

GERIATRIC EMERGENCIES

A discussion-based review

Amal Mattu, Shamai A. Grossman & Peter L. Rosen

Robert Anderson, Christopher Carpenter, Andrew Chang, Jon Mark Hirshon, Ula Hwang,
Maura Kennedy, Don Melady, Vaishal Tolia and Scott Wilber

CURRENT TOPICS IN EMERGENCY MEDICINE



WILEY Blackwell

Geriatric Emergencies

Current Topics in Emergency Medicine

Series editor-in-chief, Peter L. Rosen

Associate series editor-in-chief, Shamai A. Grossman

Geriatric Emergencies

A discussion-based review

Edited by

Amal Mattu

University of Maryland School of Medicine, Department of Emergency Medicine, USA

Shamai A. Grossman

Harvard Medical School, USA

Beth Israel Deaconess Medical Center, Boston Massachusetts, USA

Peter L. Rosen

Harvard Medical School, USA

Beth Israel Deaconess Medical Center, Boston Massachusetts, USA

Associate Editors

Robert Anderson, MD

Christopher Carpenter, MD, MSC

Andrew Chang, MD, MS

Jon Mark Hirshon, MD, MPH, PhD

Ula Hwang, MD, MPH

Maura Kennedy, MD, MPH

Don Melady, MD, MSC(Ed)

Vaishal Tolia, MD, MPH

Scott Wilber, MD, MPH

WILEY Blackwell

This edition first published 2016 © 2016 by John Wiley & Sons, Ltd

Registered office: John Wiley & Sons, Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial offices: 9600 Garsington Road, Oxford, OX4 2DQ, UK
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK
111 River Street, Hoboken, NJ 07030-5774, USA

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell

The right of the authors to be identified as the authors of this work has been asserted in accordance with the UK Copyright, Designs and Patents Act 1988.

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, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book. It is sold on the understanding that the publisher is not engaged in rendering professional services. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

The contents of this work are intended to further general scientific research, understanding, and discussion only and are not intended and should not be relied upon as recommending or promoting a specific method, diagnosis, or treatment by health science practitioners for any particular patient. The publisher and the author make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation any implied warranties of fitness for a particular purpose. In view of ongoing research, equipment modifications, changes in governmental regulations, and the constant flow of information relating to the use of medicines, equipment, and devices, the reader is urged to review and evaluate the information provided in the package insert or instructions for each medicine, equipment, or device for, among other things, any changes in the instructions or indication of usage and for added warnings and precautions. Readers should consult with a specialist where appropriate. The fact that an organization or Website is referred to in this work as a citation and/or a potential source of further information does not mean that the author or the publisher endorses the information the organization or Website may provide or recommendations it may make. Further, readers should be aware that Internet Websites listed in this work may have changed or disappeared between when this work was written and when it is read. No warranty may be created or extended by any promotional statements for this work. Neither the publisher nor the author shall be liable for any damages arising herefrom.

Library of Congress Cataloging-in-Publication Data applied for:

9781118753347[hardback]

A catalogue record for this book is available from the British Library.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Cover image: ©Dustin Diaz / EyeEm /Getty images

Set in 9/11.5pt, SabonLTStd by SPi Global, Chennai, India.

Contents

List of Contributors, vii

- 1 General assessment of the elderly patient, 1
Alison Southern & Scott Wilber
- 2 Physiologic changes with aging, 13
Kate D. Zimmerman & Robert S. Anderson, Jr.
- 3 Functional assessment of the elderly, 28
Kirk A. Stiffler
- 4 Pharmacological issues in the elderly, 43
Ruben Olmedo & Denise Nassisi
- 5 Altered mental status in the elderly, 58
Josh Joseph & Maura Kennedy
- 6 Geriatric psychiatric emergencies, 71
Josh Joseph & Maura Kennedy
- 7 Acute abdominal pain in the elderly: Surgical causes, 83
Katren Tyler & Maura Kennedy
- 8 Nonsurgical abdominal pain in the elderly, 99
Katren Tyler & Maura Kennedy
- 9 Back pain, 110
Nicholas Santavicca & Michael E. Winters
- 10 Headache, 123
Benjamin W. Friedman & Rebecca Nerenberg
- 11 Dyspnea in the elderly, 139
Mercedes Torres & Siamak Moayedi
- 12 Acute chest pain in the geriatric patient, 152
Marianne Haughey
- 13 Acute cardiac disease in elder patients, 168
Susanne DeMeester
- 14 Syncope in Geriatrics, 191
Timothy C Peck, Nissa J Ali & Shamai A Grossman
- 15 Stroke, 203
Julie Watkins-Torrey, Roxanna Sadri & Kama Guluma
- 16 Infections, 218
Jason Ondrejka & Scott Wilber
- 17 Dizziness and vertigo in the geriatric population, 234
Jonathan Edlow & Alessandro Cancelliere

CONTENTS

- 18 Weakness and functional decline, 252
Colleen M McQuown
- 19 Emergency department evaluation of falls in the elderly, 264
Tania D. Strout & Robert S. Anderson
- 20 Trauma in the geriatric patient, 280
Christopher R. Carpenter & Peter L. Rosen
- 21 Surgical considerations in the elderly, 304
Charles W. O'Connell, Davut Savaser & Colleen Campbell
- 22 Oncologic emergencies, 321
Gabriel Wardi, Alexander Bromfield & Leslie C. Oyama
- 23 Elder abuse and neglect, 351
Michael C. Bond & Kenneth H. Butler
- 24 Geriatric emergency pain management case, 363
Teresita M Hogan & Alexandra Wong
- 25 Ethical issues and end-of-life care, 386
Phillip D. Magidson & Jon Mark Hirshon
- 26 Geriatric dispositions and transitions of care, 394
Barbara Morano, Carmen Morano, Kevin Biese, Eric A. Coleman & Ula Hwang
- 27 The geriatric ED, 407
Phillip D. Magidson, John G. Schumacher & Elizabeth A. Couser

Index, 417

List of Contributors

Nissa J. Ali, MD

Beth Israel Deaconess Medical Center
Harvard Affiliated Emergency Medicine Residency
Department of Emergency Medicine
West Campus Clinical Center
Boston, MA, USA

Robert S. Anderson, Jr., MD

Assistant Professor
Tufts University School of Medicine
Departments of Emergency Medicine and Internal
Medicine and Division of Geriatric Medicine
Maine Medical Center
Portland, ME, USA

Kevin Biese, MD, MAT

Vice Chair of Academic Affairs
Department of Emergency Medicine
University of North Carolina at Chapel Hill Chapel
Hill, NC, USA

Michael C. Bond, MD

Associate Professor, Residency Program Director
Department of Emergency Medicine
University of Maryland School of Medicine
Baltimore, MD, USA

Alexander Bromfield, MD

Clinical Instructor, Department of Emergency
Medicine
University of California San Diego Health System
San Diego, CA, USA

Kenneth H. Butler, DO

Associate Professor, Associate Residency Program
Director
Department of Emergency Medicine
University of Maryland School of Medicine
Baltimore, MD, USA

Colleen Campbell, MD

Associate Clinical Professor
Department of Emergency Medicine
Division of Emergency Ultrasound
University of California
San Diego Health System
San Diego, CA, USA

Alessandro Cancelliere, MD PhD

Assistant Professor
Department of Emergency Medicine
University of Massachusetts Medical School
Worcester, MA, USA

Christopher R. Carpenter, MD, MSC

Associate Professor
Division of Emergency Medicine
Washington University in St. Louis School of
Medicine
St. Louis, MO, USA

Andrew K. Chang, MD, MS

Vincent P. Verdile Vice Chair for Research and
Academic Affairs
Professor of Emergency Medicine
Albany Medical College
Attending Physician
Albany Medical Center
Albany, New York

Eric A. Coleman, MD, MPH

Professor of Medicine and Head, Division of Health
Care Policy and Research
Director
Care Transitions Program University of Colorado
Denver
Anschutz Medical Campus
Aurora, CO, USA

LIST OF CONTRIBUTORS

Elizabeth Couser, MSW
Gerontology PhD Candidate
Doctoral Program in Gerontology
University of Maryland
Baltimore, MD, USA

Susanne DeMeester, MD
Attending Physician and Director Emergency
Observation Center
St Joseph Mercy Hospital
Ann Arbor, MI, USA

Jonathan Edlow, MD
Vice-Chair, Department of Emergency Medicine
Beth Israel Deaconess Medical Center
Professor of Medicine and Emergency Medicine
Harvard Medical School
Boston, MA, USA

Benjamin W. Friedman, MD, MS
Associate Professor of Emergency Medicine
Albert Einstein College of Medicine
Montefiore Medical Center
Bronx, NY, USA

Shamai A. Grossman, MD
Associate Professor of Medicine and Emergency
Medicine
Harvard Medical School
Vice Chair for Health Care Quality
Director
Observation Medicine
Department of Emergency Medicine
Beth Israel Deaconess Medical Center
Boston, MA, USA

Kama Guluma, MD
Clinical Professor
Department of Emergency Medicine
University of California San Diego Health System
San Diego, CA, USA

Marianne Haughey, MD
Associate Professor of Emergency Medicine
Albert Einstein College of Medicine
Jacobi Medical Center
Bronx, New York, NY, USA

