

The YEAR BOOK of

Cancer

1977

Compiled and Edited by
RANDOLPH LEE CLARK

RUSSELL W. CUMLEY,

The YEAR BOOK of

Cancer

1977

Compiled and Edited by
RANDOLPH LEE CLARK

RUSSELL W. CUMLEY,



The YEAR BOOK of **Cancer**

1977

Compiled and Edited by

RANDOLPH LEE CLARK

B.S., M.D., M.Sc. (Surgery), D.Sc. (Hon.) – Houston, Texas

President, The University of Texas System Cancer Center; Professor of Surgery, The University of Texas M.D. Anderson Hospital and Tumor Institute; Member, President's Cancer Panel; Consultant, National Cancer Institute, F.A.C.S.; President, American Cancer Society

RUSSELL W. CUMLEY, B.A., M.A., Ph.D.

Professor Emeritus, Department of Information and Publications, and Professor of Medical Journalism, The University of Texas System Cancer Center M. D. Anderson Hospital and Tumor Institute; Executive Editor, The Medical Arts Publishing Foundation

YEAR BOOK MEDICAL PUBLISHERS, INC.
CHICAGO • LONDON

Copyright 1977 by YEAR BOOK MEDICAL PUBLISHERS, INC.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher.

Printed in U.S.A.

Library of Congress Catalog Card Number: 57-3807

International Standard Book Number: 0-8151-1785-X

RUSSELL W. CUMLEY, B.A., M.A., Ph.D.

Professor of Medicine, Department of Medicine and Pediatrics,
and Professor of Medical Jurisprudence,
The University of Texas, and Texas Law
and University Hospital and Law Institute
Executive Editor, The Medical and Publishing Foundation

YEAR BOOK MEDICAL PUBLISHERS, INC.
CHICAGO • LONDON

Editorial Board

Anesthesiology

- WEN J. CHIU, M.D., Houston, Texas
WILLIAM S. DERRICK, M.D.,* Houston, Texas
THOMAS R. KAIN, M.D., Houston, Texas
ROBERT B. RICHARDSON, M.D., Houston, Texas
IRAJ SHAHAM, M.D., Houston, Texas
BILLIE F. STROTHER, M.D., Houston, Texas

Basic Research

- STUART A. AARONSON, M.D., Bethesda, Maryland
DAVID E. ANDERSON, PH.D.,* Houston, Texas
RALPH B. ARLINGHAUS, PH.D.,* Houston, Texas
JORGE AWAPARA, PH.D.,* Houston, Texas
RICHARD S. BENUA, M.D., New York, New York
JAMES M. BOWEN, PH.D., Houston, Texas
ETIENNE DE HARVEN, M.D., New York, New York
LEON L. DMOCHOWSKI, M.D., PH.D.,† Houston, Texas
PETER J. FISCHINGER, M.D., PH.D., Bethesda, Maryland
HOWARD J. GLENN, PH.D., Houston, Texas
ROBERT J. GOLDBERG, PH.D., Bethesda, Maryland
FELIX L. HAAS, PH.D.,* Houston, Texas
CHARLES W. HAIDLE, PH.D., Houston, Texas
CALDERON HOWE, M.D., New Orleans, Louisiana
YOHEI ITO, M.D., Kyoto, Japan

- JOHN H. JARDINE, D.V.M., Houston, Texas
IVAN I. KAISER, PH.D., Laramie, Wyoming
EDWIN A. MIRAND, PH.D., D.Sc. (Hon.), Buffalo, New York
JOHN B. MOLONEY, PH.D., Bethesda, Maryland
KARL H. MUENCH, M.D., Miami, Florida
EMANUEL J. MURGOLA, PH.D., Houston, Texas
ROBERT B. NASO, PH.D., Houston, Texas
KAMAL J. RANADIVE, Bombay, India
GILBERT L. RAULSTON, D.V.M., Houston, Texas
VERNON RILEY, PH.D., Seattle, Washington
FREDERICK B. RUDOLPH, PH.D., Houston, Texas
GRADY F. SAUNDERS, PH.D., Houston, Texas
JOSEPH T. SAUNDERS, PH.D., Bethesda, Maryland
WILLIAM J. SCHULL, PH.D., Houston, Texas
LOUIS R. SIBAL, PH.D., Bethesda, Maryland
LOUISE C. STRONG, M.D., Houston, Texas
GEORGE F. VANDE WOUDE, PH.D., Bethesda, Maryland
LAUREN G. WOLFE, D.V.M., PH.D., Chicago, Illinois

