THE YEAR BOOK
of
CANCER
1972

There are twenty YEAR BOOKS in various fields of medicine and one in dentistry. Publication of these annual volumes has been continuous since 1900. The YEAR BOOKS make available in detailed abstract form the working essence of the cream of recent international medicoscientific literature. Selection of the material is made by distinguished editors who critically review each year more than 500,000 articles published in the world's foremost journals.

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INTRODUCTION

The abundance of information included in the 1972 YEAR BOOK OF CANCER is succinctly presented in abstracts of 323 articles and in 752 citations in the lists of additional reading that follow every chapter. In all, reference is made to over 1,000 of the 13,388 citations in the original bibliography of this YEAR BOOK OF CANCER.

In addition to its ongoing objective of concisely presenting the most outstanding achievements in oncology each year, this, the 16th YEAR BOOK OF CANCER, reflects the growing quest for not just survival, but quality of survival, for the cancer patient. The book focuses on the achievement of the goal of improved survival through prudent selection and use of diagnostic and treatment modalities and the future prospects provided by vital discoveries in basic research.

Chemotherapy continues to increase in importance as new drugs and new methods of administration are developed. This volume presents a special overview of chemotherapy by Dr. Stephen K. Carter, introduced by Dr. C. Gordon Zubrod, both of the National Cancer Institute. Written for the YEAR BOOK from data from the Cancer Therapy Evaluation Branch of the NCI, this report details chemotherapeutic accomplishments against various disease entities such as adenocarcinomas of breast and ovaries, non-Hodgkin's lymphoma, chronic leukemia, and others. The information, compiled from many institutes throughout the United States, stresses the increasing knowledge about the mode of action of the various drugs used, and indicates that chemotherapy has now moved from the empirical approach to a scientific rationale.

Early, accurate diagnosis remains basic to the treatment for malignant disease, and some of the significant advances in diagnostic technics are presented. For example, until now the main problem in surgical treatment for pancreatic insulomas has been the difficulty in specifically determining their location; however, the introduction of pancreatic angiography has reduced the difficulty. Another roentgenographic advance is visualization of the adrenal glands, the accomplishment of which is the culmination of many years of effort to scan the tumors that produce primary aldosteronism.

As gains are made in methods of diagnosis, so also do methods of treatment continue to improve. Even some forms of malignant disease formerly thought to be incurable are showing remarkable degrees of remission. In one of these, mycosis fungoides, various studies using the external application of nitrogen mustard, the systemic use of certain chemotherapeutic agents, and the use of total skin electron irradiation seem to be effecting significant improvements and remissions.

In treatment for breast cancer, a major difficulty in managing pleural effusions has been that of completely aspirating fluid to allow the pleural spaces to coapt and adhere. Now, a device has been devised that reaches the lowest pleural space, allowing almost all fluid to be removed. Initial studies indicate that this development for complete removal of fluid is most important. Much also has been written about treatment for lung cancer; however, here there is disappointingly little progress. Prevention

of lung cancer is still the best means of control.

In the continuing search for the origins of malignant disease, important steps are being made in basic science and research, especially in the fields of immunology and virology. There is evidence now, in some studies, of the immune reaction of the patient against tumor. This reaction has a favorable effect on prognosis, even in the presence of other unfavorable features. Greater understanding of the ways this immune reaction takes place will perhaps lead to use of immunotherapy for specific malignant diseases. Viruses as a potential cause of cancer remain of vital interest. In some areas, association of a virus with certain types of carcinoma seems very real and studies continue on these viral carcinogens.

With the continuing advances in the many disciplines involved in combating cancer, and their earlier and more effective application to the patient, the next 5 years could see a reduction in the over-all cancer death rates from between 15 and 25%.

R. L. C.
R. W. C.

ACKNOWLEDGMENTS

The editors of the YEAR BOOK OF CANCER acknowledge with gratitude the excellent cooperation of the 170 members of the editorial board who contributed their time to reviewing the more than 13,000 articles related to oncology that appeared in the literature during the previous year. Their efforts in evaluating this vast amount of literature and their recommendations of articles to be included in the volume make it possible to present abstracts of articles outstanding in the field of oncology.

The willingness of the more than 300 authors to prepare abstracts of their articles for inclusion in this work is greatly appreciated. Their cooperation has made possible an accurate representation of their work in abstract form.

Acknowledgment must be made of the aid given to us in this work by the staff members of The University of Texas at Houston M. D. Anderson Hospital and Tumor Institute, for their advice and assistance, and for their patience in answering our questions.

Credit must also be given to the members of the Department of Publications for their endeavors in preparing this volume for publication. Mrs. Carol Baxter, Mrs. Connie C. Fox, Mrs. Judith A. Haroz, Mrs. Belinda J. Hartenberger, and Mrs. Marilyn B. Haxton have managed most efficiently the library research and the many logistics of the volume.