Bryan Hayes, PharmD
Clinical Associate Professor
Department of Emergency Medicine
University of Maryland School of Medicine
Baltimore, MD, USA

Jon Mark Hirshon, MD, MPH, PhD
Professor
Departments of Emergency Medicine and of
Epidemiology and Public Health
University of Maryland School of Medicine
Baltimore, MD, USA

Teresita M. Hogan, MD
Director of Geriatric Emergency Medicine
Department of Medicine
Sections of Emergency Medicine and Geriatrics &
Palliative Care
The University of Chicago
Chicago, IL, USA

Ula Hwang, MD, MPH
Associate Professor
Department of Emergency Medicine
Brookdale Department of Geriatrics and Palliative
Medicine
Icahn School of Medicine at Mount Sinai
New York, NY
Geriatric Research, Education and Clinical Center
James J. Peters VAMC
Bronx, NY, USA

Joshua W. Joseph, MD
Fellow in Clinical Informatics
Department of Emergency Medicine
Beth Israel Deaconess Medical Center
Clinical Fellow in Emergency Medicine
Harvard Medical School, Boston, MA, USA

Maura Kennedy, MD, MPH
Associate Director for Emergency
Medicine Research
Department of Emergency Medicine
Beth Israel Deaconess Medical Center
Assistant Professor of Emergency Medicine
Harvard Medical School
Boston, MA, USA

Phillip D. Magidson, MD, MPH
 Departments of Emergency Medicine and Medicine
 University of Maryland Medical Center
 Baltimore, MD, USA

Amal Mattu, MD
 Professor of Emergency Medicine and Vice Chair
 Department of Emergency Medicine
 University of Maryland School of Medicine
 Baltimore, MD, USA

Colleen M. McQuown, MD
 Associate Professor, Northeast Ohio Medical
 University
 Rootstown, OH, USA
 Associate Research Director
 Department of Emergency Medicine
 Summa Akron City Hospital
 Akron, OH, USA

Don Melady, MD, MSC(Ed)
 Schwartz/Reisman Emergency Centre
 Mount Sinai Hospital
 Assistant Professor, Faculty of Medicine
 University of Toronto
 Toronto, ON, Canada

Siamak Moayed, MD
 Assistant Professor
 Department of Emergency Medicine
 University of Maryland School of Medicine
 Baltimore, MD, USA

Barbara Morano, MPH, LCSW
 Program Manager
 Department of Geriatrics
 Icahn School of Medicine at Mount Sinai
 New York, NY, USA

Carmen Morano, PhD, LCSW
 Associate Professor
 Silberman School of Social Work at Hunter College
 Director
 Silberman Aging: A Hartford Center of Excellence in
 Diverse Aging
 Managing Editor
 Journal of Gerontological Social Work
 New York, NY, USA

Denise Nassisi, MD
 Director of the Geriatric Emergency Department
 Mount Sinai Medical Center
 Associate Professor Departments of Emergency
 Medicine & Medicine Icahn School of Medicine at
 Mount Sinai
 New York, NY, USA

Rebecca Nerenberg, MD
 Assistant Professor of Clinical Emergency Medicine
 Department of Emergency Medicine
 Montefiore Medical Center
 Albert Einstein College of Medicine
 Bronx, NY, USA

Charles W. O'Connell, MD
 Clinical Instructor
 Department of Emergency Medicine
 Division of Medical Toxicology
 University of California San Diego Health System
 San Diego, CA, USA

Ruben E. Olmedo, MD
 Director
 Division of Toxicology
 Department of Emergency Medicine
 Mount Sinai Medical Center
 Assistant Professor
 Icahn School of Medicine at Mount Sinai
 New York, NY, USA

Jason Ondrejka, DO
 Summa Akron City Hospital
 Department of Emergency Medicine
 Akron, OH, USA

Leslie C. Oyama, MD
 Associate Clinical Professor
 Associate Residency Director
 University of California San Diego Health System
 San Diego, CA, USA

Timothy C. Peck, MD
 Beth Israel Deaconess Medical Center
 Harvard Affiliated Emergency Medicine Residency
 Department of Emergency Medicine
 West Campus Clinical Center
 Boston, MA, USA

LIST OF CONTRIBUTORS

Peter L. Rosen, MD

Senior Lecturer Emergency Medicine
Harvard Medical School
Attending Emergency Physician Beth
Israel/Deaconess Medical Center
Visiting Clinical Professor of Emergency Medicine
University of Arizona School of Medicine Tucson
Emeritus Professor of Emergency Medicine
University of California
San Diego, CA, USA

Roxanna Sadri, MD

Department of Emergency Medicine
University of California San Diego Health System
San Diego, CA, USA

Nicholas Santavicca, MD

Fellow, Emergency Medicine/Internal
Medicine/Critical Care Program
University of Maryland Medical Center
Baltimore, MD, USA

Davut Savaser, MD

Clinical Instructor
Department of Emergency Medicine
Division of Hyperbaric and Undersea Medicine
University of California San Diego Health System
San Diego, CA, USA

John G. Schumacher, PhD

Graduate Program Director, Associate Professor
Department of Sociology and Anthropology
University of Maryland
Baltimore County (UMBC),
Baltimore, MD, USA

Kirk A. Stiffler, MD, MPH

Department of Emergency Medicine,
Summa Akron City Hospital
Associate Professor of Emergency Medicine
Northeast Ohio Medical University
Akron, OH, USA

Tania D. Strout, PhD, RN, MS

Associate Professor
Tufts University School of Medicine
Director of Research
Department of Emergency Medicine
Maine Medical Center
Portland, ME, USA

Alison Southern, MD

Associate Program Director, Department of
Emergency Medicine
Summa Health System
Associate Professor of Emergency Medicine
Northeast Ohio Medical University
Akron, OH, USA

Vaishal Tolia, MD, MPH

Associate Clinical Professor
Emergency & Internal Medicine
Medical Director & Director of Observation
Medicine
Department of Emergency Medicine
UCSD Health System
San Diego, CA

Mercedes Torres, MD

Clinical Assistant Professor
Department of Emergency Medicine
University of Maryland School of Medicine
Baltimore, MD, USA

Julie Watkins-Torrey, MD

Resident Physician
Department of Emergency Medicine
University of California San Diego Health System
San Diego, CA, USA

Katren Tyler, M.B.B.S.

Associate Professor and Associate Program
Director, Geriatric Emergency
Medicine Fellowship Director,
Vice Chair for Faculty Development,
Wellness and Outreach
Department of Emergency Medicine
University of California, Davis
Sacramento, CA, USA

Gabriel Wardi, MD

Department of Emergency Medicine, Fellow,
Division of Pulmonary and Critical Care Medicine,
University of California San Diego Health System
San Diego, CA, USA

Scott Wilber, MD, MPH

Chair, Department of Emergency Medicine
Summa Health System
Professor of Emergency Medicine
Northeast Ohio Medical University
Akron, Ohio, USA

Michael Winters, MD
Associate Professor of Emergency Medicine and
Medicine
Departments of Emergency Medicine and Medicine
University of Maryland School of Medicine
Baltimore, MD, USA

Richard E. Wolfe, MD
Chief of Emergency Medicine
Beth Israel Deaconess Medical Center
Boston, MA, USA

Alexandra Wong, BA
Research Associate
Department of Medicine
Section of Geriatrics and Palliative Care
The University of Chicago
Chicago, IL, USA

Kate D. Zimmerman, DO
Assistant Professor
Tufts University School of Medicine, Associate
Director of Medical Student Education
Department of Emergency Medicine
Maine Medical Center
Portland, ME, USA

1

General assessment of the elderly patient

Alison Southern & Scott Wilber

Department of Emergency Medicine, Summa Akron City Hospital, Northeast Ohio Medical University, Akron, OH, USA

Section I: Case presentation

The patient is a 96-year-old man who presented with a chief complaint of slurred speech and generalized weakness. A history was obtained from the paramedic run sheet and family, who arrived in the emergency department (ED) 15 min after the patient. His symptoms have been waxing and waning over the last few days. Today, he had slurred speech and left-sided weakness, which has now resolved.

The patient's daughter reported that since his wife died 3 months ago, he has had a 20 lb weight loss. He has decreased appetite, decreased activity, and decreased function, which has waxed and waned. For the last 2 days, he has required wheelchair transport to the cafeteria for meals and assistance with transfer. The family stated that he has not had a recent change in his confusion.

The past medical history was significant for dementia, gastroesophageal reflux disease, hypertension, aortic stenosis, and benign prostatic hypertrophy. His social history notes that he currently lives in an assisted living facility. His daughter visits daily and assists with instrumental activities of daily living (ADLs).

On examination, the vital signs were normal. Head, eyes, ears, nose, and throat examinations were normal. Results of cardiopulmonary, abdomen, and extremity examinations were normal. On neurologic examination, he was oriented to year and person. He was not oriented to day or month. He had 0/3 items on 3 item recall. The Six-Item Screener (SIS)

score was 1. The modified Richmond Agitation and Sedation Scale (RASS) score was 0. The NIH Stroke Scale was 1 for confusion. The skin examination revealed a Stage 2 sacral decubitus ulcer.

The laboratory studies revealed an albumin of 2.3 and a hemoglobin of 9.

The family felt that the patient had been declining since his wife died and requested hospice evaluation, as a hospice had been beneficial for the patient's wife.