Dermatology

- THOMAS B. FITZPATRICK, M.D., PH.D.,* Boston, Massachusetts
ARTHUR J. SOBER, M.D.,* Boston, Massachusetts

Epidemiology

- M. BRUNET, M.D., Le Vésinet, France

*Section Chief

†Ex Officio Section Chief

JOHANNES CLEMMESSEN, M.D., Copenhagen, Denmark
 N. E. DAY, M.D., Lyon, France
 ELEANOR J. MACDONALD, A.B.,* Houston, Texas
 THOMAS F. MANCUSO, M.D., Pittsburgh, Pennsylvania
 C. S. MUIR, M.D., Lyon, France

Gastroenterology

ELMER W. HEFFERNON, M.D., Boston, Massachusetts
 ROBERT S. NELSON, M.D., Houston, Texas

Gynecology and Obstetrics

WILLIAM T. CREASMAN, M.D., Durham, North Carolina
 ERNEST W. FRANKLIN, III, M.D., Atlanta, Georgia
 ALAN L. KAPLAN, M.D., Houston, Texas
 M. STEVEN PIVER, M.D., Buffalo, New York
 FELIX N. RUTLEDGE, M.D.,* Houston, Texas
 J. TAYLOR WHARTON, M.D., Houston, Texas

Hematology

RAYMOND ALEXANIAN, M.D., Houston, Texas
 JOHN D. BONNET, M.D., Temple, Texas
 JEANE P. HESTER, M.D., Houston, Texas
 JOSEPH M. KIELY, M.D., Rochester, Minnesota
 WILLIAM C. MOLONEY, M.D., Boston, Massachusetts
 C. C. SHULLENBERGER, M.D.,* Houston, Texas

Internal Medicine

RICHARD F. BAKEMEIER, M.D., Rochester, New York
 J. ARNOLD BARGEN, M.D.,† Sun City, California
 GEORGE R. BLUMENSCHN, M.D., Houston, Texas

ROWE A. CASTAGNO, M.D., Hartford, Connecticut
 PHILLIPS K. CHAMPION, JR., M.D., Houston, Texas
 C. DECKERS, M.D., Louvain, Belgium
 ALEXANDER FEFER, M.D., Seattle, Washington
 ROBERT C. GALLO, M.D., Bethesda, Maryland
 THOMAS P. HAYNIE, III, M.D.,* Houston, Texas
 EVAN M. HERSH, M.D.,* Houston, Texas
 J. C. HEUSON, M.D., Brussels, Belgium
 PAUL Y. HOLOYE, M.D., Houston, Texas
 CLIFTON D. HOWE, M.D.,* Houston, Texas
 LAIRD G. JACKSON, M.D., Philadelphia, Pennsylvania
 MAVIS P. KELSEY, M.D.,* Houston, Texas
 EUGENE M. MCKELVEY, M.D., Houston, Texas
 GIORA MAVLIGIT, M.D., Houston, Texas
 DAVID W. MOLANDER, M.D., New York, New York
 NAGUIB A. SAMAAAN, M.D. Ph.D., Houston, Texas
 MELVIN L. SAMUELS, M.D., Houston, Texas
 JOSEPH G. SINKOVICS, M.D.,* Houston, Texas

Neurology and Neurosurgery

JAMES I. AUSMAN, M.D., Minneapolis, Minnesota
 LYLE A. FRENCH, M.D., Minneapolis, Minnesota
 MILAM, E. LEAVENS, M.D.,* Houston, Texas
 CHARLES B. WILSON, M.D., San Francisco, California

