

SECOND EDITION

Visual Diagnosis in Emergency and Critical Care Medicine



EDITED BY

Christopher Holstege, Alexander Baer,
Jesse Pines, William Brady

Visual Diagnosis in Emergency and Critical Care Medicine

"To my wife Angela and to my 6 children (Erik, Elijah, Benjamin, Samuel, Noah, and Annalee) who routinely consent to my photographing their various ailments and injuries for inclusion in this book." CPH

"To my wife and children who have always supported and inspired me." ABB

"To my supportive family – Lori, Asher, and Molly." JMP

"My thanks and love to my family, King, Lauren, Anne, Chip, and Katherine." WJB

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Foreword

This book stakes out a slightly different position from most educational publications. I believe it reaches a higher level, accomplishing more for the reader. Unlike the many texts that provide a compendium of information, this one presents cases, images, and information together in a way that parallels a clinical encounter. The work apparently intends to both enhance knowledge and also provide virtual experiences. In doing so perhaps it even helps advance the expertise of the reader. Each case is presented in a succinct paragraph accompanied by a high-quality visual image. Then a question is asked. Answers are accompanied by a detailed explanation that is longer than the case itself. The format seems simple, but it is effective, even powerful. It made me want to pick it up and read.

It takes over a decade of medical studies to become an expert physician. The journey requires relentless effort, with lots of reading, meaningful engagement in clinical situations, guidance from experts, and constructive feedback. This book offers all of this. It offers something for everyone, including even experts and teachers themselves. As teachers, we all can learn from the way the information is presented in this book. It displays the best attributes of expert teaching material. The cases are relevant and real; important questions are asked; “must-know” facts are presented. There is no excessive language or lengthy prose. The pace keeps moving. There is nothing dense to bog the reader down. This is the kind of teaching that students of all levels can enjoy.

On the journey toward expertise, a novice memorizes facts, confronts new experiences, tries to organize information, and, at first, relies heavily on short-term memory. After thousands of focused encounters, hundreds of hours of reading, timely feedback, and, crucially, guidance by experts, the novice grows to become expert. It is not an easy climb. Motivation is as important as innate skill and intellect since the work is hard. Given the length and the difficulty of the path, it is wonderful to have this teaching material, beautifully constructed, to make some of the necessary reading and memorization interesting. This kind of work will accelerate learning.

Beyond the novice, this work helps move all of us lifelong learners farther forward toward greater expertise. Each brief, salient case gives rich information that automatically triggers the expert reader. Sometimes we know

immediately what the case is about, sometimes we do not. Even as we read just the title of each case we begin to frame, or even try to diagnose, the problem. This will be natural for experienced physicians. Even when the answer is known, the case offers much additional information. The visual images are clear, compelling, and classic. Many of the cases will be variations of diagnoses that we have seen, some are unique, and all function as a high-yield clinical encounter. Every condition is central to our practice. A key question follows each case description, presenting a challenge, testing our knowledge and judgment. Some questions were easy, some were not. I have to admit that I enjoyed getting questions right, but even then I learned something more in the detailed answer. The answer set provides in-depth explanations that help us learn or relearn what we need to know.

Novices will move more slowly through the book, will encounter cases that are new to them, and will have the opportunity to mentally embed the images, along with the knowledge and facts. The relevance could not be greater. The work is visually engaging, the writing segments are brief, and the information is concentrated. The cases are not organized by organ system; they are presented in the way that an emergency physician encounters each case, as a complete unknown. At any speed, the readers’ energy and interest is kept high.

Learning is most engaging and most efficient when well guided. Each case encapsulates critical information. I am told by expert educators and cognitive scientists that, in medical education, the human mind first uses short-term memory to recall facts but, with cumulative, guided experiences, begins to integrate the facts with the patterns of disease, and the visual imagery. All this moves mysteriously into long-term memory. This long-term memory subsequently enables our quick, automatic response to a case or clinical situation. This quick reaction is familiar to all of us who have been practicing any length of time. We often can make a key, visual diagnosis within seconds. We can develop an accurate therapeutic plan within minutes. We also take time to attend to the subtleties, variations, and clinical cues that indicate we may need to consider other possibilities. It seems very tricky when described, but quite natural in practice. A hallmark of experts is this speed with which patterns are recognized. When asked,

"How did you know?" the expert has a difficult time explaining. The skill resides in parts of the brain where language does not. As learners move along the continuum to development of expertise, this book will help with both the short-term facts and the embedding into long-term memory.