Section II: Case discussion

Dr Peter Rosen (PR): I would like to remind everyone what we tell our interns when we first get a presentation like this. We should have our exact vital signs instead of just saying normal, because normal may not be normal at this age. I think one of the critical assessment points of the older patient is to understand what are the normal changes in physiology as you age, so that you aren't fooled by them. Just as when you look at an infant, a resting heart rate of 120 doesn't bother you, which it would if the child were 10 years old. That's number one. Number two: it's impossible not to be that age without taking 42 different medications, so we really need to know what they are. Without those, it's really hard to get to the root of any geriatric problem. What are some of the physiologic changes you would expect in this age group?

Dr Amal Mattu (AM): You mentioned the vital signs, so we can start with that. To reiterate, vital

signs can be unreliable. Elderly patients can have a resting bradycardia as opposed to the infants you mentioned who might have a resting tachycardia. In addition, if they're on beta-blockers, calcium channel blockers, or digoxin, any of these can produce a further reduction in the heart rate so that even in the presence of overwhelming sepsis they may not mount a tachycardia; or if they are bleeding out, they may not mount a tachycardia we've all been led to expect from those ATLS charts. Elderly patients often will have isolated systolic hypertension and may walk around with a systolic pressure of 180 or 190 torr. Thus, when they come in with a systolic pressure of 120 torr, it appears to be a normal pressure, but they may actually be in shock. These are the two vital signs that are the most misleading. Elderly patients tend to take longer to mount a fever as well. If they have an infection, they may also be more likely to develop a hypothermic response to the infection.

PR: Furthermore, not knowing what medications the patient is on prevents us from knowing what vital sign responses we can expect. Even though we are supposed to take temperatures on all patients, we frequently don't. It's just prudent to get used to having to ask for a temperature, if we don't see it right away. Can you think of any other physiologic changes to this age group that we should be aware of, such as vital capacity or respiratory rate or something to do with the neurologic system?

Dr Scott Wilber (SW): Dr Mattu mentioned the lack of tachycardia even in the case of overwhelming sepsis. One of the things we also see is that frequently tachypnea is a better indication of serious illness such as hemorrhage or infection, and you will frequently see a patient with only tachypnea as the manifestation of serious illness.

PR: The issues in this case are both medical and ethical. It seems to me that we rarely need to start ethical evaluations before we finish our medical evaluations, but here's a difference in the management of the geriatric patient. I think that unless you're willing to answer the ethical question of how much workup is this patient going to profit from, then you really can't do a good medical evaluation. This case seems to be a perfect example of that. Here's a patient with declining status, he can't take care of himself. Even from an already observed level of dementia, his family

has noticed a decline. I think a good ethical question is at what point do workup and treatment become futile and an unnecessary expense rather than trying to reach the medical endpoint that we might try to achieve in someone, who was say 30 years younger leading a normal life.

AM: I agree managing expectations is going to be very important. I think we were very fortunate that in this case, the family is actually present, and we can have that discussion with them. Moreover, the patient is somewhat stable. We can query the family about what their expectations may be for the patient's care. Also, we need to determine whether the patient had been to other facilities or his primary care physician to see if any aggressive changes might have been made to the medication regimen that might have led to the today's ED presentation. Then, we can ask that question: how much should we be doing? Other providers may not have done that, and that could actually explain why that person is here.

Dr Shamai Grossman (SG): I think the problem we are raising reflects some of the limitations of emergency medicine. We rarely have all the information about the patient, and often this is the first time we are seeing this patient. If you just read this case, you would realize we're missing vital parts of the history. You know the patient has had decreasing function since his wife died. Is that depression? Is it a physiologic process going on? The problem is we're seeing this patient fresh in the ED, and we're not his primary care doctor. In an ideal world, all these things would have been worked out by the primary care physician. At best, we will have only a brief discussion with the family members, and making these decisions is going to be very challenging. I think approaching older adults in the ED, given all these limitations that we have, requires a different method. I think a major responsibility is determining the goals of care that the patient or by proxy, the family or the caregivers would like. It's new for emergency physicians to be thinking in terms like this. Then, when we understand the immediate care goals, we can begin to find out about intermediate, and then long-term goals.

PR: I think that's a very strong point, which can also affect decision-making in terms of how aggressively you manage that patient. In any patient, you need

to discover why they are there, and I think it can be useful to ask what are the expectations from the emergency care that this family wishes to derive. If he's having a stroke, do they want us to treat that stroke? If he's just declining, then why did they bring them to the ED? Often, the primary care physician may have the answers, but they frequently don't share them with the ED. What would you suggest in terms of the workup for what sounds to be a transient ischemic attack (TIA)?

AM: I would again start with trying to find out what the family's goals are in terms of the short-term and long-term outcomes. If this were a younger patient who had fewer medical problems and many years ahead of him, then you would probably get a head CT scan, and have neurology come and do the full workup that we usually perform for TIA and stroke. On the other hand, if this is a patient for whom the family just wants to make the patient comfortable, then we do not need to do much of anything. The family requested a hospice, which certainly suggests comfort care, and may preclude doing anything but giving that comfort care.

SW: I think oftentimes it does take a few minutes of conversation with the family to explain to them the different kinds of evaluations we can do in the ED. For instance, in this situation, the family may say they do not want a stroke aggressively treated, they may not want surgery to evacuate a subdural hematoma, but if the patient had a urinary tract infection (UTI) and needed antibiotics, they might consent to that. Or, if the patient were hyponatremic, and needed some IV fluids for a day, they might consent to that. I therefore might spend time with the family just to explain the kind of testing we can do, and what that would lead to. In this particular situation, a CT scan often may lead to more aggressive treatment than checking the patient's electrolytes or checking a urinalysis.

SG: I might add one more thing. We are concentrating on the wishes of the family, but what we need to be sure of is that these also are the patient's wishes. If the patient can't articulate what he really thought, we are obliged to make sure that the person you're talking to is really the healthcare proxy and make sure that when you talk to the family that they're actually communicating the patient's best wishes and not the family

member's vested interests, and that they're not trying to make someone who potentially has some viability into a hospice patient. I think it's an ethical imperative that when we talk about patient autonomy, it's not solely the family's autonomy. When the patient is decisionally incapacitated, then you have to do the next best thing, which is to try to figure out what the patient would want.

SW: The ethical terms we use are using substituted judgment rather than best interest. Whenever possible, we want to substitute for our judgment what the patients would want, rather than just acting in their best interest. When we have no ability to ascertain what the patient would have wanted, then we act using the patient's best interest, but whenever possible, we use substituted judgment.

PR: A number of EDs have benefited from having a pharmacologist available in the department to help in the evaluation of complex drug interactions. I think that's particularly useful in the geriatric population because they have so many different medications that none of us can keep all the interactions in our head. We need to be cautious because the patient may have been taking inappropriate and just wrong medications, which somehow became the patient's ordered therapy at the nursing home. Diabetic medications are one of the most common sources of increasing confusion in the elderly patient, and it would be useful to check the patient's glucose level. Do you have any solutions for how we can ensure the quality of this patient's medications?

AM: In terms of a simple solution, I don't know that there is one. ED pharmacists can be very helpful here as they can focus on scrutinizing the medications these patients are taking and look for drug interactions and potential adverse effects, especially if you are planning on adding a new drug to the regimen. There is probably not as great a need for them or for us to scrutinize medications in young patients, but in older patients the effort is very important. Sometimes, 5 min of study of past records or computer drug records will identify the single cause of the patient's presentation, the patient's delirium, or whatever else it is that brings them into the hospital.

PR: Most of us are not familiar with all of these scores that are mentioned here and are not likely to learn them. Do you have any suggestions for how

the emergency physician can make a quick mental status assessment that might identify an acute organic brain syndrome (delirium), as opposed to declining dementia?

SW: So I think it's important that we try to be objective when we do a mental status examination. Frequently, I will have residents present to me that a patient is alert and oriented times three (A&Ox3). I generally think that means that the patient was awake and interactive and that they didn't specifically ask the patients the questions to determine their orientation. So I think it's important to be objective about that. In this case, we used something called a SIS. A very quick test where we just ask the patient to remember three items (apple, table, and penny) and then to tell us the day, the month, and the year, and then to repeat back the objects we asked. And a score of 4 or less out of 6 is equivalent of a mini mental status examination (MMSE) of approximately 23 or less. Now none of us are going to do a full MMSE on a patient that might take 15 min, but the SIS might be incorporated into your examination without increasing your time with the patient significantly. The RASS score is something that a lot of residents are probably familiar with right now, but those of us who are older may not be. The reason the residents are familiar with this is that often it is used in the ICU to titrate sedation. Basically, a RASS of 0 means the patient is awake, alert, and interactive. Scores that are negative mean that the patient is more lethargic and may be aroused only to verbal and painful stimuli; scores that are positive indicate a patient who is more agitated. Whether they use this scale or a descriptive scale, it is important to determine if the patient is alert and attentive. A patient who is unable to pay attention to you while you are doing a history and is obsessed with the beeping monitor and with things going on outside of the room may be exhibiting the first signs of delirium, that is, lack of attention. So I think those are the two ways to evaluate the two parts of their consciousness: the content of their consciousness, or how confused they are, and their level of consciousness, or how awake they are.