Orthopedics

ROBERT D. KEAGY, M.D., Chicago, Illinois
 JOHN T. MAKLEY, M.D., Cleveland, Ohio

*Section Chief
 †Deceased

Otology, Laryngology, Rhinology

- HELMUTH GOEPFERT, M.D., Houston, Texas
 EDWARD C. HINDS, M.D., D.D.S., Houston, Texas
 DONALD A. SHUMRICK, M.D., Cincinnati, Ohio
 JAMES Y. SUEN, M.D., Little Rock, Arkansas

Pathology

- N. B. ATKIN, M.D., Middlesex, England
 FREDERICK BECKER, M.D., Houston, Texas
 JAMES J. BUTLER, M.D., Houston, Texas
 EDWIN R. FISHER, M.D., Pittsburgh, Pennsylvania
 STEVEN I. HAJDU, M.D., New York, New York
 J. BEACH HAZARD, M.D., Key Biscayne, Florida
 ELSON B. HELWIG, M.D., Washington, D.C.
 ROBERT V. P. HUTTER, M.D., Livingston, New Jersey
 MERLE A. LEGG, M.D., Boston, Massachusetts
 JOHN M. LUKEMAN, M.D., Houston, Texas
 MYRON R. MELAMED, M.D., New York, New York
 F. WILLIAM ORR, M.D., Farmington, Connecticut
 WILLIAM O. RUSSELL, M.D.,* Houston, Texas
 CARLO SIRTORI, M.D., Milan, Italy
 J. LESLIE SMITH, JR., M.D., Houston, Texas
 SHELDON C. SOMMERS, M.D.,* New York, New York

Pediatrics

- MARGARET P. SULLIVAN, M.D., Houston, Texas
 W. W. SUTOW, M.D., Houston, Texas
 H. GRANT TAYLOR, M.D.,* Houston, Texas
 JAN VAN EYS, M.D., PH.D., Houston, Texas

Physics

- JOHN HALE, PH.D., Philadelphia, Pennsylvania
 RONALD M. HUMPHREY, PH.D., Houston, Texas
 MONROE F. JAHNS, PH.D., Houston, Texas
 MARVIN MEISTRICH, PH.D., Houston, Texas
 ROBERT J. SHALEK, PH.D.,* Houston, Texas

Radiotherapy and Roentgenology

- JOSEPH R. CASTRO, M.D., San Francisco, California
 GILBERT H. FLETCHER, M.D.,* Houston, Texas
 JOHN H. HEALD, M.D., San Francisco, California
 ERICH K. LANG, M.D.,* Shreveport, Louisiana
 HENRI MAISIN, M.D., Louvain, Belgium
 CARLOS A. PEREZ, M.D., St. Louis, Missouri
 ANTONIN RAVENTOS, M.D., Davis, California
 FERDINAND A. SALZMAN, M.D., Boston, Massachusetts
 E. H. SCHULTZ, JR., M.D., St. Petersburg, Florida
 MANUEL VIAMONTE, JR., M.D., Miami Beach, Florida

Surgery

- NEIL C. ANDREWS, M.D., Davis, California
 IRVING M. ARIEL, M.D.,* New York, New York
 A. J. BALLANTYNE, M.D.,* Houston, Texas
 DAVID P. BOYD, M.D., Boston, Massachusetts
 ROBERT M. BYERS, M.D., Houston, Texas
 EDUARDO CACARES, M.D., Lima, Peru
 MURRAY M. COPELAND, M.D.,* Houston, Texas
 BERNARD FISHER, M.D., Pittsburgh, Pennsylvania
 OSCAR M. GUILLAMONDEGUI, M.D., Houston, Texas

*Section Chief

PAUL HANDEL, M.D., Houston, Texas
 JOHN E. HEALEY, JR., M.D.,* Miami, Florida
 ROBERT C. HICKEY, M.D.,* Houston, Texas
 GEORGE A. HIGGINS, JR., M.D., Washington, D.C.
 E. DOUGLAS HOLYOKE, M.D., Buffalo, New York
 ROBERT J. JENSIK, M.D., Chicago, Illinois
 RICHARD H. JESSE, JR., M.D.,* Houston, Texas
 CHARLES M. MCBRIDE, M.D.,* Houston, Texas
 MARION J. MCMURTREY, M.D., Houston, Texas
 RICHARD G. MARTIN, M.D.,* Houston, Texas
 CLIFTON F. MOUNTAIN, M.D.,* Houston, Texas
 GUY F. ROBBINS, M.D., New York, New York
 MARVIN M. ROMSDAHL, M.D., Ph.D.,* Houston, Texas
 GEORGE P. ROSEMOND, M.D., Philadelphia, Pennsylvania

