Handbook of Otolaryngology

Head and Neck Surgery

Second Edition

David Goldenberg
Bradley J. Goldstein

Thieme

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Head and Neck Surgery

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164 illustrations

Thieme
New York • Stuttgart • Delhi • Rio de Janeiro

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Library of Congress Cataloging-in-Publication Data

Names: Goldenberg, David, 1962- editor. | Goldstein, Bradley J., editor.
Title: Handbook of otolaryngology : head and neck surgery / [edited by] David Goldenberg, Bradley J. Goldstein.
Other titles: Head and neck surgery
Description: Second edition. | New York : Thieme, [2018] | Includes bibliographical references and index.
Identifiers: LCCN 2017028786| ISBN 9781626234079 (pbk. : alk. paper) | ISBN 9781626234086 (e-book)
Subjects: | MESH: Head--surgery | Neck--surgery | Handbooks
Classification: LCC RF51 | NLM WE 39 | DDC 617.5/1059--dc23
LC record available at https://lccn.loc.gov/2017028786

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+1 800 782 3488, customerservice@thieme.com

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+49 [0]711 8931 421, customerservice@thieme.de

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Thieme Publishers Rio de Janeiro, Thieme Publicações Ltda.
Edifício Rodolpho de Paoli, 25ª andar
Av. Nilo Peçanha, 50 – Sala 2508
Rio de Janeiro 20020-906, Brasil
+55 21 3172 2297

Cover design: Thieme Publishing Group
Typesetting by Prairie Papers

Printed in India by Replika Press Pvt. Ltd. 5 4 3 2 1

ISBN 978-1-62623-407-9

Also available as an eBook:
eISBN 978-1-62623-408-6

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This book is dedicated in loving memory of our dear, sweet daughter Ellie Goldenberg (זיל) 1994–2017

From the last song Ellie sang for us:

I am there in music
I am there in sky
I don't know why this thing did happen
But this much is clear
Anytime or anywhere
I am there

William Finn

—David Goldenberg, MD, FACS

To my wife, Liz, and to my children, Ben and Eva.

—Bradley J. Goldstein, MD, PhD, FACS

Contents

Foreword

With this second edition of this popular clinical reference textbook, edited by Dr. David Goldenberg and Dr. Bradley Goldstein, two outstanding clinicians and educators, the reader has available, in one succinct text, a wealth of information spanning the breadth of the specialty of otolaryngology—head and neck surgery. This makes this text a valuable resource not only for medical students, residents, and fellows, but also active practitioners.

The book's content has been updated with the second edition, ensuring up-to-date clinical information. Each section has an editor and multiple expert content contributors. Chapters are organized within subspecialty sections around specific clinical scenarios using a uniform-content format. In each chapter, key features of the specific disorder are highlighted, followed by epidemiology, clinical presentation, evaluation, therapeutic options, and follow-up.

Dr. Goldenberg and Dr. Goldstein continue their success with the second edition of this popular text, which is a beneficial trove of clinical information for students, specialty trainees, and established practitioners alike.

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Preface

The vision for *Handbook of Otolaryngology–Head and Neck Surgery* arose when, several years ago, the editors felt that a truly practical clinical guide of sufficient quality was lacking. In an effort to fill this void, the first edition was designed to present key information in a highly organized format, covering the broad spectrum of otolaryngology subjects. From the start, this product was intended to be most useful as a clinical handbook, especially for students, residents, or other clinicians seeking rapid and reliable guidance relating to clinical care.

In the six years since the first edition was published, our specialty has witnessed continual expansion and innovation. Accordingly, the second edition builds upon the original 160 chapters to incorporate necessary changes. Without increasing the overall size of the book, we have sought to update existing chapters, combine redundant subjects, reorganize certain topics more logically, and include entirely new subjects where necessary. Whenever available, we have incorporated accepted evidence-based guidelines or recommendations.

We are grateful to all of our original contributors who helped develop the first edition content. The second edition acknowledges the new section editors who have worked to update and revise our original material. Readers will notice that references were removed, as their value in a clinical handbook is limited, while precious page space is consumed. Similarly, diagnosis-code information was eliminated, since we now have a vastly expanded ICD10 system, which is difficult to list efficiently.

We are thankful to all of those who have used our handbook, and we hope that this second edition will serve its readers well. As always, we are especially grateful to students who continue to challenge and teach us and who are our future.

"It goes without saying that no man can teach successfully who is not at the same time a student." —Sir William Osler

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Acknowledgments

The contributing authors are true experts in the topics at hand and have put forth great effort into preparing exceptional sections and chapters that are informative, readable, and concise. We would like to thank them for their willingness to participate. Also, we thank the people who provided us with our training—faculty, fellow residents, and patients.

The thirteen chapters of this book that include cancer staging information have been thoroughly updated with data from Amin MB, Edge S, Greene F, et al, eds. *AJCC Cancer Staging Manual 8th Edition* (Springer, 2017), with the kind permission of the American Joint Committee on Cancer and of Springer.