As with the preceding volumes of the YEAR BOOK OF CANCER, the work would not have been possible without the continued support of the William Heuermann Fund.

R. L. C.
R. W. C.

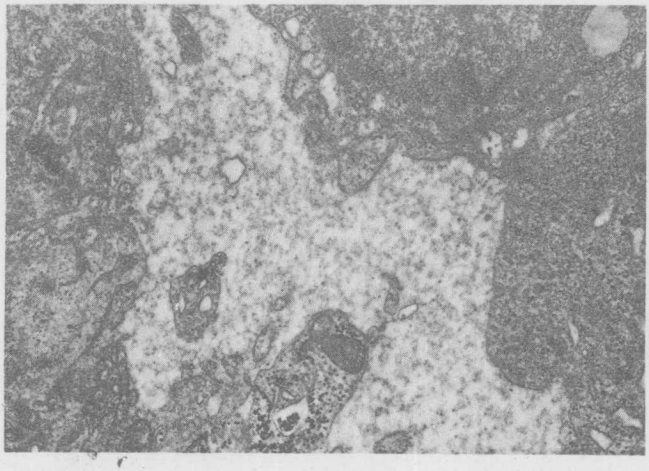
BRAIN AND NERVOUS SYSTEM

Extracellular Space in Brain Tumors.—*I. Morphologic considerations; II. Sucrose space.*—Louis Bakay[1] (State Univ. of New York, Buffalo). It is generally assumed that the blood-brain barrier is absent in brain tumors. This results in a relatively free passage of many substances from plasma into neoplastic tissue. Though increased uptake by cerebral neoplasms could be based entirely on abnormal permeability of their vasculature, a greatly enlarged extracellular compartment within the tumor may be responsible, provided that there is rapid equilibration of molecules between plasma and extracellular fluid. The role of extracellular fluid in this process cannot be assessed without determining the size of the extracellular compartment of brain tumors.

The size of the extracellular space in human gliomas and meningiomas was determined by direct measurement with the electron microscope. Considerable variation occurred between different portions of the same tumor; the values cited represent the mean calculated for the whole tumor. The space was enlarged in gliomas (20-40%), compared with normal brain tissue (6-7%). The extracellular compartment of endotheliomatous meningiomas was relatively small (13-15%).

Expansion of the extracellular space was similar in glioblastomas and in astrocytomas. There was no significant difference in the size of the space in gliomas resulting in a positive ^{203}Hg-chlormerodrin brain scan and in those giving negative scans. A direct relationship between the size of the extracellular space and degree of radioisotope uptake in most neoplasms could not be established. There was a correlation between the electron microscopic appearance of the extracellular fluid and isotopic concentration: in tumors with positive scan, the fluid was invariably flocculent (proteinaceous) (Fig. 1). In negatively scanning gliomas, the fluid was electron lucent.

Fig. 1.—Glioblastoma. The distended (32%) extracellular space is filled with flocculent electron-dense material; reduced from ×8,500. (Courtesy of Bakay, L.: Brain 93:693–698, 1970.)



(1) Brain 93:693-698, 1970.

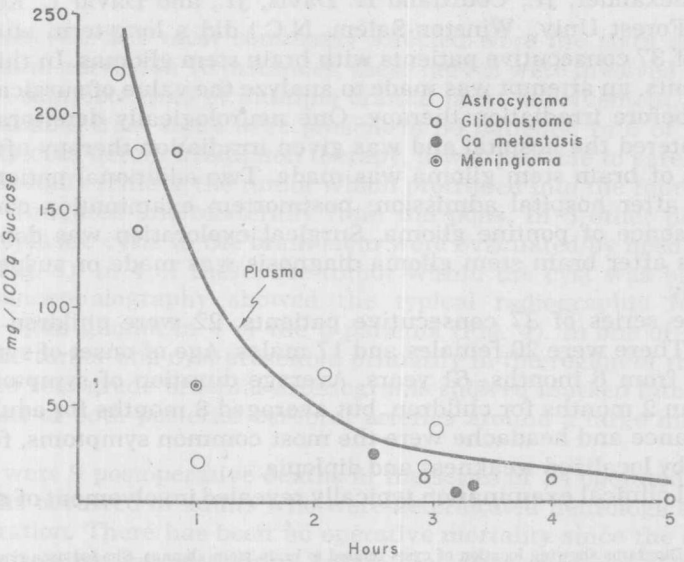


Fig. 2.—Sucrose content of various neoplasms in relation to the mean plasma concentration curve. (Courtesy of Bakay, L.: Brain 93:693–698, 1970.)