ROBERT J. SCHWEITZER, M.D., Oakland, California
 OLEG S. SELAWRY, M.D., Miami, Florida
 MARGA H. SINCLAIR, M.D., Houston, Texas
 ROBERT TURELL, M.D.,* New York, New York
 J. A. VAN DONGEN, M.D., Amsterdam, The Netherlands
 RONALD G. VINCENT, M.D. Buffalo, New York

Urology

ROBERT B. BRACKEN, M.D., Houston, Texas
 DOUGLAS E. JOHNSON, M.D.,* Houston, Texas
 GERALD P. MURPHY, M.D., D.Sc. Buffalo, New York

Managing Editor

DIANE L. CULHANE, B.A., M.A.

Manuscript Editors

LARRY W. DYBALA, B.A.
 WALTER J. PAGEL, B.A.

Table of Contents

INTRODUCTION	11
BRAIN AND NERVOUS SYSTEM	15
HEAD AND NECK	31
SKIN	53
BREAST	65
CHEST	83
BILIARY TRACT, LIVER, AND PANCREAS	103
STOMACH, DUODENUM, AND SMALL BOWEL	117
COLON, RECTUM, AND ANUS	125
GENITOURINARY TRACT	135
FEMALE GENITAL TRACT	149
LEUKEMIA AND LYMPHOMA	163
CANCER IN CHILDREN	191
ENDOCRINE TUMORS	203
BONE AND SOFT TISSUE TUMORS	215
PATHOLOGY	225
ROENTGEN DIAGNOSIS	237
NUCLEAR MEDICINE	245
RADIOTHERAPY	257
CHEMOTHERAPY AND HORMONE THERAPY	277
IMMUNOLOGY AND IMMUNOTHERAPY	293
ANESTHESIOLOGY	313
RECONSTRUCTION AND REHABILITATION	323
ADVANCED TUMORS AND TERMINAL CARE	333
EPIDEMIOLOGY, STATISTICS, AND CANCER CONTROL	343
GENETICS	361
BIOCHEMISTRY	373
RADIOBIOLOGY AND RADIOPHYSICS	393
BIOLOGY	407
CYTOLOGY	421
MOLECULAR BIOLOGY	437
VIROLOGY	447
GENERAL ANIMAL TUMORS	465

Introduction

The 160 members of the YEAR BOOK OF CANCER editorial board have once again examined an enormous amount of oncologic literature—about 20,000 articles this year—in an effort to find those that best describe the progress being made on many fronts in the war against cancer. With great care, they have narrowed the list down to the 283 articles abstracted here. If space and time were not constraints, the hundreds of articles listed as additional reading could profitably have been abstracted, too.

As new data concerning cancer pour in, not all the questions are answered, but at least they can be stated more clearly and the answers can begin to take shape. While there is still disagreement, for example, on the best methods of treating patients who have various stages of breast cancer, the articles in the chapter on breast cancer indicate how multifaceted the attack is and how great the progress being made.

Another example of this multifaceted attack can be found in the chapter on endocrine tumors. The author of one article explains how echography is making possible more precise clinical diagnosis of thyroid disease. With this modality, "cold" thyroid nodules may be identified as benign cysts or solid, frequently malignant tumors. A second author discusses autotransplantation of parathyroid tissue to prevent hypocalcemia after total thyroidectomy.

Another diagnostic breakthrough lies in the new applications researchers have found for several radiopharmaceuticals that have great affinity for malignant tissue. Gallium-67 citrate has definite value in detecting bronchogenic carcinomas and staging Hodgkin's disease and non-Hodgkin's lymphomas, while various chelates of bleomycin are useful in detecting adenocarcinoma of the gastrointestinal tract. In other articles, authors break no new ground, but review some aspect of the state of the art, such as the scientific basis for adjuvant therapy. New parameters of diagnosis and prognosis are to come from studies of the computerized axial tomographic scanner and biological markers.

