TUMOR SURGERY
OF THE
HEAD AND NECK

ROBERT S. POLLACK

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WITH 49 ILLUSTRATIONS

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To My Wife

PREFACE

TUMOR SURGERY of the head and neck is becoming, more and more, a specialty of its own. Because of the anatomical location it naturally has borrowed techniques and philosophies from several specialties. As a field of surgery it bridges the gaps between general surgery, otorhinolaryngology, oral surgery and plastic surgery. It is, undoubtedly, a hybrid, made necessary by the complex nature of the tumors and their anatomy.

Interest has been lost in the fundamental science of surgical technique. In this decade of wider excision and physiochemical problems, the importance of "methodology" may be overlooked. A book which can help bridge the gap between several specialties and improve the techniques involved, should be of value. It has been with this hope in mind that the present volume was written.

The book is entirely clinical, and covers only the more important surgical procedures related to head and neck tumors. Brevity and conciseness have been a major goal. The step-by-step illustrations of operations have saved many words of description. Brief discussions of the rationale of each procedure have been restricted to pertinent facts only. This book is not an encyclopedia, and it is assumed that for more information the reader may turn to the many accompanying bibliographic references.

No originality can be claimed or is inferred. Many sources make up this book, and to the following the author wishes to express his appreciation and gratitude: Dr. Hayes E. Martin and his staff at Memorial Hospital, New York, New York, where the author received his early training and background; the Department of Surgery, and Dr. Leonard Dobson, Director of the Tumor Clinic, Stanford University School of Medicine, San Francisco, California; the Department of Surgery, Mount Zion Hospital, San Francisco, California, and its late Chief of Surgery, Dr. Franklin I. Harris; the Department of Surgery, Veteran's Administration Hospital, Oakland, California, and Dr. J. Vernon Smith, Chief of Surgery; and the Tumor Board of the U. S. Naval Hospital, Oakland, California.

I wish also to express my thanks to Dr. S. H. Baron, Chief of Otorhinolaryngology, Mount Zion Hospital, San Francisco, California, for his help with the chapter on Diagnostic Procedures; to Dr. Joseph Kriss, Associate Clinical Professor of Medicine, Stanford University School of Medicine, San Francisco, California, for his help with the chapter on Isotopes; to Dr. Laurens P. White, Assistant Clinical Professor of Medicine, Stanford University School of Medicine, for his help with the section on Chemotherapy; to Dr. H. C. Saltzstein, Detroit, Michigan, for his help with the chapter on Recurrent Cancer; to Miss Maud Greenwood, medical artist, Veterans' Administration Hospital, Oakland, California, whose meticulous, painstaking and highly illustrative drawings have added so much to this book; and finally, to the publishers of this book, Lea & Febiger, for their help and interest.

San Francisco, California ROBERT S POLLACK, M.D

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Chapter 1

INTRODUCTION

This is a book about the anatomy and technique of surgery of the head and neck. It might almost be labelled the art of head and neck surgery. But like any specialized book there are many aspects that it does not cover. It deals entirely with tumor surgery, which represents only a portion of head and neck problems, and because it deals with the more major procedures, it appears that relatively few operations are described. However, each operation, with a few exceptions, is a composite of many. The combined procedure for tongue cancer incorporates a tracheostomy, a radical neck dissection, a hemiglossectomy and a hemimandibulectomy. The description of a hemimandibulectomy alone includes a submaxillary space dissection.

The author has also taken certain things for granted. These relate to the basic knowledge of the surgeon, and the fact that excellent information on related procedures can be obtained elsewhere. Little improvement, for example, can be made on the descriptive articles already available on radical neck dissections.[1, 2, 3] This is the keystone procedure for the surgeon dealing with head and neck tumors, and it is assumed that the reader can perform this procedure with facility before embarking on many of the operations described in this book. Emphasis has been placed here on the more common tumors whose surgical treatment requires extensive local therapy, and on the surgical technique of cancers which require combined or in continuity dissections.