The problem of the extracellular space was then subjected to a physiologic approach. The uptake by brain tumors of sucrose, a widely used extracellular molecule, was determined after its intravascular injection in man, and its distribution in tumor tissue was compared with the anatomically determined extracellular space. Observations were made on 15 patients with brain tumors who received 50 Gm. of sucrose in 100 ml. of distilled water I.V. before craniotomy. At regular intervals, samples of venous blood and CSF from the ventricles were taken. Tissue samples included normal cortex, white matter, and tumor tissue. Total glucose content of the samples was determined and the sucrose concentration calculated from these values after hydrolysis. The exchange of sucrose between plasma and brain tumor as well as normal brain tissue was then determined over a period of 30 minutes to 5 hours after injection (Fig. 2).

There was an immediate and sustained uptake of sucrose by neoplastic tissue; sucrose concentration in normal CNS tissue and CSF was negligible. Tumors of different origin (astrocytomas, glioblastomas, metastatic carcinomas, and one meningioma) showed similar rates of sucrose uptake. Though the sucrose content of the tumors declined in time with the decrease in plasma concentration, the often very high level in the neoplasms several hours after injection and the resulting large sucrose space suggest that in some of these neoplasms sucrose is taken up by cells.

► [This study indicates that there is an enlarged extracellular space in brain tumors, which, however, does not account for the increased concentration of radioisotope in brain tumors. The author confirms reports of a defect in capillary walls of brain tumors that facilitates rapid passage of plasma-borne substances. S. Baum's work (Radiology 99:153, 1971) shows technetium to localize in mouse glioma tumor cells.—Eds.]

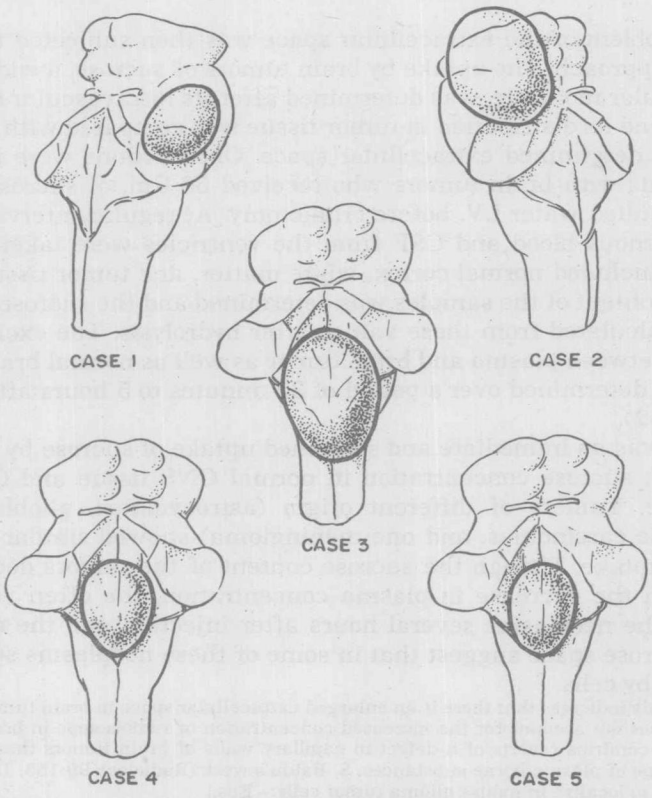
Surgical Treatment of Brain Stem Gliomas. Kenneth R. L. Lassiter,

Eben Alexander, Jr., Courtland H. Davis, Jr., and David L. Kelly, Jr.[2] (Wake Forest Univ., Winston-Salem, N.C.) did a long-term study of a series of 37 consecutive patients with brain stem gliomas. In this group of patients, an attempt was made to analyze the value of surgical exploration before irradiation therapy. One neurologically deteriorated patient entered the hospital and was given irradiation therapy after a diagnosis of brain stem glioma was made. Two additional patients died shortly after hospital admission; postmortem examination confirmed the presence of pontine glioma. Surgical exploration was done in 34 patients after brain stem glioma diagnosis was made or suspected by air study.

In the series of 37 consecutive patients, 22 were children and 15 adults. There were 20 females and 17 males. Age of onset of symptoms ranged from 6 months–61 years. Average duration of symptoms was less than 2 months for children, but averaged 8 months for adults. Gait disturbance and headache were the most common symptoms, followed closely by localized weakness and diplopia.

Initial clinical examination typically revealed involvement of multiple

Fig. 3.—Diagrams showing location of cysts related to brain stem gliomas. Shaded area represents the part of the brain stem noted to be abnormal by the surgeon. (Courtesy of Lassiter, K. R. L., *et al.*: J. Neurosurg. 34:719–725, June, 1971.)



(2) J. Neurosurg. 34:719-725, June, 1971.