PR: We used to use the clock as a quick delirium screen in younger patients. Can the patient draw a time that you give them on a clock face? It's a very quick assessment of someone who may from time

to time appear to be normal and alert, but who is actually confused. We used to use the "string sign" for withdrawing alcoholics, where you ask "Do you see the string?" and you of course hold no string. If the patient reports seeing a string, then the patient is confabulating and has an acute organic brain syndrome (delirium). I think that the point being that many of these patients are acutely altered as opposed to being at baseline demented. If they were normal before they have the drug interactions, it's useful to know that this is a form of dementia that you can reverse. Amal, we also know that the patient has a history of prostatic hypertrophy. While we know that UTIs are more common in the elderly and are one of the more common causes of acute organic brain syndromes, would you do any special kind of workup for this man's prostate? That is, would you do a bladder evaluation to see if this man's emptying, or if what the patient would benefit from would be an indwelling Foley as we are again unlikely to recommend surgery?

AM: I've seen a couple of patients who have developed delirium simply from significant urinary retention. Checking the urine and confirming that the patient is able to void and is not retaining is simple and should be probably done. With ready access to ultrasound, everywhere it's easy to take a look at the bladder and see if it's significantly distended. If it is, then putting a catheter in to decompress the bladder would be useful as would sending a urinalysis. If the bladder does not appear to be distended, my preference would be to not put the catheter in because it would be a portal of entry for bacteria.

SG: I would also remember to do a rectal exam as prostatitis is an often-missed cause of elderly UTIs, who bounce back to the ED with recurrent or worsened infections after their antibiotics are completed, but their infection has yet to be adequately treated.

PR: In reading the case, it sounds like the family's desire is to change the focus of his care from nursing home to hospice. I'm not personally aware of any of the hospice restrictions although I thought that death had to be imminent – 30 days or less, to get into a hospice, and I don't know how I'd be able to make that argument in this patient. Maybe you could help us in terms of whether or not this patient is even a candidate for hospice.

SW: Most hospices require that two physicians certify that the patient has a projected prognosis of 6 months or less. It is really not imminent death but a best guess of 6 months or less. The estimate can be extended if the patient doesn't die within 6 months, and the patient can be recertified for an additional 6 months. There are different categories for hospice qualification. There are criteria for failure to thrive, stroke, chronic renal disease, chronic liver disease, and dementia. The general indicators that I keep in mind are that if someone is having functional decline and problems with nutrition, they may be appropriate for hospice. For failure to thrive, they have to have increasing symptoms, progression of disease, or frequent ED visits plus impaired nutritional status and failure to thrive. We see that this patient had an albumin of 2.3 showing impaired nutritional status, and also a decubitus ulcer suggesting impaired nutritional status as well. Thus, we do have a documented functional decline. Functional decline and impaired nutritional status with weight loss and low albumin are two things to indicate to an emergency physician that the patient may qualify for hospice.

Dr Ula Hwang (UH): There are two things I would bring up in terms of approaching the family's wishes. We've discussed a lot about the potential medical evaluation, but another thing that may also be of benefit for this patient is a quick evaluation for depression. I know that the patient has significant dementia; it sounds like he hasn't varied much from his baseline, but the history does include the fact that his wife died 3 months ago, and we saw this significant weight loss, perhaps he has had some functional decline, decreased appetite. Some of this may also contribute to the big picture of what's going on. It's probably not the only cause, but that may also be part of the family's decision-making in terms of palliative care evaluation and end-of-life discussions with the family. The physician can think not necessarily in terms of imminent death, but rather withdrawal of active treatment. If he is not undergoing active treatment, he could and should be evaluated by palliative medicine, if not for hospice, then at least for comfort measures that may be useful for him.

PR: Perhaps you could tell us the outcome of this case and what precisely ended up being the cause of this patient coming to the hospital that day.

SW: I had a discussion with the family. We did agree to evaluate for potentially reversible conditions such as a UTI, which they would have wanted to have treated, and we did decide to do a CT scan of the head, which was done more for prognosis than for treatment. They felt that if the patient had a significant abnormality on CT scan, it would have made them more likely to want to have the patient in hospice. The CT scan of the head did not show anything acute. He did not have any evidence of infection. His medications were reviewed, and there was nothing obvious that was a medication interaction or a new medication added. In fact, he had been evaluated for depression and had been on antidepressant since his wife had gotten sick several months ago; so, it was not thought that new depression was the cause of his functional decline and symptoms. The patient was admitted to the hospital and evaluated by the palliative care team on the acute palliative care unit and was found eligible for hospice. He lived for several more months under hospice care before he died.

PR: I would like to discuss one more idea brought up by this case. We went through most of the responsibilities of the emergency physician. What we did not discuss are some of the painful life realities. That is, patients like this are very difficult to admit. Most medical services do not feel that they have anything to offer the patient and do not want to admit patients for whom there is no easy outcome that they can see. When I was a young physician, we had a service at the hospital where I trained that would admit patients like this. They were basically sociologic admissions or administrative admissions, where you had to put patients in the hospital before you could get them into a nursing home, and it was more custodial care rather than diagnostic or therapeutic care. I wonder if we shouldn't be developing more services like that as we have populations that age, and more patients who are developing these kinds of problems. It is especially frustrating with all the crowding problems we have now and the increasing focus as to whether patients qualify for admission in terms of reimbursement. It is certainly getting tougher for all of us to get these patients admitted. I don't have a simple solution except to remind all the readers that our job is to be advocates for the patients. We have to remember why we went into medicine, which is to take care of people and not just to focus on reimbursement, and

to be an advocate for the patient as much as possible. Sometimes, advocating for patients doesn't involve giving drugs or IV fluids but merely doing the best thing for the patient. This may involve a fight to get them admitted just to protect them in some way, or to facilitate their transit to a nursing home or hospice.

SW: I think that this case illustrates a new kind of approach that we need to take with older patients in the ED. We need to look at the whole patient. We do not always need to offer aggressive medical treatment, and sometimes the best thing we can offer is palliative treatment or hospice care. These patients are complex, but we went into emergency medicine for the challenge, and I think that these patients do challenge us. We can end up with good outcomes, and I think this patient had a good outcome.

UH: I would add that the approach to older patients and their assessment in the ED does incorporate different and new approaches with regard to assessment. The vitals must be interpreted differently. We must think about cognitive and functional status. We must make a diligent attempt to ascertain what the goals of care would be for the patient and for the family members.

AM: I was just thinking that when I was in medical school, the medical professors used to talk about this holistic approach to patients and a biopsychosocial model of medical care. It was a bit soft or too theoretical for many of us. We went into emergency medicine because we wanted to do focused evaluations. Fast, quick, "treat 'em and street 'em" approaches. Yet, now I think we're realizing that as the population is aging, and we're seeing more and more patients who have more than just isolated medical issues, the focused approach is very short-sighted and inappropriate to successfully caring for these patients. The reality is that emergency medicine needs to become a more holistic, at least in our approach to older patients. We need to consider not only the medical issues but also the psychosocial aspects of patient care as well. More and more I'm realizing that when you take the time to do that, it turns out to be a very good investment in the medical care of these patients. It does result in fewer bounce backs. The population is changing, and our practice needs to change as well. A case like this is a really good demonstration of that.

Section III: Concepts

Background

A key concept that is evident from this case presentation and discussion is that the general assessment of the elderly patient in the ED is complex and different from practice upon younger patients, and this patient population requires special attention. These patients often have complex past medical histories and interrelated psychosocial issues contributing to their current presentation. Although the hallmark of the initial stabilization of the elderly patient remains airway, breathing, and circulation, the remainder of the assessment becomes a biopsychosocial evaluation. It is essential that the emergency physician be able to see the whole picture, with the ultimate goal of care to manage the elderly patient as the patient would wish. This presents many challenges including accurate history taking and gathering, diagnosing medical problems within the context of physiologic changes related to age, treating complex medical problems along with polypharmacy, assessing cognitive and functional status, and determining end-of-life decisions and goals of care.

In most cases, the assessment of the older patient in the ED should be comprised of four specific areas of focus: (1) medical evaluation, (2) cognitive evaluation, (3) functional evaluation, and (4) social evaluation [1].

Medical evaluation

The medical evaluation comprises the standard approach to ED patients. It should include a thorough history and physical examination. At times, given the circumstances of the patient and ED, these may not proceed in the ordered manner one was taught in medical school, but both should be performed.

History

The initial history, including a review of the chief complaint, and a history of present illness should be reviewed in all patients. Some older patients may not be able to provide adequate history due to cognitive impairment, hearing impairment, or acuity of illness; in these patients, alternative sources of history should be obtained and documented. Serious conditions often present atypically in the older ED patients, and

vague presenting complaints such as “weakness” may be indicative of serious disease [2].

The patient’s past medical history should be elicited and the medications reviewed. This would include the current medication list and dosages, paying close attention to any new or recently removed medications. Older patients are often prescribed multiple medications for chronic illnesses; this may lead to increased adverse effects and drug–drug interactions. The number of medications taken by older patients is increasing. In 2002, the Sloan Survey collected data on drug usage from a random sample of US patients. This survey showed that of patients ≥ 65 years of age, 23% of women and 19% of men took at least five medications and 12% of both women and men took >10 medications [3].

