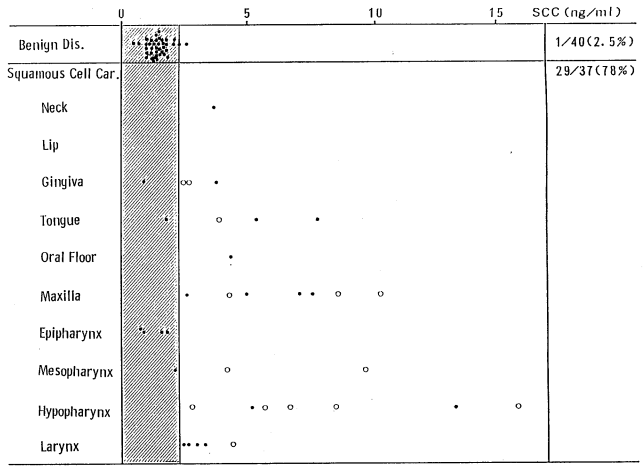

Fig. 1. Serum SCC levels in patients with benign and malignant head and neck diseases. Closed circle; untreated case. Open circle; recurrent case.

The correlation with the extent of the tumor, estimated with the clinical staging, and serum SCC levels in patients with head and neck squamous cell carcinoma was shown in Fig. 2. The positivity rate for stage I was 25% (1/4) and for stage IV was 69% (9/13). Three of 4 cases, in spite of stage IV, presenting with negative results were located in epipharynx and mesopharynx.

Chronological changes of serum SCC levels in patients with head and neck

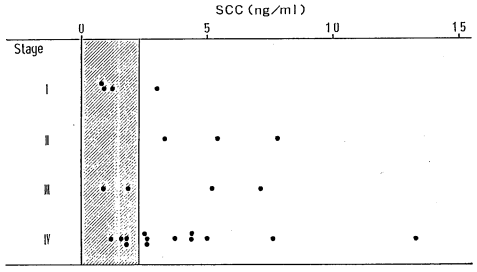

Fig. 2. Clinical staging and serum SCC levels in patients with head and neck squamous cell carcinoma.

squamous cell carcinoma before and after treatment were shown in Fig. 3. The initiation of treatment led serum SCC levels in all cases to the decreased levels. Therefore, serial determinations of serum SCC could be monitoring the response to treatment.

Correlation with the detectivity of the recurrence and serum SCC level was shown in Fig. 4. In 13 of 14 patients without recurrence, serum SCC levels distributed within normal range, while 10 of 11 patients with recurrence showed the elevated levels.

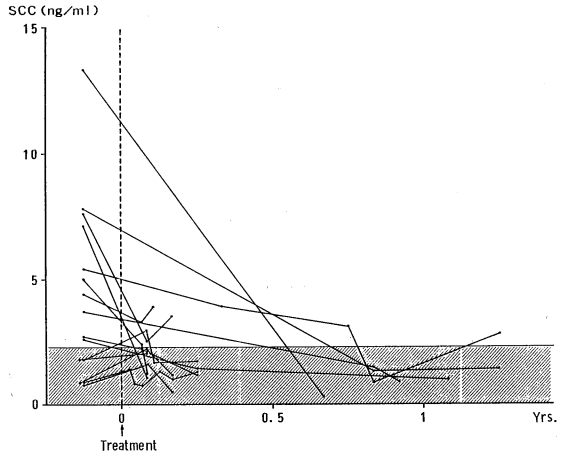

Fig. 3. Chronological changes of serum SCC levels in patients with head and neck squamous cell carcinoma before and after treatment.

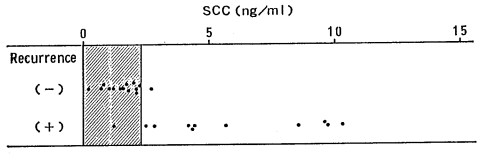

Fig. 4. Relationship between the recurrence and serum SCC levels in follow-up cases with head and neck squamous cell carcinoma.

DISCUSSION

Although a number of serum parameters have been used to monitor the course of head and neck malignancy, yet there has been no specific and sensitive marker for this purpose.[6,7] In present study, SCC, specific to squamous cell carcinoma of lung and esophagus as well as uterine cervix, was measured in serum, and was found to be useful as a tumor marker of head and neck squamous cell carcinoma. The positivity rate (78%) of untreated or recurrent head and neck squamous cell carcinoma was equal or superior to that of other squamous cell carcinoma reported.[3,4,8] Furthermore, the measurement of this tumor marker could be discriminated the head and neck squamous cell carcinoma from the benign diseases and, to some extent, the malignancy of other histological types. Interesting enough, however, the positivity rate of epipharyngeal cancer was low. This phenomenon might be reflected the fact that, with ascending to the upper part of pharynx, the cell differentiation was poorer. However, in order to clarify this reason more accurate, further study will be needed.

In addition, the usefulness of SCC assay at the time of presentation in patients with clinically early head and neck squamous cell carcinoma was interpretated. The positivity rate for the advanced cases was relatively high, while for stage I was low. Thus, as the measurement of serum SCC levels lacks the sensitivity, it was limited to use in the early diagnosis.

Although, as to the head and neck tumor, the inspection examination is exclusively used in the search for the tumor growth and the recurrence, the elevated SCC levels were also indicative for the predictive potential in monitoring the response to treatment and in detecting the recurrence.

In conclusion, although SCC applied to head and neck squamous cell carcinoma was far from ideal, it was found that SCC assay could serve as an index of the management of the tumor.

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