Head and neck tumors are operated upon when one is confronted with a radioresistant tumor or a recurrent tumor following irradiation therapy; a tumor which has invaded underlying bone or a tumor which poses an immediate threat to life, such as a hemorrhage, or respiratory obstruction. Surgery may be necessary for palliation and the relief of pain. In some instances it is the only logical form of therapy to cure the patient because of the extent of the tumor and its metastases.[5] It is the only method of therapy which considers as desirable the removal of primary tumor, intralymphatic pathways and lymph nodes, en bloc, to eradicate a cancer.[4] This basic tenet of tumor surgery, however, must be used with discretion and may not be applicable or necessary in every instance. Not all tumors of the head and neck are treated best by surgery. Some are better treated by irradiation therapy alone; others may demand a combination of efforts. To the conscientious surgeon proper indications exist for every operative procedure. With the extensive cancers there is a prac-

tical limit to what radical head and neck surgery can accomplish. Despite the fact that almost any tumor of the head and neck, regardless of its stage, can be resected by the experienced surgeon, enthusiasm for a procedure does not supplant mature judgment, and resectability does not always mean operability.

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Chapter 2

DIAGNOSIS OF HEAD AND NECK TUMORS

SPECIFIC TREATMENT cannot start until a correct diagnosis has been made. In many instances this represents no problem because a visible or palpable tumor on the tongue, the floor of the mouth, in the parotid or thyroid glands is quite obvious. However, there are many examples of tumors in the head and neck which have remained occult for so long a period of time that they produce as their first sign a metastasis rather than symptoms referable to the primary site.[3] The hidden nature of some head and neck tumors must be kept constantly in mind.

For example, cancer of the paranasal sinuses represents a particularly vexing problem in early diagnosis, and the majority of patients are first seen in an advanced stage of disease.[7] Symptoms such as increased nasal discharge, paresthesias of the cheek and face, painful upper molars, unhealed, draining tooth sockets following extraction, trismus, and malar eminence tenderness warrant further study. Cancer of the nasopharynx tends to remain hidden and asymptomatic for many months and, in the majority of patients, will give as its first sign an enlarged metastatic lymph node in the neck before symptoms of the primary site become noticeable.[4] Or because of its proximity to the foramen lacerum, and extension through this foramen, the overlying abducens (VI*th*) nerve becomes involved and causes lateral rectus paralysis. The unwary diagnostician is thus led away from the primary site of disease. Small cancers in the vallecula may remain hidden for years in the numerous lymphoid folds of this area, and long before they become apparent give rise to early neck node metastasis. Cancers deep in the pyriform sinus act similarly and, again, give as their initial sign a metastatic lymph node in the neck. Thyroid cancers are notorious for the occult nature of the primary tumor and an easily palpable cervical node metastasis.[1]

The neck holds the key to diagnosis of tumors in this region. Cancers of the oral cavity, the paranasal sinuses and nasopharynx, and of structures in the neck itself, as a rule, metastasize to the cervical lymph nodes first. A more accurate diagnosis of head and neck cancer can be made if the neck tumors, which are the more apparent ones, are divided into primary and secondary groups. The primary group includes those tumors arising from neck structures independent of other organs. The secondary group of tumors are enlarged lymph nodes, related to disease in other parts of the body. A practical working classification is as follows:

I *Primary Tumors:*
- A. Congenital: 1. Thyroglossal remnant. 2. Branchial cleft remnant. 3. Cystic hygroma
- B. Salivary Glands: 1. Parotid. 2. Submaxillary. 3. Sublingual
- C. Thyroid
- D. Parathyroid
- E. Vascular: 1. Carotid body. 2. Hemangioma
- F. Lymphoid: 1. Lymphomas (benign and malignant)
- G. Neurogenic: 1. Peripheral nerves. 2. Cranial nerves. 3. Sympathetic nerves and ganglia
- H. Miscellaneous:
  1. Lipomas
  2. Skin—(melanoma, basal-cell carcinoma, squamous carcinoma)
  3. Paranasal Sinuses (mostly maxillary)
  4. Bone (mandible)
  5. Cervical Esophagus and Hypopharynx
  6. Larynx
  7. Trachea