It is estimated that 5–10% of admissions to the hospital for older patients are due to adverse drug reactions [4]. According to data from estimates of the 58 nonpediatric hospitals that participate in the National Electronic Injury Surveillance System–Cooperative Adverse Drug Event Surveillance (NEISS–CADES) project, drug interactions result in an estimated 99,628 emergency hospitalizations each year among older adults. Warfarin is implicated in approximately one third of these adverse events; insulin, oral anti-platelet agents, and oral hypoglycemic agents account for approximately another third [5].

In 2012, the American Geriatric Society updated the Beers criteria for potentially inappropriate medication use in older adults. This was accomplished through an extensive literature search and expert panel. The Beers criteria are used as an educational tool and a quality measure; the goal of these criteria is to improve older patients’ care by reducing their exposure to potentially inappropriate medications. Fifty-three medications or medication classes make up the updated 2012 AGS Beers Criteria, which are divided into three categories. The first category is the potentially inappropriate medications and classes to avoid in older adults. The next category summarizes potentially inappropriate medications and classes to avoid in older adults with certain diseases and syndromes that the drugs listed can exacerbate. The third group, medications that should be used with caution, was added with the 2012 update [6]. The Beers Criteria help in the review of a patient’s medication list for potential medications causing side

effects. It also aids physician’s decision making when new medications are needed.

Vital signs

All too often, a quick review of the vital signs in an elderly patient leads to the conclusion that he/she is “normal,” as in the case presentation above. However, in this age group, subtle changes in vital signs may be easily overlooked and lead physicians in the wrong direction. Each vital sign can give objective information in a patient whose history is already most likely limited. Therefore, a thorough review of a complete set of vital signs is crucial.

Blood pressure can be misleading in the elderly population. A blood pressure that may appear normal may be markedly abnormal compared to the patient’s baseline blood pressure. Due to physiologic changes of aging, there is a loss of elastic fibers, causing vessels to be more rigid and less compliant. This hardening of the major vessels leads to systolic hypertension, increased peripheral resistance, and ventricular hypertrophy [7]. Ventricular hypertrophy can lead to diastolic dysfunction with decreased cardiac filling [8]. In a patient with systolic hypertension, it is important to know the patient’s baseline systolic blood pressure as “normal” blood pressures may actually be a sign of shock.

Older patients are also subject to orthostatic hypotension, or the inability of the body to adjust the blood pressure during postural changes, resulting in hypotension. Orthostatic hypotension is estimated to occur in 20–30% of community-dwelling older patients and 50% of nursing home residents. Orthostatic hypotension is associated with falls, syncope, dizziness, and confusion in older patients [9].

Another cardiovascular physiologic change of aging is a reduction in the number of atrial pacemaker cells. This leads to a decreased intrinsic heart rate. There is also a decreased responsiveness to beta adrenergic receptor stimulation that leads to a decreased heart rate response to exercise and stress [10]. Older patients are more likely to have a resting bradycardia, sick sinus syndrome, and atrial dysrhythmias [11]. This can add additional risk to a patient who is already at risk for falls and syncope. A patient’s medication may also mask problems normally evident by abnormal vital signs [12]. For example, a patient with severe sepsis or hemorrhagic shock may be

unable to mount a tachycardia due to beta-blockers, calcium channel blockers, or digoxin. This lends further importance to a thorough review of the patient's medication list.

Aging results in many changes in the respiratory system. There is a loss of elastic lung recoil, leading to an increasing number of alveoli that do not participate in gas exchange. The chest wall loses ability to expand, and the lungs lose defense mechanisms, such as mucociliary reflex [13]. Kyphosis can reduce chest wall compliance and diaphragm function. These changes can increase the work of breathing and decrease functional reserve [14].

The respiratory rate may be a subtle sign of distress in older patients and may be the only vital sign that appears abnormal on initial evaluation. As it requires some time to obtain an adequate respiratory rate, and it may be poorly recorded, it may be prudent for the physician to verify the respiratory rate personally. Tachypnea is associated with cardiac arrest in admitted patients, transfer to higher level of care within 24 h of ED admission, and 30-day mortality in ED patients [15, 16]. Tachypnea can be a sign of impending respiratory distress or failure, infection, cardiac disease, or shock. In patients with sepsis, tachypnea is independently associated with in-hospital mortality [17]. There is also an association with mortality and tachypnea in older patients with suspected infection [18].

Accurate testing of pulse oximetry is also important as many geriatric patients have underlying chronic lung diseases as well as peripheral vascular disease, which may make an accurate pulse oximeter reading more difficult to obtain [19].

Older patients have limitations in body temperature regulation resulting in a lower core body temperature [20]. They may not mount a febrile response to infection and are apt to be hypothermic as a result of infection [21]. The cutoff defining a fever may need to be adjusted in older patients in order to improve the detection of serious infections. For example, with older nursing home patients in the ED, a temperature of 99°F (37.2°C) has a sensitivity of 83% and a specificity of 89% for significant bacterial infections [22]. As baseline temperatures may be lower in older patients, a change from baseline temperature of at least 1.3°C or 2.4°F may be an important indicator of infection [23].

Physical examination

After initial stabilization and review of the vital signs, it is important to perform a full physical examination when assessing the elderly patient. Oftentimes, history may be limited secondary to chronic dementia or a newly altered mental status. These patients may not be able to relate that they have a sore on their back or a neglect of their right side. Therefore, a complete head-to-toe examination including skin examination and neurologic assessment is essential. When assessing the patient's skin, it is important to remove clothes including socks to assess whether there is skin breakdown. This is especially important in the evaluation of potential infections. It may be necessary to roll immobile patients to examine their buttocks, sacrum, and back.

Laboratory studies

There are a number of laboratory studies whose normal values do not change with aging. These include electrolytes, blood urea nitrogen, hemoglobin, platelet count, and white blood cell count. In these situations, comparison to a baseline value is helpful to evaluate whether abnormal values are an acute or chronic change [24]. There are other laboratory parameters whose normal ranges do change with age. For instance, the erythrocyte sedimentation rate upper limit of normal should be age adjusted ($\text{age}/2$ for men and $(\text{age} + 10)/2$ for women) [25]. Since creatinine values are related to lean body mass, normal creatinine values decline with aging. In this situation, "normal" values may indicate reduced glomerular filtration rate [26]. In addition, D-dimer values may need adjustment with aging, a series of recent studies suggest that a value of $(\text{age} \times 10)$ mg/l may be a reasonable cutoff for excluding pulmonary embolism [27].

Cognitive assessment

Cognitive impairment is common in the elderly patient population and the emergency physician should be able to utilize tools available to aid in recognition of this impairment. Commonly physicians will document that the patient is "A&Ox3." This likely reflects that the patient was able to carry on a conversation and answer historical questions. More formal testing should be used to avoid an inadequate and incomplete assessment. The Geriatric Emergency Medicine Task

Force recommends a mental status evaluation of all elderly patients presenting to the ED [28].

As it is often difficult to discern worsening dementia from acute delirium in confused ED patients, additional information from paramedics, family, primary care providers, and caretakers should be sought. The emergency physician should not assume that confusion or altered mental status is the patient's baseline status without verification.

The classic cognitive screening test is the MMSE. This test is difficult to perform in the ED as it is time-consuming and scoring is complex. Alternatives include screening tests that are sensitive, quick, and easy for the physician to remember and score. The SIS and Ottawa 3DY (O3DY) meet these criteria [29].

The SIS consists of item recall plus orientation. The SIS takes approximately 1 min to complete. It begins by asking the patient to repeat three items such as apple, table, and penny. The patient is asked to recall these items in a few minutes. They are then asked year, month, and day. Finally, they are asked to recall the initial three items. It is scored as a sum of the correct answers with 6 being the highest score. A score of 4 or less suggests cognitive impairment. A cutoff of 3 or more errors has a similar sensitivity and specificity for a diagnosis of dementia *as does* a cutoff score of 23 on the MMSE [30]. In a study of 352 subjects with 111 cognitively impaired by MMSE, the SIS is 63% sensitive and 81% specific in detecting cognitive impairment. The sensitivity in this study is lower than reported in prior studies [31].

The O3DY consists of asking the patient to spell "world" backward (Dlrow), the day, the date, and the year. This tests for orientation and verbal fluency. The O3DY was derived from the Canadian Study of Health and Aging (CSHA-1). The test was meant to be extremely brief, yet sensitive at the expense of specificity. It is 95% sensitive and 51% specific for cognitive impairment [32].

Differentiating dementia from delirium is a challenge for the emergency physician. Many patients who present with delirium also have an underlying dementia. The Confusion Assessment Method may be used quickly and easily and has a high specificity (100%) and sensitivity (86%) for the diagnosis of delirium [33]. This tool features four items and requires the presence of an acute change from baseline and either inattention or fluctuation of behavior,

along with either disorganized thinking or altered level of consciousness.

In assessing level of consciousness, the modified RASS score can be used quickly and has the benefit of reproducibility. A modified RASS of 0 means the patient is awake and interactive. A negative score means the patient is more lethargic and a positive score means the patient is more agitated. A positive score may lead the emergency physician down the path to the diagnosis of acute delirium, recognizing that one of the first signs of delirium is inattention. A prospective cohort study was performed in a tertiary VA hospital in New England. As a single screen, the modified RASS has a sensitivity of 64% and specificity of 93% for delirium. When serial scores were used the sensitivity increased to 85%. The modified RASS score should therefore be considered for daily screening for delirium [34].