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1.0 Approach to the Otolaryngology–Head and Neck Surgery Patient

This book is organized into brief chapters addressing specific clinical entities. To enable readers to focus readily on their information needs, the chapters are arranged in a similar manner:

- Key Features
- Epidemiology
- Clinical
  - Signs and symptoms
  - Differential diagnosis
- Evaluation, including history, exam, imaging, and other testing
- Treatment options, including medical and surgical treatments
- Follow-up care

This first chapter is an exception because it deals entirely with the evaluation step. Specifically, we review in detail the approach to an efficient and effective otolaryngology patient history and physical examination, which should be especially useful to those new to the care of such patients.

◆ History

The generally accepted organization of the history and physical examination for a new patient is outlined in **Table 1.1**.

The History of Present Illness is the subjective narrative regarding the current problem. It should include a focused summary of the complaint, including location, time of onset, course, quality, severity, duration, associated problems, and previous testing or treatment.

◆ Physical Exam

The physical examination in otolaryngology is typically a complete head and neck exam. This should include an evaluation of the following:

General

- The general appearance of the patient (i.e., well- or ill-appearing, acute distress)
- Vital signs (temperature, heart rate, blood pressure, respiratory rate, weight, possibly BMI)
- Stridor, abnormal respiratory effort/increased work of breathing

Head

- Normocephalic, evidence of trauma
- Description of any cutaneous lesions of the head and neck

Ear

- Pinnae, ear canals, tympanic membranes, including mobility
- 512-Hz tuning fork testing (Weber, Rinne)

Nose

- External nasal deformities
- Anterior rhinoscopy noting edema, masses, mucus, purulence, septal deviation, perforation

Oral Cavity/Oropharynx

- Noting any masses, mucosal lesions, asymmetries, condition of dentition, presence/absence of tonsils and appearance
- Consider palpation of floor of mouth and base of tongue
- Hypopharynx and larynx
- Presence of hoarseness or phonatory abnormality
- Direct fiber optic or indirect mirror exam of the nasopharynx, hypopharynx, and larynx
- Laryngeal exam should note vocal fold mobility, mucosal lesions, and masses as well as assess the base of the tongue, valleculae, epiglottis, vocal folds, and piriform sinuses

Neck

- Inspection and palpation of the parotid and submandibular glands
- Inspection and palpation of the neck for adenopathy or masses
- Inspection and palpation of the thyroid gland for enlargement or masses
- Cranial nerve function

Other, more specialized aspects of an examination are discussed in the various sections that follow, such as vertigo assessment and nasal endoscopy.

◆ Endoscopic Exam

If the mirror examination does not provide an adequate assessment of the nasopharynx, hypopharynx, or larynx, a flexible fiberoptic nasolaryngoscopy is performed. Usually, the nose is decongested with oxymetazoline (Afrin, Schering-Plough Healthcare Products Inc., Memphis, TN) or phenylephrine (Neo-Synephrine, Bayer Consumer Health, Morristown, NJ) spray. Topical Pontocaine or lidocaine spray may be added for anesthetic. Surgilube jelly (E. Fougera & Co., Melville, NY) is helpful to reduce irritation. Antifog is applied to the tip of the flexible laryngoscope. The patient is best examined sitting upright. The tip of the scope is inserted into the nostril and under direct vision is advanced inferiorly along the floor of the nose into the nasopharynx. If septal spurring or other intranasal deformities prevent

advancement of the scope, the other nostril may be used. The nasopharynx is assessed for masses or asymmetry, adenoid hypertrophy, and infection. In the sleep apnea patient, the presence of anteroposterior (AP) or lateral collapse of the retropalatal region is remarked. The scope is then guided inferiorly to examine the base of the tongue, valleculae, epiglottis, piriform sinuses (piriform fossae), arytenoids, and vocal folds. Again, mucosal lesions, masses, asymmetries, and vocal fold mobility are noted. Asking the patient to cough, sniff, and phonate will reveal vocal fold motion abnormalities. The piriform sinuses may be better visualized if the patient puffs out the cheeks (exhalation with closed lips and palate).

◆ Other Tests

Often, laboratory studies, audiograms, or imaging studies are reviewed. These are summarized in the note after the physical exam section. Whenever possible, radiology images (CT, MRI) should be personally reviewed to confirm that one agrees with the reports.

◆ Impression and Plan

In the documentation of the patient's visit, the note concludes with an impression and plan. Generally, a concise differential diagnosis is given, listing the entities that are considered most relevant. A plan is then discussed, including further tests to confirm or exclude possible diagnoses as well as medical or surgical treatments that will be instituted or considered. Timing of a return or follow-up visit, if needed, is noted.

A copy of one's note, or a separate letter, should always be sent to referring physicians.

