Aurelio Rodriguez
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Geriatric Trauma and Acute Care Surgery

Springer

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ISBN 978-3-319-57402-8 ISBN 978-3-319-57403-5 (eBook)
https://doi.org/10.1007/978-3-319-57403-5

Library of Congress Control Number: 2017962623

Printed on acid-free paper
This Springer imprint is published by the registered company Springer International Publishing AG part of Springer Nature
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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Part I

Introduction

Introduction

1

C.W. Schwab

Our ELDERS—special care for special people …

I became interested in the geriatric injury shortly after leaving the United States Navy. I was 34 years "young" and entered my first academic position in Tidewater, Virginia. Every year we would see a surge of older Americans seriously injured while vacationing or enjoying the milder climate of the eastern shores of Virginia and North Carolina. These elders were "different" and the information, especially in the standard surgical textbooks and the few trauma books of the day, did not mention any other special population except pediatrics. The first paper we published was on flail chest in the elderly, a small retrospective case study. It attempted to point out the dissimilarities of presentation, acute management, natural history, and poor outcomes of blunt high-energy chest trauma in the "old" vs. the young. Throughout my career, I have maintained an intellectual focus on this enlarging part of our practices.

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The words elderly, geriatric, and senior conjure a picture of slow, frail, and mental struggle. My own father, born in 1907, lived till age 91 and was independent, physically active, and as "sharp as a tack." Perhaps out of respect for him, I adopted the term "elder" and replaced, where I could, the more frequently used above terms. An "elder" is a person of influence within certain cultures or in a family and community. Many societies and governing bodies use the term "elder" to connote a person of great influence, experience, and wisdom. For the sake of simplicity, I will use the terms geriatric, elderly, and senior interchangeably, but as you read this new textbook keep the image of the "elder" in mind.

"Elderly" is not easy to define for medical purposes as chronologic age does not accurately define one's physiologic age. Nor does age alone give us an ability to predict recovery from injury or a critical medical emergency. An accepted definition for geriatrics is 65 years and older, but the foundations for this reside in government so as to administer such tasks as census tracking or qualifying citizens for social security. Age alone does not explain the health and medical characteristics of our patients. Each patient over 65 years is a blend of genetics, biologic and mechanical aging, medical conditions, and sequelae of any treatments. Each of us "ages" at a different rate as does each organ system.

A. Rodriguez et al. (eds.), *Geriatric Trauma and Acute Care Surgery*,
https://doi.org/10.1007/978-3-319-57403-5_1

Thus, the ability to predict outcomes is complex and requires assessment of the type and severity of injury or insult, physical and mental fitness, and especially the preinjury or illness functional state. In my own experience, the prediction equations for elderly outcomes are *only* guidelines and modestly sensitive. What I have found is that higher pre-event intact cognitive abilities and higher physical fitness reset the chronologically aged person to a younger cohort and predict better outcome.

It's important to grasp the statistics, epidemiology, and impact of the elder populations as it relates to medicine. As we speak, the face of the world's population is changing with the percentage of those living older than 65 years rapidly approaching 17%, while children 7 years and younger falling toward 7%. By 2030, if trends continue, one-fifth of the United States' population will be over the 65-year mark and those living into their 90s will be a large proportion of that 20%.

Globally, this elderly momentum is occurring in most well-developed countries. Thus in the few next decades, caring for our elders will become a *very* large part of all aspects of medical practice, especially emergency, trauma, and intensive care. Trauma centers are seeing an increasing number of older patients as people live longer, and are more active and exposed to increased risk for injury. Falls have become the most common mechanism of injury at most trauma centers and are equal in number to those combined by *all* motor vehicular mechanisms. Pennsylvania, the country's sixth largest state population, has one of the highest proportions of Americans over 65 years. Twelve million people live in the state, and two million in central rural PA, and are well served by a network of trauma centers. Trauma registry data from one busy rural center show the impact of the above on their emergency and trauma practices. From 2012 to 2015, the trauma center evaluated over 4000 trauma patients older than 65; 40% of all trauma patients and 15% of these elders were greater than 80 years of age. Falls were the dominant mechanism and fall from standing was the most common MOI within the "older old" subgroup of patients.

As physicians and nurses, we know that improving care to special populations requires advancing knowledge and standardizing approaches to these patients. Whether that special population is defined by an uncommon procedure (Whipple procedure, high-risk cardiac or CNS surgery, etc.), condition (spinal cord injury, immune suppressed, etc.), or age (pediatrics, geriatrics), outcomes will improve when these two facets inform our practices and therapies. The third impactful element is the team approach to complex medical situations. This team concept has shown its value by integrating disciplines and specialists and expanding the clinical focus across the spectrum of an illness. The care of the "elder" is no different and requires specialists at the medical management and rehabilitation of the emergencies of older patients. Though surgery is a critical factor, leading this team concept is a requirement to assure optimal care of the most vulnerable patients. At our own institution, we have been fortunate to have a vibrant gerontology department. The gerontology service with its team of experts in medicine, nursing, pharmacy, occupational and physical therapy, social service, and hospice is invaluable to help older patients and their families. They have adapted to the demands of the trauma center, become integrated on our teams, and advanced our understanding of older people at every phase. They display a passion for "caring" for seniors as "elders." They bring extraordinary judgment and humanism to the bedside and further help families navigate difficult and uncharted waters. This beneficial linkage to the trauma, emergency, surgical, and critical care services should be a part of a modern hospital and an essential requirement to any accredited trauma center.