After assessing both cognition and level of consciousness, if both are found to be normal, the physician can then document "normal mental status." If the patient has impairment of either cognition or level of consciousness, further evaluation should follow. Determining onset of symptoms should be attempted with all sources available, including family, friends, caretakers, and primary providers [35].

Functional assessment

The functional assessment of the elderly patient includes things such as ADLs, mobility, continence, and hearing and vision impairment. A complex geriatric assessment may be necessary but is not practical in the ED. Simplified tools have been developed to aid the emergency physician in quickly identifying functional impairments.

The ability to perform ADLs is pertinent to the overall assessment of the elderly patient and determining goals of care. Examples of basic self-care ADLs include dressing, using the toilet, and walking. Instrumental ADLs evaluate executive function, the higher level ADLs necessary for function within the community. Examples include driving, shopping, and paying bills [36]. Some ADLs from both basic and instrumental scales can contribute to ED visits. Declines in mobility-related ADLs such as ability to dress, transfer, walk (basic ADLs) and transportation, shopping, meal preparation, and housework (instrumental ADLs) have been shown to contribute to ED

visits in older patients [37]. When impairments in ability to perform ADLs are identified, these patients are at higher risk for falls and are more likely to require skilled nursing facility placement [38].

Mobility is determined by gait, balance, ability to transfer, and joint function [39]. The “Get Up and Go” Test is a practical approach to gait assessment in the elderly. This involves instructing the patient to get up, stand still, walk forward, turn around, walk back to chair, and sit down. There is no score associated with this test; the test is considered abnormal if the patient appears at risk of falling at any time during the test [40].

Vision and hearing impairment are associated with a substantial increased risk of falls [41]. Progressive loss of vision and hearing can lead to impairment of the ability to perform basic and advanced ADLs. Although generally beyond the scope of ED practice, in select circumstances patients should be screened for difficulty with vision and hearing in the ED and referred for specialty testing when indicated.

The geriatric syndrome of frailty is related to functional decline and is characterized by weight loss, fatigue, reduced muscle strength, reduced physical activity, and reduced walking speed [42]. Frailty is associated with increased risk of ED visits, hospitalization, disability, and death [43].

Social assessment

The social assessment of a patient is important for making disposition decisions. Obtaining important information early can make the emergency physician more efficient by avoiding inappropriate discharges and addressing concerns proactively. Important questions include the following: Does the patient have friends or family nearby who could provide support with ADLs? Would these people be available occasionally, daily, or 24/7? Does the patient use any assistive devices, such as a walker or a cane? Is it mandatory to use steps in the home, or are the bedroom, bathroom, and kitchen all on one floor? If the patient is sent home with a walker, are the hallways wide enough for the walker?

Posing these types of questions to the patient and family will help determine if the home environment is appropriate and may uncover potential difficulties that the patient or family had not previously considered. In a trial conducted to study the effectiveness of distributing fall prevention information to patients

65 years or older, it is suggested that even minimum discussion of fall prevention may lead to home modification [44].

A large part of the case discussion for this chapter involved establishing goals of care and managing expectations. This can be a time-consuming and challenging aspect of the management of elderly patients, but this can also be a beneficial and rewarding aspect as well. If these difficult discussions are possible early on in the patient’s visit, goals of care for the patient can be established, and in many cases, the patient may avoid unnecessary testing, financial burden, and inappropriate admissions.

It is necessary to determine whether the patient has decision-making capacity, and if not, identify a surrogate decision-maker. State laws vary in this regard. When using a surrogate decision-maker, the emergency physician and the surrogate decision-maker act using substituted judgment. In other words, the surrogate decision-maker should make decisions based on what the patient would have wanted, not what they themselves would want. Only when the patient’s wishes are unknown, should the decision-maker decide what would be in the patient’s best interest [45]. The emergency physician can assist the surrogate decision-maker in using substituted judgment rather than best interest by phrasing questions as “What would the patient want us to do in this situation” rather than “What would you like us to do.”

Section IV: Decision-making

- The general assessment of the elderly patient in the ED is unique and requires special attention.
- Each older patient should have an assessment of the medical condition, cognition, function, and social situation.
- A thorough review of a complete set of vital signs is crucial.
- Pay close attention to the patient’s medication list, and recognize any new or recently removed medications.
- The Geriatric Emergency Medicine Task Force recommends a mental status evaluation of all elderly patients presenting to the ED.
- The SIS and O3DY are screening tests that are sensitive, quick, and easy for the physician to remember and score.

- The functional assessment of the elderly patient should include things such as ADLs, mobility, continence, and hearing and vision impairment.
- The ultimate goal of care is to manage the elderly patient, using substituted judgement, or as the patient would wish.

References

- 1 Siebens, H. (2005) The domain management model – a tool for teaching and management of older adults in emergency departments. *Acad. Emerg. Med.*, **12** (2), 162–168.
- 2 Sanders, A.B. and Force S for AEM (U S) GEMT (1996) *Emergency Care of the Elder Person*, Beverly Cram Publications, 328 p.
- 3 Kaufman, D.W., Kelly, J.P., Rosenberg, L. *et al.* (2002) Recent patterns of medication use in the ambulatory adult population of the United States: the Slone survey. *J. Am. Med. Assoc.*, **287** (3), 337–344.
- 4 Halter, J., Ouslander, J., Tinetti, M. *et al.* (2009) *Hazzard's Geriatric Medicine and Gerontology*, 6th edn, McGraw-Hill Professional, New York, 1760 p.
- 5 Budnitz, D.S., Lovegrove, M.C., Shehab, N., and Richards, C.L. (2011) Emergency hospitalizations for adverse drug events in older Americans. *N. Engl. J. Med.*, **365** (21), 2002–2012.
- 6 American Geriatrics Society 2012 Beers Criteria Update Expert Panel (2012) American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. *J. Am. Geriatr. Soc.*, **60** (4), 616–631.
- 7 Narang, A.T. and Sikka, R. (2006) Resuscitation of the elderly. *Emerg. Med. Clin. North Am.*, **24** (2), 261–272, v.
- 8 Chester, J.G. and Rudolph, J.L. (2011) Vital signs in older patients: age-related changes. *J. Am. Med. Dir. Assoc.*, **12** (5), 337–343.
- 9 Gupta, V. and Lipsitz, L.A. (2007) Orthostatic hypotension in the elderly: diagnosis and treatment. *Am. J. Med.*, **120** (10), 841–847.
- 10 Cheitlin, M.D. (2003) Cardiovascular physiologic changes with aging. *Am. J. Geriatr. Cardiol.*, **12** (1), 9–13.
- 11 Pavri, B.B. and Ho, R.T. (2003) Syncope. Identifying cardiac causes in older patients. *Geriatrics*, **58** (5), 26–31; quiz 32.
- 12 Douglas, G., Nicol, E.F., and Robertson, C. (2013) *Macleod's Clinical Examination*, Churchill Livingstone Elsevier, Edinburgh.
- 13 American College of Emergency Medicine (2004) *Geriatric Emergency Medicine*, 1st edn (eds S. Meldon, O.J. Ma, and R. Woolard), McGraw-Hill, Health Professions Division, New York, 585 p.
- 14 Pedone, C., Bellia, V., Sorino, C. *et al.* (2010) Prognostic significance of surrogate measures for forced vital capacity in an elderly population. *J. Am. Med. Dir. Assoc.*, **11** (8), 598–604.
- 15 Farley, H., Zubrow, M.T., Gies, J. *et al.* (2010) Emergency department tachypnea predicts transfer to a higher level of care in the first 24 hours after ED admission. *Acad. Emerg. Med.*, **17** (7), 718–722.
- 16 Fiesemann, J.F., Hendryx, M.S., Helms, C.M., and Wakefield, D.S. (1993) Respiratory rate predicts cardiopulmonary arrest for internal medicine inpatients. *J. Gen. Intern. Med.*, **8** (7), 354–360.
- 17 Shapiro, N.I., Wolfe, R.E., Moore, R.B. *et al.* (2003) Mortality in Emergency Department Sepsis (MEDS) score: a prospectively derived and validated clinical prediction rule. *Crit. Care Med.*, **31** (3), 670–675.
- 18 Caterino, J.M., Kulchyski, L.K., Fischer, C.M. *et al.* (2009) Risk factors for death in elderly emergency department patients with suspected infection. *J. Am. Geriatr. Soc.*, **57** (7), 1184–1190.
- 19 Valdez-Lowe, C., Ghareeb, S.A., and Artinian, N.T. (2009) Pulse oximetry in adults. *Am. J. Nurs.*, **109** (6), 52–59; quiz 60.
- 20 Gomolin, I.H., Lester, P., and Pollack, S. (2007) Older is colder: observations on body temperature among nursing home subjects. *J. Am. Med. Dir. Assoc.*, **8** (5), 335–337.
- 21 Ball, J. (2015) *Seidel's Guide to Physical Examination*, 8th edn, Elsevier/Mosby, St. Louis, MO.
- 22 Castle, S.C., Norman, D.C., Yeh, M. *et al.* (1991) Fever response in elderly nursing home residents: are the older truly colder? *J. Am. Geriatr. Soc.*, **39** (9), 853–857.
- 23 Castle, S.C. (2000) Clinical relevance of age-related immune dysfunction. *Clin. Infect. Dis.*, **31** (2), 578–585.
- 24 Kane, R.L., Ouslander, J.G., and Abrass, I.B. (1999) *Essentials of Clinical Geriatrics*, McGraw-Hill, Health Professions Division, New York.
- 25 Miller, A., Green, M., and Robinson, D. (1983) Simple rule for calculating normal erythrocyte sedimentation rate. *Br. Med. J. (Clin. Res. Ed)*, **286** (6361), 266.
- 26 Levey, A.S., Stevens, L.A., Schmid, C.H. *et al.* (2009) A new equation to estimate glomerular filtration rate. *Ann. Intern. Med.*, **150** (9), 604–612.
- 27 Righini, M., Van Es, J., Den Exter, P.L. *et al.* (2014) Age-adjusted D-dimer cutoff levels to rule out pulmonary embolism: the ADJUST-PE study. *J. Am. Med. Assoc.*, **311** (11), 1117–1124.
- 28 Samaras, N., Chevalley, T., Samaras, D., and Gold, G. (2010) Older patients in the emergency department: a review. *Ann. Emerg. Med.*, **56** (3), 261–269.