Table 1.1 Organization of the history and physical exam for a new patient

Chief complaint
History of present illness
Past medical history
Past surgical history
Current medications
Medication allergies
Social history
Family history
Review of systems
Physical examination
Laboratory testing/imaging
Impression
Plan

1.1 Diagnostic Imaging of the Head and Neck

Many of the structures of the head and neck are deep and inaccessible to direct visualization, palpation, or inspection. Therefore, valuable information may be obtained by the use of various radiographic techniques. Advances in technology have supplemented simple X-ray procedures with computed tomography (CT), magnetic resonance imaging (MRI), ultrasound, and positron emission tomography (PET). Other imaging modalities are used for specific conditions, such as angiography for vascular lesions or barium swallow cinefluoroscopy for swallowing evaluations.

◆ Computed Tomography

A contrast-enhanced CT scan is typically the first imaging technique used to evaluate many ear, nose, throat, and head and neck pathologies. The CT scan is an excellent method for the staging of tumors and identifying lymphadenopathy. A high-resolution CT scan may be used in cases of trauma to the head, neck, laryngeal structures, facial bones, and temporal bone. Temporal bone CT is used to assess middle ear and mastoid disease; paranasal sinus CT is the gold standard test for assessing for the presence and extent of rhinosinusitis and many of its complications. A CT scan is superior to MRI in evaluating bony cortex erosion from tumor. A CT scan is also widely used for posttreatment surveillance of head and neck cancer patients.

Working Principle of CT

In CT, the X-ray tube revolves around the craniocaudal axis of the patient. A beam of X-rays passes through the body and hits a ring of detectors. The incoming radiation is continuously registered, and the signal is digitized and fed into a data matrix, taking into account the varying beam angulations. The data matrix can then be transformed into an output image (**Fig. 1.1**). The result is usually displayed in "slices" cross-sectionally. Different tissues attenuate radiation to varying degrees, allowing for the differentiation of tissue subtypes (**Table 1.2**). This absorption is measured in Hounsfield units. When one views an image, two values are displayed with the image: Window and Level. The Window refers to the range of Hounsfield units displayed across the spectrum from black (low) through the grayscale to white (high). Level refers to the Hounsfield unit on which middle gray is centered. By adjusting the window and level, certain features of the image can be better assessed or emphasized.

Recent advances have improved the quality of CT imaging. Multidetector scanners have several rows of photoreceptors, enabling the simultaneous acquisition of several slices. Helical techniques allow the patient table to move continuously through the scanner instead of stopping for each slice. These advances have significantly decreased scan times and radiation exposure while improving spatial resolution. Improved resolution and computing power enable cross-sectional images to be reformatted into any plane (axial, coronal, sagittal), as well as three-dimensional anatomy or subtraction images to be displayed when necessary or helpful (e.g., three-dimensional reconstruction of airways). Newer in-office flat-plate cone-beam scanners

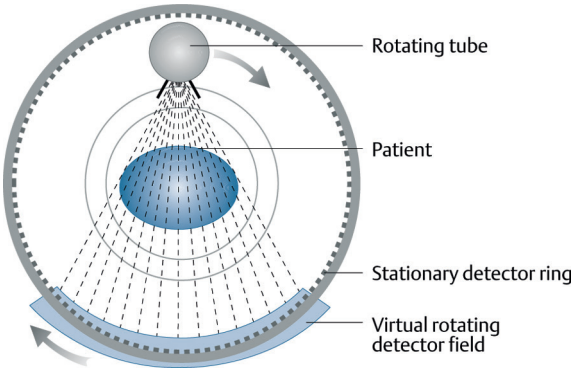

Fig. 1.1 Working principle of computed tomography. The X-ray tube revolves continuously around the longitudinal axis of the patient. A rotating curved detector field opposite to the tube registers the attenuated fan beam after it has passed through the patient. Taking into account the tube position at each time point of measurement, the resulting attenuation values are fed into a data matrix and further computed to create an image. (Used with permission from Eastman GW, Wald C, Crossin J. *Getting Started in Clinical Radiology: From Image to Diagnosis*. New York: Thieme; 2006:9.)

Table 1.2 Attenuation of different body components

Body Component	Hounsfield Units (HU)
Bone	1000–2000
Thrombus	60–100
Liver	50–70
Spleen	40–50
Kidney	25–45
White brain matter	20–35
Gray brain matter	35–45
Water	–5 to 5
Fat	–100 to –25
Lung	–1000 to –400

Data from Eastman GW, Wald C, Crossin J. *Getting Started in Clinical Radiology: From Image to Diagnosis*. Stuttgart/New York: Thieme; 2006.

can rapidly acquire 1-mm slice thickness images of the sinuses and temporal bone with very low radiation exposure.

Contrast Media

Intravenous contrast media are used in CT to visualize vessels and the vascularization of different organ systems. This allows better differentiation of vessels versus other structures. Some tissues also take up greater amounts of contrast natively, as well as in certain disease states (e.g., infection, neoplasm, edema). Luminal contrast material containing iodine or barium