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The role of complex biophysical–chemical therapies for cancer *

U.G. Randoll and R.M. Pangan

Department of Maxillofacial Surgery, University of Erlangen / Nürnberg, Glückstrasse 11, 8520 Erlangen (Germany)

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Abstract

In true tumor therapy the local "functional organization" of single cell units relative to the whole body is very important, because it reveals the first changes within the internal milieu of an organism. Histomorphologic changes resulting from the organism's reduced regulative capacity begin in the microcirculation of the intra- and extracellular spaces. This cell milieu is partly discernible through biochemical and biophysical parameters (osmolarity, acid–base content, dielectric properties, degree of ionization of particular ions, susceptibility, temperature) [1].

In the tumor cases presented, standard tumor therapy could have resulted in major functional and esthetic defects. Application of a regulative interstitial complex therapy produced a significant reduction in tumor size and a general improvement in the condition of the patients was observed. Therefore this therapy made smaller surgical resections possible.

INTRODUCTION

The advent of musculo–cutaneous flaps has encouraged radical surgical procedures in treating oro–pharynx carcinomas. However, the real issue is whether these improvements in operative techniques correlate with improvement in the survival rate of tumor patients. A retrospective study of 76 patients with stage 2 and 3 squamous cell cancers of the oral cavity revealed that the survival rate is dependent on the size of the primary tumor [2].

These results challenge us to consider our current tumor therapies in terms of the cybernetic aspects of tumor biology. Cybernetics [3] acts as a bridge between

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different sciences and makes it possible to analyse concurrently both visible matter and the invisible forces underlying its structure. According to the cybernetic model each organism has its own biological rhythm that can be damaged by various stresses (i.e. mechanical, chemical, thermal, galvanic, electromagnetic, infectious, toxic, allergic, nervous, emotional) [4]. These stresses produce nonspecific effects on the organism's interstitium, depending on the degree and duration of various stresses [5]. The clinical symptoms become evident only after dysregulation and decompensation of physical, biochemical and emotional parameters.

This understanding of thermodynamic cybernetics is important because it explains the various properties of living systems (single cell units, functional cellular units, organs, organisms and populations) [6,7].

NEW CONCEPT OF TUMOR THERAPY

The common characteristics of our tumor patients with oro-pharynx carcinoma are psychological depression, nicotine abuse, poor oral hygiene and high alcohol comsumption. Clinical tests revealed an abnormal liver function as well as pathological immunological tests. These observations allow us to treat the etiology of squamous cell carcinoma as a local process with a corresponding local therapy or to view the problem as systemic and to consider systemic therapies.

The aim of the systemic therapy is to bring about reduction in tumor size prior to surgical resection and eventual control of tumor growth. This therapy complements the findings of Steinhäuser and Baumann [2] discussed above.

Furthermore, our observations of living cell cultures by means of a high resolution microscope (Olbrich-Ergonom 400) [8] and photomultipliers [9,10] have provided vital information about the structure and functional organization of the cell (cellular communication, reaction and cellular regulations stimulated by specific biophysical or biochemical signals).

BASIC TREATMENT PLAN

Direct antioxidants (β-carotene, a-tocopherol, ascorbic acid) and substances that catalyse antioxidative mechanisms (Na-selenium, Zn-orotate) are given preoperatively [12]. Patients with tumor induration and pain are exposed to weak pulsating electromagnetic fields (Magnetodyn® system) that can be synchronized with pulse rate. The use of this external magnetic field coupled with the inherent electromagnetic field of the heart is known to influence "dia- and paramagnetic matter" and to restore a holistic rhythmic molecular process in colloids of biological systems.

PRELIMINARY RESULTS

A reduction in tumor size was observed in two patients with diagnosed squamous cell carcinoma of the tongue ($T_3/N_1/Mo$) (Figs. 1 and 2). Total glossectomy, radical neck dissection and regional flaps were avoided. One of our patients