It seems to me that this book does much more than present information, it serves as a trainer for those of us who aspire to be better at what we do. Every expert requires constructive challenges, a coach to provide feedback, help correct us and, perhaps even to inspire us to maintain our motivation. The book does all this for me,

and is perhaps the next best thing to a live devoted teacher. It is ideal for residents and a pleasure for the experienced physician. It is designed by expert educators and expert emergency physicians who provide rich material, present a challenge, and then provide feedback and critical facts that helps us move forward toward that mysterious attribute called expertise.

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Preface

The acute care practitioner faces numerous challenges in the approach to the critically ill or injured patient. Clearly, the history of the event is a vital portion of the evaluation, providing the “answer” to the clinical situation in many instances. The physical examination and the results of various diagnostic investigations, however, are also essential components of the medical evaluation. In fact, the examination, the electrocardiogram, and the radiograph provide the clinician with either the diagnosis or important information which will lead to the diagnosis. The rash of erythema multiforme, the electrocardiogram in pronounced hyperkalemia, the radiograph in carpometacarpal dislocation are all presentations where a single “clinical image” provides the immediate diagnosis or a substantial clue that leads to the correct diagnosis, with appropriate therapy subsequently following. Bed-side clinical diagnosis, based upon specific clinical images, is a vital skill for the acute care practitioner.

The purpose of this book is to provide some of those visual diagnostic clues that might be encountered in acute

care scenarios. Each visual cue is associated with an actual case and a multiple choice question. The correct answer and a focused discussion then follow. In academic practice, utilizing a visual cue with an associated case presentation and a multiple choice question is a highly effective teaching method. In clinical practice, the use of case-based scenarios is a popular, effective means of self-education. This enables the teacher or the student to discuss the disease – and importantly the diagnosis and management. We have attempted to capture this teaching style within the context of this book. Whether you are an experienced clinician in private practice, an academician engaged in teaching, a resident or student in training looking to prepare for tests, we hope this book will provide you with further experience to excel as a practitioner in the field of medicine.

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Illustration credits

- 1) **Slash Wound to the Neck.** Case: Alexander B. Baer
- 2) **I've got Blood in My Eye.** Case: Chris S. Bergstrom; Figure Chris S. Bergstrom
- 3) **Forearm Fracture after Falling.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 4) **Neonate with Fever and Rash.** Case: Alexander B. Baer
- 5) **A Missing Button Battery.** Case: Sarah G. Winters; Figure 1: Brendan G. Carr; Figure 2: Christopher P Holstege; Figure 3: Brendan G. Carr; Figure 4: Brendan G. Carr; Figure 5: Brendan G Carr
- 6) **Anorexia, Hair Loss, and Fingernail Bands.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 7) **Wide Complex Tachycardia in a Young Adult.** Case: William J. Brady; Figure 1: William J. Brady
- 8) **Wide Complex Tachycardia in an Older Male Patient.** Case: William J. Brady; Figure 1: William J. Brady; Figure 2: William J. Brady
- 9) **Muscle Spasms Following a Spider Bite.** Case: Christopher P. Holstege
- 10) **Necrotic Skin Lesion.** Case: Kenneth A. Katz
- 11) **Intense Pain following High-pressure Injection injury.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 12) **Prenatal Vitamin Overdose.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 13) **Blurred Vision Following Yard Work.** Case: Alexander B. Baer; Figure 1: Christopher P Holstege
- 14) **Foot Pain in a Gymnast.** Case: Alexander B. Baer; Figure 1: Alexander B Baer
- 15) **Child with Bruises of Different Ages.** Case: Christopher P. Holstege
- 16) **Sudden Shortness of Breath after Removal of a Central Line.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 17) **My Eyes are Yellow.** Case: Alexander B. Baer
- 18) **Pleuritic Chest Pain in a Young Adult Male.** Case: William J. Brady
- 19) **Exposed During a Blizzard.** Case: Alexander B. Baer
- 20) **FAST Evaluation of a Trauma Patient.** Case: Anthony J. Dean; Figure 1: Anthony J. Dean; Figure 2: Anthony J. Dean; Figure 3: James H. Moak; Figure 4: James H. Moak
- 21) **Chest Pain with Sudden Cardiac Death.** Case: William J. Brady
- 22) **Wrist Sprain in a Child.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 23) **Acute Eye Pain and Blurred Vision in an Elderly Female.** Case: Chris S. Bergstrom
- 24) **Heel Pain Following a Fall.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 25) **Confluent Rash on a Child.** Case: Brendan Carr
- 26) **Bradycardia Following an Herbal Ingestion.** Case: Christopher P. Holstege
- 27) **Painfree Adult with Persistent T Wave Abnormalities.** Case 1: William J. Brady; Figure 1: William J. Brady; Figure 2: William J. Brady
- 28) **Caustic Ingestion with Cardiotoxic Effects.** Case: Christopher P. Holstege
- 29) **Chemical Eye Exposure.** Case: Chris S. Bergstrom
- 30) **Acute Abdominal Pain in Pregnancy.** Case: Anthony J. Dean; Figure 1: Anthony J. Dean; Figure 2: Anthony J. Dean; Figure 3 James Moak
- 31) **Coma Following Head Trauma.** Case: Alexander B. Baer
- 32) **Tongue Swelling in a Hypertensive Female.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 33) **Purulent Eye Discharge in an Adult.** Case: Chris S. Bergstrom
- 34) **Shoulder Pain Following Direct Blow.** Case: Alexander B. Baer; Figure 1: Alexander B Baer
- 35) **Gagging Child.** Case: Christopher P. Holstege
- 36) **Adult Male with a Sudden, Severe Headache.** Case: Alexander B. Baer
- 37) **New Facial Droop.** Case: Alexander B. Baer
- 38) **Eye Pain after Tree Branch Strike.** Case: Chris S. Bergstrom
- 39) **Elderly Woman with Groin Pain.** Case: Alexander B. Baer
- 40) **Rash and Joint Pain in a Child.** Case: Mara Becker