II. *Secondary Tumors, i. e.,* metastases to lymph nodes from:
- A. Paranasal sinuses
- B. Nasopharynx
- C. Oral cavity: lip, tongue, upper and lower gums, palates, tonsils, pharynx
- D. Larynx
- E. Major salivary glands
- F. Thyroid
- G. Below clavicle: lungs, stomach, pancreas, colon, testicle.

With few exceptions tumors in the primary group offer little diagnostic problem. Thyroid, parotid, and submaxillary salivary glands, when involved by visible or palpable tumors reveal an obvious site of origin. A midline cyst is nearly always thyroglossal; a lateral cyst, anterior to the sternocleidomastoid muscle, is of branchial cleft origin. Solitary, solid tumors may be of vascular or neurogenic origin, such as carotid body tumors, neurofibromas or ganglioneuromas, but are rare. Benign lymphomas, such as tuberculosis, or malignant lymphomas, such as Hodgkin's Disease and lymphosarcoma, frequently start with enlargement of the cervical lymph nodes, but once histologically verified are not problems in diagnosis or site of origin.

The secondary tumors, being metastases, demand further examination to find the primary lesion. The average adult who has an enlarged metastatic lymph node in his neck, in the majority of instances, will have a primary cancer of the oral cavity, the nasopharynx or larynx.

The anatomical site of the enlarged lymph nodes in the neck often indicates where the primary tumor is located. For this reason the lymphatic pathways of the neck deserve special consideration. Situated over the carotid bulb and just below the pos-

terior belly of the digastric muscle is the lymph node most frequently involved by metastatic intraoral cancer. Primary tumors of the tongue, especially the middle and posterior thirds, of the lower alveolar ridge, of the lateral aspects of the floor of the mouth, of the tonsil and tonsillar pillars, the buccal mucosa and extrinsic larynx frequently metastasize to this node first. Recognition of this fact should call immediate attention to one of these anatomical locations.

Lymph nodes which follow the internal jugular vein are also frequently involved with metastases. These are divided into three broad groups: superior, middle, and inferior, and denote the anatomical level of metastasis. A tongue cancer, for example, arising on the middle or posterior third may first metastasize to the superior group of nodes and then spread to the middle group as well. Involvement of two or more groups of nodes often denotes a tumor of long duration or one which is very aggressive.

Metastatic nodes along the spinal accessory nerve (so-called posterior triangle) usually signify a tumor of the nasopharynx, maxillary or ethmoid sinuses. Enlarged lymph nodes, low in the neck, and laterally situated along the transverse cervical artery, frequently represent metastases from thyroid cancer. Tumors in this region were referred to as lateral aberrant thyroid cancers. It became evident, however, that these were, in fact, metastases from a small primary cancer in the homolateral lobe of the thyroid which had completely replaced the lymph node, and were not primary tumors in themselves.[1, 2, 6, 8, 9] Aberrant thyroid cancer, if it does exist at all, is extremely rare.

Enlarged lymph nodes in the submental and submaxillary triangles may be caused by cancers of the lower lip, anterior third of the tongue, floor of the mouth and anterior lower gum.

Metastases to nodes are almost invariably silent. Slowly growing, asymptomatic lymph nodes appearing in the neck of an adult should never be neglected and always warrants further clinical investigation. When thorough examination of the head and neck, however, has not yielded a primary site, and a chest x-ray is negative for a parenchymal lung lesion, biopsy of the node is indicated.

Microscopic study of the lymph node further narrows the diagnosis. In some instances it becomes obvious, as in Hodgkin's disease, or it determines the primary site, as in thyroid cancer. In the majority of instances, however, the node will show merely metastatic epidermoid carcinoma, and the primary tumor still will have to be found.