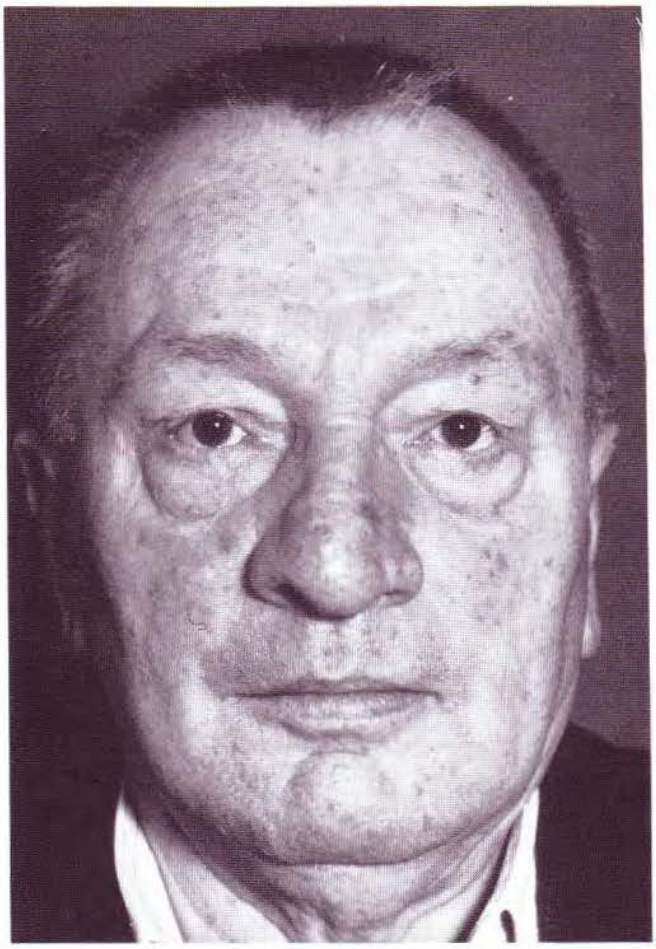


Fig. 1. 58-year-old patient presenting with squamous cell carcinoma of the tongue ($T_3/N_1/M_0$) (29 January 1990).

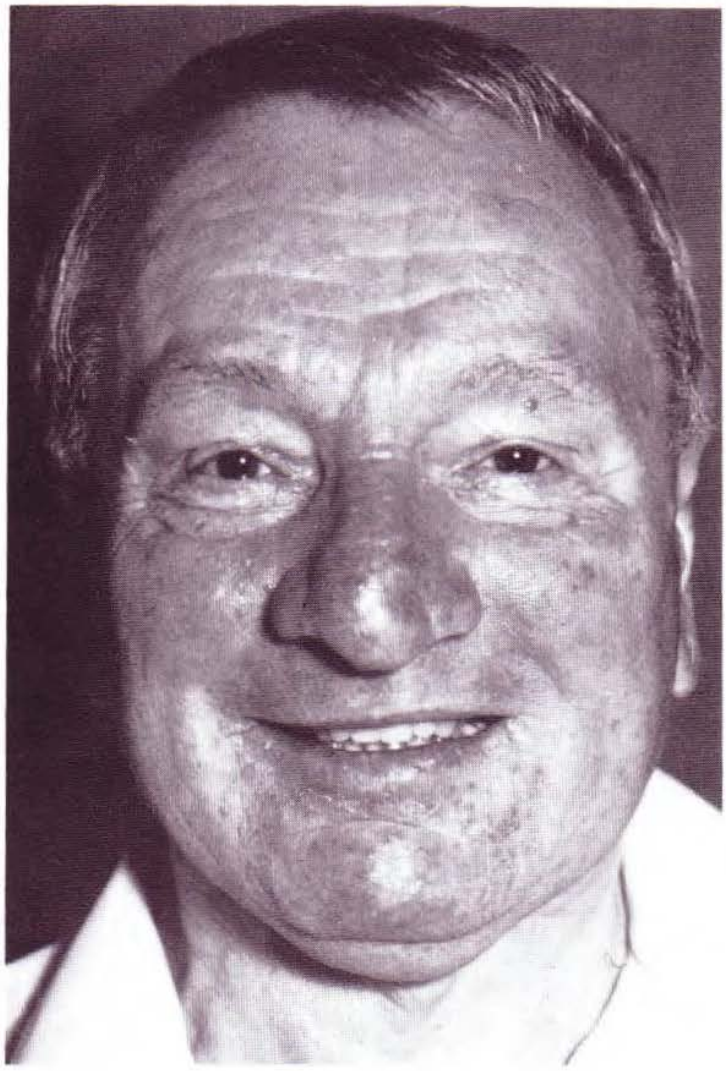
Fig. 2. Pre-therapeutic status of tongue carcinoma.

Fig. 3. Four weeks after therapy (26 February 1990).

developed pus formation after 3 weeks of therapy. In both patients the consistency of the tongue became softer and more mobile, and improvement in speech was noted. Adequate pain control, which allowed withdrawal of analgesics was also observed after a few days of therapy (Figs. 3 and 4).

Surgery was carried out 7 weeks after therapy with minimal resection of the tongue tip together with bilateral suprahyoid neck dissection. Histologic examina-

Fig. 4. Five weeks after therapy (3 March 1990): significant tumor reduction.