- 41) **Radiology Findings after Laparoscopy.** Case: Munish Goyal
- 42) **Post-prandial Abdominal Pain in an Elderly Woman.** Case: Alexander B. Baer
- 43) **"Pinkeye" in a Contact Lens Wearer.** Case: Chris S. Bergstrom
- 44) **Suspicious Hand Pain.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 45) **Fever and Rash in a Child.** Case: Alexander B. Baer
- 46) **An Alcoholic with Dyspnea.** Case: Anthony J. Dean; Figure 1: Anthony J. Dean; Figure 2: Anthony J. Dean; Figure 3: Anthony J. Dean; Figure 4: Anthony J. Dean
- 47) **Dark Urine from an Immigrant.** Case: William H. Shoff; Figure 1: Suzanne M. Shepherd
- 48) **Chest Pain and Lead aVR ST Segment Elevation.** Case: William J. Brady
- 49) **Hand Pain after Striking Wall.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 50) **A Refugee with Skin Lesions.** Case: Edward T. Dickinson
- 51) **Pain out of Proportion to Examination.** Case: Robert M. Underwood
- 52) **Leg Pain Following a Motor Vehicle Collision.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 53) **Deformed Globe Following Trauma.** Case: Chris S. Bergstrom
- 54) **Foot Pain Following Breaking.** Case: Alexander B. Baer
- 55) **Lamp Oil Ingestion.** Case: Christopher P. Holstege
- 56) **Intermittent Abdominal Pain in a Female.** Case: Anthony J. Dean; Figure 1: Anthony J. Dean
- 57) **Hallucinations in a Botanist.** Case: Christopher P. Holstege & Alexander B. Baer
- 58) **Altered Mental Status with an Abnormal Electrocardiogram.** Case: William J. Brady; Figure 1: William J. Brady; Figure 2: William J. Brady
- 59) **Fishing in the Stomach.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 60) **Overdose-induced Boiled Lobster Skin.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 61) **Back Pain Following a Fall.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 62) **Painful Facial Rash.** Case: Alexander B. Baer
- 63) **Intense Wrist Pain Following Trauma.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 64) **Fever and Drooling in a Child.** Case: Alexander B. Baer
- 65) **Syncope and Flank Pain in an Elderly Man.** Case: Anthony J. Dean; Figure 1: Anthony J. Dean; Figure 2: Anthony J. Dean
- 66) **Get them Undressed!** Case: Christopher P. Holstege
- 67) **A "Blue Hue" Following Endoscopy.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 68) **Acute Onset Blurred Vision.** Case: Chris S. Bergstrom; Figure 1: Chris S. Bergstrom; Figure 2: Chris S. Bergstrom; Figure 3: Chris S. Bergstrom; Figure 4: Chris S. Bergstrom
- 69) **Elbow Pain in a Child After a Fall.** Case: Stephen M. Borowitz; Figure 1: Stephen M. Borowitz
- 70) **Confusion, Anemia, and Abdominal Pain in a Toddler.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 71) **Ground-level Fall with Ankle Pain.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 72) **Traumatic Eye Pain and Proptosis.** Case: Chris S. Bergstrom
- 73) **Diffuse Ankle Pain Following a Fall.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 74) **Rash Following Brush Fire.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 75) **Abdominal Pain in a Trauma Victim.** Case: Alexander B. Baer
- 76) **Skin Target Lesion.** Case: Carlos Rosé
- 77) **Chest Pain and a Confounding Electrocardiogram Pattern.** Case: William J. Brady; Figure 1: William J. Brady
- 78) **Sudden Sedation in a Student.** Case: Alexander B. Baer
- 79) **Skin Lesions in a Comatose Patient.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 80) **Raccoon Eyes.** Case: Alexander B. Baer
- 81) **Fall on an Outstretched Hand in a Young Adolescent.** Case: William J. Brady; Figure 1: William J. Brady; Figure 2: William J. Brady
- 82) **Eye Pain and Facial Swelling.** Case: Alexander B. Baer; Figure 1: Chris S. Bergstrom; Figure 2: Chris S. Bergstrom
- 83) **Wrist Pain Following Fall on an Outstretched Hand.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer; Figure 2: Alexander B. Baer
- 84) **Rash on a Child with Epilepsy.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 85) **Abdominal Pain in an Alcoholic.** Case & Figure: Alexander B. Baer
- 86) **Chest Pain with Electrocardiographic ST Segment & T-Wave Abnormalities.** Case: William J. Brady; Figure 1: William J. Brady
- 87) **Heroin Abuser with Multiple Skin Lesions.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer; Figure 2: Alexander B. Baer; Figure 3: Alexander B. Baer; Figure 4: Christopher P. Holstege