Sometimes progress is made by reevaluating old assumptions, such as the belief that smoking is the major cause of lung cancer. One article suggests that industrial and environmental exposures may be equally culpable, while another cites genetic factors. Sometimes a previously unsuspected agent may be found to be potentially carcinogenic, as in the article on the possible relationship between cancer in operating room personnel and anesthetics.

The battle goes on. This volume records one year's many victories and occasional temporary setbacks. The eventual outcome lies in the future, but steady advances and new facets of knowledge are added on a continuing basis. Various types of systemic cancer are being cured in

an increasing number of patients. Generally these remissions and cures have been achieved by multimodal therapy and are far too few. Prevention of cancer is receiving much more attention both in research and in clinical application, but we are applying what little we do know in this area with very little success to date.

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

The 100 members of the Year Book of Cancer Editorial Board have once again examined an enormous amount of oncologic literature - about 20,000 articles this year - in an effort to find those that best describe the progress being made on many fronts in the war against cancer. With great care, they have narrowed the list down to the 288 articles abstracted here. It takes time and time were not abundant, the hundreds of articles listed as additional reading could probably have been abstracted, too.

As new data concerning cancer pour in, not all the questions are answered, but at least they can be stated more clearly and the answers can begin to take shape. While there is still disagreement, for example, on the best methods of treating patients who have various stages of breast cancer, the articles in this chapter on breast cancer indicate how multifaceted the attack is and how great the progress being made.

Another example of this multifaceted attack can be found in the chapter on endocrine tumors. The author of one article explains how endocrine glands are making possible more precise clinical diagnosis of this kind of disease. With this knowledge, cold thyroid nodules may be identified as benign cysts or solid, frequently malignant tumors. A second author discusses surgical resection of metastatic disease to prevent local relapse after total thyroidectomy.

Another diagnostic breakthrough lies in the new applications researchers have found for serum and lymphokines that have great affinity for malignant tissue. Gallium-67 citrate has definite value in detecting bronchogenic carcinomas and staging Hodgkin's disease and non-Hodgkin's lymphomas, while various isotopes of phosphorus are useful in detecting adenocarcinoma of the gastrointestinal tract. In other articles, authors break no new ground, but review some aspects of the state of the art, such as the scientific basis for adjuvant therapy. Few parameters of diagnosis and prognosis are to come from studies of the complicated extra-tumoral, scanner and biological markers.

Sometimes progress is made by reevaluating old assumptions, such as the belief that smoking is the major cause of lung cancer. One article suggests that industrial and environmental exposures may be equally culpable, while another cites genetic factors. Sometimes a previously unsuspected agent may be found to be potentially carcinogenic, as in the article on the possible relationship between cancer in organophosphate workers and anesthesia.

The battle goes on. This volume records one year's many victories and occasional temporary setbacks. The eventual outcome lies in the future, but steady advances and new facets of knowledge are added on a continuing basis. Various types of systemic cancer are being cured in

Acknowledgments

In our efforts to bring to the reader the best current oncology literature in the shortest possible time, we have had to depend on the cooperation of hundreds of men and women. Once again, we have not been disappointed.

This 21st volume of the YEAR BOOK OF CANCER would not have been possible without the generous assistance of the members of the editorial board, who had to make very difficult decisions in the face of equally difficult deadlines. Similarly, the authors of the 283 articles abstracted here were unfailingly cooperative, and to them we owe our sincere thanks.

We also wish to acknowledge the assistance of those members of the staff of the University of Texas System Cancer Center M. D. Anderson Hospital and Tumor Institute who gave so willingly of their time and knowledge. Our special thanks go to the editors and secretaries in the Publications Office of the Department of Information and Publications who worked long months compiling, editing, and typing the manuscript.

As in the past, the continued support of the William Heuermann Fund is gratefully acknowledged.