- 29 Wilber, S.T., Lofgren, S.D., Mager, T.G. *et al.* (2005) An evaluation of two screening tools for cognitive impairment in older emergency department patients. *Acad. Emerg. Med.*, **12** (7), 612–616.
- 30 Callahan, C.M., Unverzagt, F.W., Hui, S.L. *et al.* (2002) Six-item screener to identify cognitive impairment among potential subjects for clinical research. *Med. Care*, **40** (9), 771–781.
- 31 Wilber, S.T., Carpenter, C.R., and Hustey, F.M. (2008) The Six-Item Screener to detect cognitive impairment in older emergency department patients. *Acad. Emerg. Med.*, **15** (7), 613–616.
- 32 Carpenter, C.R., Bassett, E.R., Fischer, G.M. *et al.* (2011) Four sensitive screening tools to detect cognitive dysfunction in geriatric emergency department patients: brief Alzheimer’s Screen, Short Blessed Test, Ottawa 3DY, and the caregiver-completed AD8. *Acad. Emerg. Med.*, **18** (4), 374–384.
- 33 Monette, J., Galbaud du Fort, G., Fung, S.H. *et al.* (2001) Evaluation of the Confusion Assessment Method (CAM) as a screening tool for delirium in the emergency room. *Gen. Hosp. Psychiatry*, **23** (1), 20–25.
- 34 Chester, J.G., Beth Harrington, M., Rudolph, J.L., and VA Delirium Working Group (2012) Serial administration of a modified Richmond Agitation and Sedation Scale for delirium screening. *J. Hosp. Med.*, **7** (5), 450–453.
- 35 Wilber, S.T. (2006) Altered mental status in older emergency department patients. *Emerg. Med. Clin. North Am.*, **24** (2), 299–316, vi.
- 36 Lawton, M.P. and Brody, E.M. (1969) Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist*, **9** (3), 179–186.
- 37 Wilber, S.T., Frey, J.A., Poland, S.A. *et al.* (2012) Muscle strength, muscle mass, and muscle fatigue and their relationship with mobility-related activities of daily living in older emergency department patients. *Ann. Emerg. Med.*, **60** (4), S29–S30.
- 38 Robbins, A.S., Rubenstein, L.Z., Josephson, K.R. *et al.* (1989) Predictors of falls among elderly people. Results of two population-based studies. *Arch. Intern. Med.*, **149** (7), 1628–1633.
- 39 Tinetti, M.E. and Ginter, S.F. (1988) Identifying mobility dysfunctions in elderly patients. Standard neuromuscular examination or direct assessment? *J. Am. Med. Assoc.*, **259** (8), 1190–1193.
- 40 Mathias, S., Nayak, U.S., and Isaacs, B. (1986) Balance in elderly patients: the “get-up and go” test. *Arch. Phys. Med. Rehabil.*, **67** (6), 387–389.
- 41 Tinetti, M.E., Inouye, S.K., Gill, T.M., and Doucette, J.T. (1995) Shared risk factors for falls, incontinence, and functional dependence. Unifying the approach to geriatric syndromes. *J. Am. Med. Assoc.*, **273** (17), 1348–1353.
- 42 Robertson, D.A., Savva, G.M., and Kenny, R.A. (2013) Frailty and cognitive impairment – a review of the evidence and causal mechanisms. *Ageing Res. Rev.*, **12** (4), 840–851.
- 43 Stiffler, K.A., Finley, A., Midha, S., and Wilber, S.T. (2013) Frailty assessment in the emergency department. *J. Emerg. Med.*, **45** (2), 291–298.
- 44 Gerson, L.W., Camargo, C.A., and Wilber, S.T. (2005) Home modification to prevent falls by older ED patients. *Am. J. Emerg. Med.*, **23** (3), 295–298.
- 45 Combs, M.P., Rasinski, K.A., Yoon, J.D., and Curlin, F.A. (2013) Substituted judgment in principle and practice: a national physician survey. *Mayo Clin. Proc.*, **88** (7), 666–673.

2

Physiologic changes with aging

Kate D. Zimmerman¹ & Robert S. Anderson, Jr.²

¹Department of Emergency Medicine, Maine Medical Center, Portland, ME, USA

²Departments of Emergency Medicine and Internal Medicine and Division of Geriatric Medicine, Tufts University School of Medicine, Maine Medical Center, Portland, ME, USA

Section I: Case presentation

This was an 85 year old woman with progressive dementia who presented from home with family with non-specific complaints of functional decline over the prior week. She was normally ambulatory with minor assistance. She was usually attentive and conversant. Family noted that over the prior week, she had required an increasing level of ambulatory support, was sleeping more, was not as conversant, and had been eating less. The family denied cough, abdominal pain, chest pain, diarrhea, falls, or rash. They reported an oral temperature of 37.2 degrees Centigrade (99.0 degrees Fahrenheit) on the day prior to presentation.

The past medical history was notable for hypertension and hyperlipidemia. Given her age and dementia, a decision was made to scale back on medications 6 months prior. Her current medications were aspirin and as needed colace.

On examination, her oral temperature was 37.3 C (99.1 degrees Fahrenheit), supine blood pressure was 105/60 mm/hg and pulse of 80 beats/min. With standing her blood pressure was 95/50 mm/hg and pulse 110 beats/min. Her respiratory rate was 22 breaths/min. with a pulse oximetry of 93% on ambient air. She was able to follow commands and was attentive. She was unable to stand without assistance. Pulmonary, cardiac, and abdominal examinations were unremarkable. She had dry axillae, poor skin turgor, and dry mucous membranes.

Laboratory studies included CBC, CMP, and UA. They were notable for lack of leukocytosis, an elevated

BUN and creatinine, urine specific gravity of 1.030, positive leukocyte esterase and nitrite, and occasional bacteria in the urine. Given the pulse oximetry reading, low grade fever, and elevated respiratory rate a chest radiograph was ordered that showed a right middle lobe infiltrate.

Section II: Case discussion

Peter Rosen: Rob, this is a fascinating case in regards to the diligence of the family that has managed this elderly patient at home a lot longer than most families seem to be able to do. Rather than a physiology of aging issue, I'm wondering if this isn't more of an ethical case because the reality is we have a demented patient who has not been stable in her dementia who is beginning to fail. I think the family has already addressed some of the issues of how much medical support to give her. But clearly they haven't come to terms with her getting worse. I find it yet, once again, interesting that the presentation of the patient is to the emergency department (ED) as opposed to a family primary care physician. Perhaps you could comment on the why they came to the ED, and also some of the ethical issues of how do you define futility in a demented patient.

Rob Anderson: Peter, your perspective is interesting because the case was intended to paint a picture of a woman with dementia who was usually attentive and interactive with her family. She was a woman whose life has a value to her and her family, and for whom treating an acute infectious process makes

a lot of sense. This is in contrast to people who have very endstage dementia, who are no longer communicative, who are no longer mobile, and for whom the treatment of an infectious process might be debated.

PR: You have to gauge your decisions about futility to some degree on what you're starting from, and that unfortunately leads to subjective errors. Qualities of life that we don't particularly want for ourselves we presume someone else doesn't want, and yet, as you've pointed out, here is a family who gets some sort of positive interaction with this patient, and wants to preserve it. Therefore, the decisions for futility are going to be made on an individual family construct as opposed to necessarily the patient alone.

Also, would you comment on, do you think it provides some degree of comfort care to always treat infections?

RA: That's a very complicated question as well, I'm not sure I have the answer. Some folks feel antibiotics are can be palliative for treatment of urinary tract infections. The decision to use or not use antibiotics is addressed on the Physician Orders for Life Sustaining Treatment order form, or the POLST form. In the correct setting, it would be ideal to have started the discussion with family prior to the acute issue. I think the decision should be made on a case-by-case basis.

