TREATMENT OF CANCER AND ALLIED DISEASES

SECOND EDITION

VOLUME II

Tumors of the Nervous System

BY THIRTY AUTHORS

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With 340 Illustrations

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Second Edition

Volume II: Tumors of the Nervous System

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Volume II: Tumors of the Nervous System

TREATMENT OF CANCER AND ALLIED DISEASES

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Dedicated to the late

HARVEY CUSHING

pioneer neurologic surgeon, master clinical craftsman,
and inspiring teacher

and to

ALFRED P. SLOAN, JR., and CHARLES F. KETTERING

for their dedicated devotion to cancer research, exemplified
by their establishment and endowment of the Sloan-Kettering
Institute for Cancer Research of the Memorial Center for
Cancer and Allied Diseases

Surgical judgment, indeed, is a more or less inspirational quality which is variable and elusive, all surgeons being conscious of having it in hand on some occasions, of losing it on others. It is a good deal like a game which even the best and most consistent player foozles for some unaccountable reason at certain times. The surgery of brain tumors may be likened without being trivial to a form of major sport which is played against an invisible but utterly relentless antagonist quick to take advantage of every misplay and faulty move. And when the time comes to make public one's score, it is done somewhat apologetically, but with the expectation that others may profit by it and with the assurance they will come to improve upon it.

—Harvey Cushing

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Preface

Tumors of the Nervous System, the second volume in the new edition of *Treatment of Cancer and Allied Diseases,* discusses the treatment of tumors of the brain, spinal cord, and peripheral nervous system, including the sympathetic and parasympathetic systems. Subsequent volumes of this new series are devoted to the treatment of tumors of other systems and regions of the body.

The highly specialized procedures described in this volume for treating neoplasms of the nervous system are recent developments. In the chapters are related the personal experiences of eminent authorities in the fields of neurologic surgery and radiation therapy. Extensive bibliographies are included.

The modern treatment of brain tumors has evolved from knowledge gleaned from three separate perimeters: (1) The development of neurology, which permitted an exact localization of tumors of the central nervous system by clinical criteria. (2) The development of diagnostic aids with which to define precisely an organic lesion of the nervous system. These include roentgenography, ventriculography, encephalography, electroencephalography, myelography, angiography, and the more recent use of radioactive isotopes for diagnostic purposes. (3) The classification of neoplasms of the nervous system on a histogenetic basis, which accomplished for neurologic surgery that which Ewing achieved for oncology in general.

The determination of the precise histologic classification of a given tumor permitted an understanding of the natural history of that tumor and its methods of spread. The entire field of neurologic surgery was given a strong impetus for developing methods and technics that would allow for the more radical procedures indicated for removing neoplasms of the nervous system.

Tumors of the Nervous System opens with a general discussion of the four major approaches to the treatment of specific tumors of the nervous system: (1) the classification of the neoplasms and their routes of spread, (2) the general and special measures for diagnosing tumors of the nervous system, (3) the important subjects of anesthesia and the preoperative and postoperative care of the neurosurgical patient, and (4) an over-all appraisal of the accomplishments and complications of irradiation of neurogenic tumors. Specific neoplasms arising from the central and peripheral nervous systems are then taken up according to their histogenetic classification.

Gliomatous Tumors

Since the first recorded resection of a glioma, in 1884, attempts to control this most frequent and one of the most lethal of brain tumors have dominated much of neurologic surgical thought and effort. The chapter on gliomatous tumors in the history of neurologic surgery is a most important one in the control of cancer of the brain, and the chapter on gliomatous tumors in this volume is a significant analysis of one of the largest per-

sonal series of verified gliomatous tumors, with critical attention to a description of the various subdivisions of this group of neoplasms. Indications for, and technics of, surgical and radiation treatment and a report of the end results obtained from the different variants of gliomas are included. Each phase of the total care of a patient suffering from a gliomatous tumor is described. In another chapter, attempts to treat gliomatous neoplasms by neutron capture technics, namely, placing the patient in front of an atomic pile for neutron bombardment of administered boron localized in the tumor, are described.

Pituitary Tumors

The exact function of the pituitary gland has long been enigmatic, and the gland elusive to approach for its extirpation. The correlation of the various generalized disturbances as expressions of functioning tumors of this "master gland" and the identification of localized syndromes as due to the expansion of tumors arising from the hypophysis represent dramatic discoveries of the neuroanatomist, neurohistologist, neurophysiologist, and neuropathologist. The development of surgical technics for extirpating the pituitary gland from its hidden bony housing reflects the painstaking anatomic studies and the persistent clinical trials of many neurologic surgeons.

The chapters in this volume dealing with the surgical and radiologic treatment of pituitary tumors represent an epilogue to these discoveries and describe the present-day methods of coping with hypophyseal neoplasms. Attention is directed to palliative efforts whenever a cure cannot be obtained.

Meningiomas

The numerous technics described in the chapter on meningiomas represent a recapitulation of the history of efforts to treat this unique tumor. After having been at one time considered a fungus growth or a granuloma, the tumor was labeled by Virchow in 1864 a "sarcoma." Shortly thereafter, various investigators noted that some were benign, and Cushing, in 1922, coined the term "meningioma."

Meningiomas are now considered to be histologically benign tumors but capable of compressing the brain, infiltrating the dura and bone, and even penetrating the soft tissues of the scalp. The fact that meningiomas could occur anywhere within the brain resulted in many attempts to develop technics for exposing and removing these neoplasms in various locations. The chapter on meningiomas in this volume consists of excellent descriptions, graphically illustrated, of these various technics.

Tumors of the Peripheral Nervous System

The material for these chapters is based on personal experience with an unusually large series of peripheral nerve tumors. A classification of the tumors is given, and the treatment of each type is delineated.

The authors of the chapters are convinced by their own experiences with tumors arising from peripheral nerves that frequently an entire segment of nerve tissue is doomed to undergo malignant transformation. Accordingly, in such instances, the most radical of amputations becomes necessary, with resection of the extremity and excision of the nerves supplying the extremity as near their emergence from the spinal canal as possible. These chapters also include a discussion of the natural history of the various tumors, the principles of, and indications for, their surgical resection, and the end results of treatment.

Other Tumors of the Nervous System

Discussed in this volume, in separate chapters and in considerable detail, are neoplasms of the cerebellopontine angle, vascular malformations and tumors, tumors of congenital origin, tumors which metastasize *to* the nervous system, central nervous system involvement in lymphomatous neoplasia, and the surgical and radiologic treatment of neoplasms of the spinal cord.

Palliation by Neurologic Surgical Procedures

From meager beginnings, neurologic surgeons have made notable contributions to the treatment—palliative and otherwise—of neoplasms arising from extra-nervous system

tissue. The procedures resulting from their advancements are discussed in this volume. The recognition that certain tumors, especially of the prostate gland and the breast, may be hormone dependent and controlled by altering the hormonal balance of the patient has lead to an increased use of hypophysectomy in these situations, in an effort to stay the growth of the tumor as well as offer palliation to the patient. This is a major contribution of neurologic surgery to oncology in general. By relieving pain through the interruption of pathways that transmit pain impulses (including resection of peripheral nerves, sympathectomy, posterior rhizotomy, chordotomy, medullary tractotomy, thalamotomy, etc.) and by the performance of prefrontal lobotomy, multitudes of patients bearing cancers in all parts of the body have been mercifully benefited.

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