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

Brain and Nervous System

Olfactory Neuroblastoma: A Clinical Analysis of 17 Cases. Sidney Kadish, Max Goodman, and C. C. Wang¹ discuss the histories of 17 patients with olfactory neuroblastoma seen at Massachusetts General Hospital and Massachusetts Eye and Ear Infirmary from 1941 to 1971. A system of pretherapy staging is proposed in which group A tumors are those limited to the nasal cavity; group B, those localized to the nasal cavity and paranasal sinuses; and group C, those that extend beyond the nasal cavity and paranasal sinuses.

The presenting symptoms in groups A and B were the common, non-specific indicators of intranasal neoplasms, including unilateral nasal obstruction in 12 patients (70%), epistaxis in 7 (41%), sinus pain in 4 (24%), and rhinorrhea in 2 (12%). Group C patients had symptomatic evidence of disease extending beyond the nasal cavity and paranasal sinuses. Physical findings consisted of intranasal mass in groups A and B and orbital, nasopharyngeal, or cervical findings in group C. All patients had roentgenographic evidence of intranasal soft tissue mass. Six patients from groups B and C had paranasal soft tissue masses and 6 had evidence of bone destruction.

Treatment methods were varied, consisting of surgery, radiotherapy, or combinations of them. Of the 17 patients, 13 (76%) showed no evidence of disease for 3 or more years posttherapy. Of 7 patients in group A, all survived without disease, 5 following surgery, 1 after irradiation, and 1 after combined radiotherapy and surgery. Of 5 patients in group B, 4 were without disease, 2 following surgery and 2 following combined treatment. Of 5 patients in group C, only 2 survived 3 or more years, 1 treated by surgery and 1 by a combined regimen. Recurrent disease at the primary site occurred in 4 of 8 patients treated by surgery alone. Two were salvaged by radiotherapy and 2 by further surgical resection.

These data confirm the radioresponsiveness and radiocurability of the tumor. The authors advocate careful pretreatment staging. For patients in groups A and B, a course of preoperative megavoltage irradiation of 5000 rad delivered over 5-6 weeks followed by surgical resection is recommended. For group C patients, 6000-6500 rad in 7 weeks should be followed by surgery. Because of the low incidence of neck metastases (3 of 17 patients, or 18%), elective neck irradiation or dissection does not appear to be indicated.

► [Olfactory neuroblastomas require the combined skills of surgeons and radiotherapists. The poor prognosis justifies an aggressive attack on this tumor. This article contains an excellent review of the subject, as well as data on a large personal series of cases. —Eds.] ◀

(1) Cancer 37:1571-1576, March, 1976.

Papillary Meningioma: A Malignant Variant of Meningioma.

Samuel K. Ludwin, Lucien J. Rubinstein, and Dorothy S. Russell¹² (Stanford Univ.) report on a series of 17 meningiomas, each characterized histologically by a papillary pattern. The papillary formations consisted of tumor cells arranged radially around fibrovascular cores. In some tumors, phosphotungstic acid hematoxylin-positive fibrils radiated around the blood vessels in the cores. In 15 of the cases the papillary pattern was associated with some of the well-known histologic variants of meningioma (Figs 1 and 2), whereas in the remaining 2 cases the pattern was predominantly papillary. The papillary pattern often appeared or became more prominent in the recurrences or metastases, suggesting that it represented a more aggressive phase in the evolution of the tumor.

In contrast to the usual low incidence of malignancy in meningiomas, all 17 cases had features of malignancy (high mitotic rate, local brain invasion, and distant metastases). In addition, 5 were of the angioblastic type, as opposed to the reported incidence of 4% of angioblastic meningiomas among meningiomas as a whole. This variant is thought to be more aggressive than other variants of meningioma. Of the patients, 59% developed recurrences, as opposed to 21% of meningioma patients as a whole. In addition, a considerably higher number of cases developed distant metastases than would have been expected from the incidence of metastases in meningiomas as a whole.

Fig 1 (left).—Papillary pattern in a meningioma that showed elsewhere the histologic picture of an angioblastic meningioma. Hematoxylin-eosin; reduced from $\times 225$.

Fig 2 (right).—Papillary perivascular pattern in a meningioma that showed elsewhere the histologic picture of a syncytial meningioma. Hematoxylin-eosin; reduced from $\times 225$.

(Courtesy of Ludwin, S. K., et al.: *Cancer* 36:1363–1373, October, 1975.)