Amal Mattu: I would just add on to that, first of all, I agree with what you said that it is a case-by-case decision. What is the patient's baseline in terms of where you hope to get them back to, and it also makes a difference what type of infection you're treating. If the patient had a reasonable quality of life, which of course if very subjective, but the family was content with that, and you think this is an infection that is going to be reasonable to treat, then I would think that you're going to go full force. On the other hand, if the patient has an overwhelming infection, and you think that the chances of getting the patient back to baseline are very low, then you probably want to treat anyway, but I think you're going to focus more on keeping the patient as comfortable as possible. In this particular case, it looks like the patient has what appears to be a unilobar pneumonia and the patient doesn't appear to be toxic in appearance. We can talk about some of the pitfalls associated with these relatively normal-looking vital signs, nevertheless, the patient doesn't appear to be toxic.

PR: Maura, pneumonia has been called the old person's friend. I think that even in severe cases of dementia, urinary tract infection and pneumonia are worth treating because they clearly worsen the mental status. How do you feel about those issues?

Maura Kennedy: I absolutely agree. I would concur with both Amal and Rob about the spectrum of dementia. This patient at baseline is ambulatory with minor assistance, so it sounds like she has a higher degree of function than many patients at the farther end of the spectrum. Her vital signs indicate that she's tachypneic and hypoxic. I would presume that she's uncomfortable in the setting of this infection, and I think it would be entirely appropriate to treat this patient with antibiotics to try to improve her symptomatically and hopefully return her back to her level of functioning. Though currently she is attentive, so possibly not yet delirious, delaying treatment could result in her becoming delirious, and certainly that can further impair her quality of life.

PR: Rob, this is a patient who I initially would not be inclined to admit to an ICU, and I guess most ICUs would not take her even though she's probably the patient who would most benefit from aggressive care of this infection before she deteriorates. Would you consider treating a patient like this at home to try to avoid some of the negative effects of hospitalization such as delirium?

RA: I think that's an excellent question and discussion point because and we should always be asking ourselves "what is the best thing for this person?" She might come into the hospital and get delirious to go home and then potentially decompensate. I think that it also based on the resources that you have at hand, family preference, and the ability to follow up with the PCP. We have a very robust home health visiting nurses program in Maine, so this kind of person could have a visiting nurse be at the house the very next day to check her pulse oximetry and see how she's doing. Discussion with family is paramount and should guide final decision.

PR: Maura, you've made very useful points in past case discussions about the sociology of the old patient at home. Would you comment a little bit on at what point you think someone like this would perhaps do better not to be with the family, but needs to be placed in assisted living? The family has done a terrific job

with her, and I don't know the construct here whether there's somebody who's capable of being at home with her, but at what point to do you think both the patient and the family would benefit from an assisted living program assuming its available and finances permit?

MK: Outside of the acute illness or with respect to the acute illness we're dealing with?

PR: Well maybe triggered by the acute illness, but I was thinking more in spite of or after the acute illness has been taken care of.

MK: I think some of the things that need to go into that consideration is "what function do the patients have at home?" Are they able to do things such as make meals and eat unassisted? Are they able to go out and do food shopping? Do they need assistance with bathing? Also, what sort of social interactions they're getting, and is that adequate for this individual? While many of these things can be done in a private home with aids and visiting nursing, if there needs to be assistance with delivery of medication, sometimes it's easier to coordinate that in an assisted living facility where there are the opportunities to attend meals and set social events that enable the person to participate with others. One must also think about, this particular person walks with minor assistance, but if someone is in a wheelchair or requires a walker, being in a living situation that doesn't require lots of stairs would be another consideration. I would probably look both at their ambulatory status and their ability to do their activities of daily living.

PR: I think those are really excruciatingly difficult points to meet in many cases, and, as we've mentioned before, the financial resources for the elderly become more diminished all the time. One of the things I've been struck by is the older patient who lives alone, perhaps because of divorce, perhaps because of the demise of the spouse, but there seems to be a rapid decline in function for people who live alone. Rob, do you think that that almost by itself is an indication for assisted living?

RA: No, I think again it's a case-by-case situation. In fact I just came from a house call where I visited a man who really should not be alone anymore. He is really not doing well and his family is quite worried about him. He did very poorly on my cognitive testing. He doesn't understand his medications. He's taking high

risk medications such as warfarin and oxycodone and a fentanyl patch. But he is adamant that he will stay home, and he does not want to leave. And he's still driving. So there's a whole host of issues that come up that we have to face and help families face. How we respect a person's autonomy and also do the safe thing for them is a very complicated issue.

AM: The interesting thing in the United States is that personal liberties are such a tremendous emphasis and focus in our laws, and just in terms of our culture that it's very, very difficult to make decisions like that. I would imagine that even the court systems would have a tough time taking the keys away from someone, and taking away their personal liberties. Moreover, driving is considered a tremendous personal liberty in the United States. I would guess that in other countries they don't worry as much about taking away personal liberties and taking away somebody's car keys, and saying that that person is not a safe driver. But I do think it's so much harder to do that in our society.

MK: I would also add to that that it's also dependent on your geographic situation. In a country like this where there are parts of the country where there's really no public transportation and no alternative way to get around, it becomes much more significant when someone is no longer able to drive. In smaller countries with a societal structure where a lot of people live together in the center of the town or where there is better transportation available then it can be less of an issue with respect to autonomy.

PR: Well I was struck when I was in Italy by how much more walking older people do there, and probably because they do it, it keeps them functional a lot longer. Certainly the statistics on auto crashes in the elderly are frighteningly high. We don't have any state that I'm aware of that has solved the problem of how you figure out whether someone is still competent to drive. I remember an elderly couple that I knew in Chicago; the man had been declared legally blind but was able to renew his driver's license every year. That made about as much sense as having the ATM in braille on the drive through at the bank. Amal, maybe you could comment on what you think are some reliable indications for admission in patients like this. Or has it still got to be individualized to the point where so much depends on family structure and primary care availability, etc.?

AM: I really think it does have to be individualized. Let's take this patient with a unilobar pneumonia. If this patient looks pretty well, and the patient already has some degree of dementia, Rob brought up the concern about perhaps increasing the level of delirium related to admission. It might be very appropriate to put this patient on some good antibiotics, and send them home with a reliable family and with a nursing visit the next day. If you work in an area where you can set that up and the patient has the appropriate insurance or resources, whatever that may be, and you can set that up I think that's perfect. In my setting, I can't often arrange something like that. Therefore, this is somebody who would, in all likelihood, be either admitted to observation or just a flat out admission to the hospital. The concerns here are that, with regards to the physiologic changes, even though this person doesn't appear to be running a high fever or isn't that tachypneic or hypotensive, because of the changes that do occur in the elderly, that temperature of 99.1 would be considered febrile. The blood pressure of 105/60 mm/hg could be relative hypotension for this patient. The heart rate of 80 could be very concerning if this patient's on a beta blocker. The lack of orthostatic changes in an elderly patient doesn't even matter. This person could be essentially equivalent to a person who is significantly hypovolemic. A pulse oximetry reading of 93% clearly is a bit on the low side. If these numbers were present in a younger person, they probably wouldn't be terribly concerning. I'd still worry a bit about that 93% pulse oximetry, but everything else wouldn't be terribly concerning. Nevertheless, I would say that those are pretty remarkable numbers in an 85-year-old, and in most settings I think this justifies admitting the person unless you have the type of resources that Rob alluded to.

PR: This patient really is on the verge of decompensating, and I think she could go very rapidly downhill whether or not she's admitted.

Maura, there's been a lot of debate about whether antibiotics actually help patients once they're bacteremic. From the statistics on pneumococcal disease it would appear that antibiotics haven't changed the destiny of patients once they are bacteremic. While I think that may be true, nevertheless, I do believe that early and aggressive use of antibiotics has made an enormous difference for patients with pneumonia, and maybe our conclusions are that we've looking at

the wrong end of the disease. Once they have become septic then antibiotics are not going to help much, but a patient like this who is still compensated but on the verge of being decompensated is the one who would most benefit from aggressive management. Would you comment on that please?

MK: I would agree with that. I think that, particularly in a patient who also is at risk for having more of a compromised immune system simply with respect to aging, I think that antibiotics would be a critical element in treating this infection. I also think she's at the precipice of really declining. I think it needs to be part of her care along with close evaluation of fluid management in her. I'd be very concerned about sending her home unless it was consistent with her goals of care because she already has demonstrated that she's dehydrated based on the physical examination and elevated creatinine. She has had decreased oral intake over the past week; presumably her thirst response isn't as robust as a younger person's would be. I think if she were to go home, she would be at high risk of further deterioration with or without antibiotics due to dehydration; she would probably become more hypotensive. I agree that once they're in florid septic shock, antibiotics alone are certainly not the answer. I think antibiotics early are critical in combination with other elements of treatment in this patient including close monitoring of her respiratory status. Additionally, I think her work of breathing could increase as she doesn't have as much compensatory abilities.

PR: I think that, Rob, a really important part of the management of this patient is going to be family expectations. They behave as if they expect her to live forever, and I think that their primary care hasn't done very much useful counseling in terms of her declining status. At some point they have to make a decision about how much aggressive care they want for this patient. That's something we're faced with all the time in the ED, and I don't see any particular cure for it, but certainly this is not too early to start such a discussion with this patient if you don't have the right circumstances at home. Maybe you could tell us what the final outcome of this case was since I think it's been a very interesting discussion in terms of how to manage someone like this as an outpatient.

RA: She was admitted to the hospital, and had a short stay, and was discharged home with visiting nurses