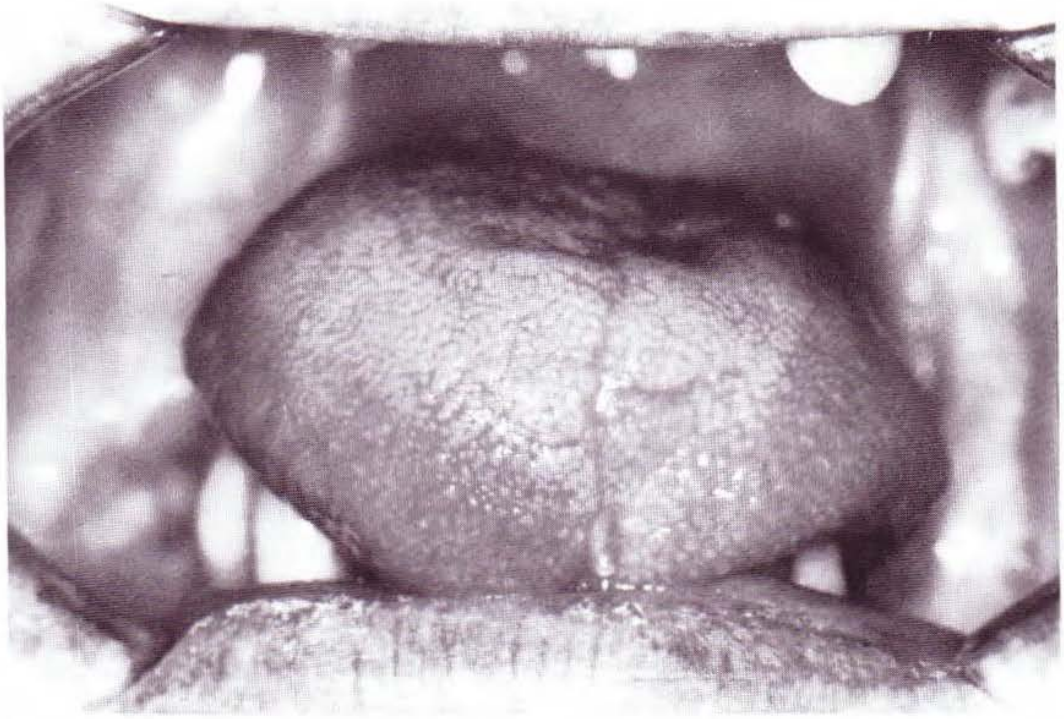


Fig. 5. Patient's present condition after combined systemic therapy and surgery.

tion of the borders of resection and the neck dissection was negative for tumor cells. Excellent wound healing was also observed (Fig. 5).

Another 11 patients with stage 3 tumors who were treated with combined radio- and chemotherapy were also subjected to this adjuvant therapy. Improved tolerance to radio- and chemotherapy and minimal skin and mucosal changes were observed in these patients. These preliminary findings have encouraged us to pursue this new concept of tumor therapy further.

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REFERENCES

1 U.G. Randoll, Konrad Thielemann, von der Biomechanik der Artikulationslehre zu bioenergetischen Messverfahren, Med. Diss., Frankfurt, 1989.
2 E.W. Steinhäuser and A. Baumann, Vortrag am 41st Kongr. Dtsch. Ges. für MKG-Chirurgie, Würzburg, 1991.
3 N. Wiener, Kybernetik-Regelung und Nachrichtenübermittlung im Lebewesen und in der Maschine, Econ-Verlag, Düsseldorf, 1963.
4 U.G. Randoll, Dtsch. Apoth. 11 (1991) 313.
5 W.H. Hauss, G. Junge-Hülsing and U. Gerlach, Die unspezifische Mesenchymreaktion, Thieme, Stuttgart, 1968.
6 I. Prigogine and I. Stengers, Dialog mit der Natur. Neue Wege naturwissenschaftlichen Denkens (5th Edn.), Piper, München, 1986.
7 B.O. Küppers, Ordnung aus dem Chaos (3rd Edn.), Piper, München, 1991.
8 K. Schönbeck, "Scharfmacher", Capital, 1 (1991) 156.
9 J.P. Isaacs and J.C. Lamb, Complementarity in Biology, Johns Hopkins Press, Baltimore, MD, 1969.
10 F.A. Popp, U. Warnke, H.L. König and W. Peschka, Electromagnetic Bioinformation, Urban and Schwarzenberg, München, 1989.
11 U.G. Randoll and A. Baumann, Vortrag am 1st Zinksymp., Leipzig, 1991, in press.
12 G. Ohlenschläger, Das Glutathionsystem. Ordnungs- und informationserhaltende Grundregulation lebender Systeme, Verlag für Medizin Fischer, Heidelberg, 1991.