There is, perhaps, no chapter in diagnostic medicine more confusing than this particular situation, for the primary tumor, as has been stated, occasionally may lie hidden and dormant for years. Because of this clinical fact, and because of an unknown primary site, such metastatic lymph nodes have been often erroneously called branchial cleft, or branchial cyst (remnant) cancers. In order to explain their existence, they are referred to as primary tumors of branchial origin and, therefore, primary in the neck itself. This conclusion is not only erroneous in the overwhelming number of instances, but also is detrimental to the patient because such a diagnosis precludes any further search for the primary tumor, and incorrectly labels a metas-

tasis the primary site of disease. Any therapy, therefore, aimed at curing the "neck cancer" is bound to fail because the primary site is still uncontrolled.

Serious doubt exists as to whether there is such an entity at all as cancer of branchial cleft origin.[5] During the last eight years every patient the author has seen with this diagnosis has on careful examination and follow up study, sometimes for as long as four years, been found to have a primary cancer either in the nasopharynx, the vallecula or the pyriform sinus. It may be safely concluded that if such an entity does exist it is yet to make itself apparent. This does not mean that it cannot occur, but rather that the weight of evidence points to the contrary.

The importance of this concept is obvious to the cancer surgeon. No cancer can be treated with logic and rationale unless primary site and lymph node metastases are thought of as part of the same problem. They cannot be separated, and above all, they must be treated in sequence; that is, either simultaneously, en bloc, or the primary first and then the metastasis, but not the metastasis alone. To be satisfied with the diagnosis of "cancer of the neck, branchial cleft origin" means treating the metastasis without any consideration of a primary tumor.

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Chapter 3

DIAGNOSTIC PROCEDURES

EXPERIENCES WITH patients who have had missed diagnoses of head and neck tumors[3] indicate the need for a review of the diagnostic measures available when looking for primary neoplasms of the nose, the nasopharynx, the sinuses, oral cavity and larynx. The following are examples: a thirty-eight-year-old female with a small, completely intralingual, submucosal carcinoma of the tongue which caused an intractable right earache; a man whose complaint of pain on the left side of his throat remained undiagnosed because a carcinoma of the tonsil was unnoticed; another man whose frequent nasal hemorrhages were not controlled because a cavernous hemangioma of the inferior turbinate had been overlooked; and a patient whose mastoid had been operated upon three times because a primary nasopharyngeal cancer had not been considered.

The reasons for failure in diagnosis are manifold: the anatomy of the area involved, the bizarre nature of the symptoms, the occult nature of the tumor, and the infrequency with which these problems are seen by the average physician. But above all, failure is probably due to lack of thoroughness and patience while examining these regions, coupled with inadequate diagnostic instruments which would simplify the procedure. The physician must also have a high index of suspicion. As a rule, signs and symptoms in any part of the head are due either to inflammation or neoplasm. If inflammation cannot be proven, then one must not rest until he has completely ruled out a neoplasm.

Examination of the orifices of the head are done with a strong source of light on a comfortable and relaxed patient. With the exception of the external auditory canal and the nasal passages all areas of the head can be well visualized with laryngeal mirrors, so-called indirect laryngoscopy. These are made in various sizes, the larger (Nos. 4, 5 and 6) being useful for the larynx and the smaller ones (Nos. 1, 2 and 3) for the nasopharynx. A nasopharyngoscope is useful and helpful in the rarer instances, but the vast majority of tumors can be readily detected with the mirror alone. The larger mirrors should always be used for examination of the base of the tongue and vallecula, as well as the larynx. Here too, very few tumors cannot be detected by the mirror, but occasionally one must resort to direct laryngoscopy.

The Larynx. The direct laryngoscope is used for examination of the larynx or base of the tongue when mirror visualization is inadequate or when biopsy is to be performed. The anterior commissure laryngoscope, designed by Jackson, is simple,