- 88) **Chest Pain in a Middle-aged Male Patient with ST Segment Elevation.** Case: William J. Brady; Figure 1: William J. Brady
- 89) **Fire Victim with Hoarseness.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 90) **Gardener with a Non-Healing Rash.** Case: Steve Larson
- 91) **Bite to the Leg in Tall Grass.** Case: Alexander B. Baer; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 92) **Elderly Man with Diffuse Facial Edema.** Case: Alexander B. Baer
- 93) **Acute-onset Double Vision.** Case: Chris S. Bergstrom
- 94) **Low Back Pain in a Car Accident Victim.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 95) **Pain and Rash following Contact with a Caterpillar.** Case 1: Christopher P. Holstege; Case 2: Sue O. Kell; Figure 1: Christopher P. Holstege
- 96) **Moonshine-induced Basal Ganglion Necrosis and metabolic acidosis.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 97) **Rock Climber with Finger Pain, Swelling and Redness.** Case: Joseph D. Forrester
- 98) **Vomiting and Syncope Following Ingestion of Ramps.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 99) **Chest Pain and Subtle ST Segment Elevation.** Case: William J. Brady
- 100) **Herbalist with Bradycardia and Vision Changes.** Case: Christopher P. Holstege
- 101) **Painless Penile Ulcer.** Case: William D. James
- 102) **Hyperthermia, Autonomic Instability, and Confusion in a Traveler.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege
- 103) **Immigrant with Neck Swelling.** Case: William H. Shoff; Figure 1: Suzanne M. Shepherd
- 104) **Eyelid Laceration following a Brawl.** Case: Chris S. Bergstrom
- 105) **Young Athlete with Back Pain.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege
- 106) **Chest Pain and Hypotension in an Adult Male patient.** Case: William J Brady; Figure 1: William J Brady
- 107) **Adult Male with Atraumatic Lower Back Pain and Leg Weakness.** Case: Alexander B. Baer; Figure 1: Alexander B. Baer
- 108) **Facial Swelling in a Patient with Poor Dentition.** Case: Alexander B. Baer
- 109) **Weakness and Bradycardia in an Elderly Female Patient.** Case: William J. Brady
- 110) **Lightning Strike-induced Skin Changes.** Case: Christopher P. Holstege; Figure 1: Christopher P. Holstege; Figure 2: Christopher P. Holstege