It is not surprising that both Drs. Rodriguez and Barraco practice at two of Pennsylvania's busiest trauma centers. Perhaps more than others,

they feel the impact of the demographic momentum on a daily basis. Years ago, Dr. Rodriguez promoted the concept of "special care for special people" and organized his hospital's resources to support the elderly trauma patient. His passion and zeal have been contagious. This new textbook embraces the team approach. Drs. Rodriguez, Ivatury, and Barraco are to be complimented for combining medical and nursing experts as authors to advance the understanding of the "elder" with life-threatening emergencies. This unique approach will help to standardize our clinical approach and ultimately improve outcomes.

2 Why This Book and Why Now? A Rationale and Systems Impact for Geriatric Trauma and Acute Care Surgery

Robert D. Barraco, Aurelio Rodriguez, and Rao Ivatury

Present State

As the founding Chair of the Geriatric Trauma Committee of the American Association for the Surgery of Trauma, Dr. Steven Shackford stated that we are in the midst of a Silver Tsunami. The geriatric population in the USA is growing (Fig. 2.1). Census projections have those aged 85 and over exceeding 20 million in the year 2050. This is not only a US problem but also one that is global. According to the World Health Organization report on Global Health and Aging, the world population aged 65 and over will triple from 524 million in 2010 to 1.5 billion in 2050 [1]. Of course, much of this growth will be in developing countries. As experience in Pennsylvania has shown, geriatric trauma volumes continue to rise, yet most of the injured elderly are seen at nontrauma centers (Figs. 2.2 and 2.3). This, coupled with the fact that the geriatrician workforce is not keeping up, is creating a healthcare crisis. In 2007, there was one geriatrician for every 2546 elderly Americans. In 2030, there will be one for every 4254 elderly Americans [2]. Everyone associated with the care of the injured elderly need to become content experts in the area to optimize the team approach to the care of the geriatric trauma patient. Back in 2006, the American Geriatrics Society issued a position statement on interdisciplinary care, espousing its benefits for the patients, families, and caregivers [3]. The John A. Hartford Foundation also supported this concept through its Geriatric Interdisciplinary Team Training Program. That is why this book enters into the prehospital, physician, nursing, and disposition spaces.

The Impact

Many sources as well as several chapters in this book discuss various aspects of the impact on healthcare of this population shift. According to a 2002 article in the International Journal of Epidemiology, much of the impact of the aging population will not come from the growth of the elders but from the slowing of the growth of the working-age population. That will mean fewer people to pay taxes for public programs that support the elders. The ratio of people 16–64 compared to those adults aged 65 and over will decline by 43% [4].

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A. Rodriguez et al. (eds.), *Geriatric Trauma and Acute Care Surgery*,
https://doi.org/10.1007/978-3-319-57403-5_2

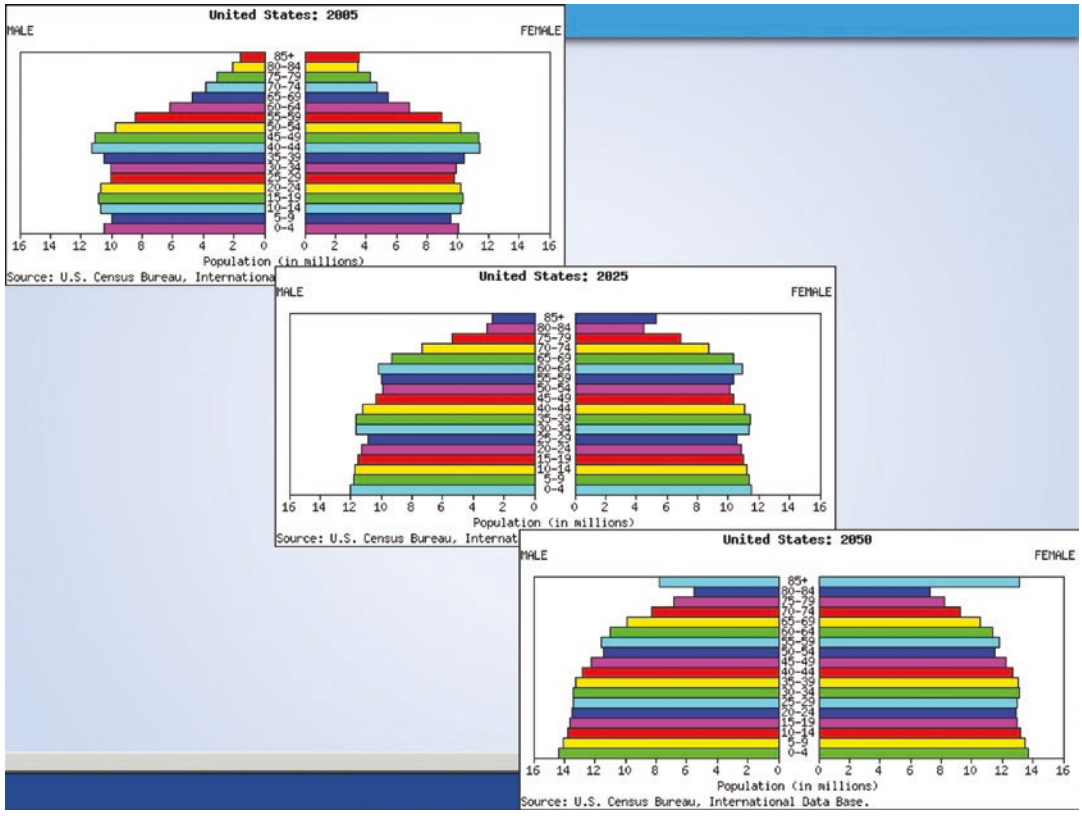

Fig. 2.1 Census projections 2005-2050

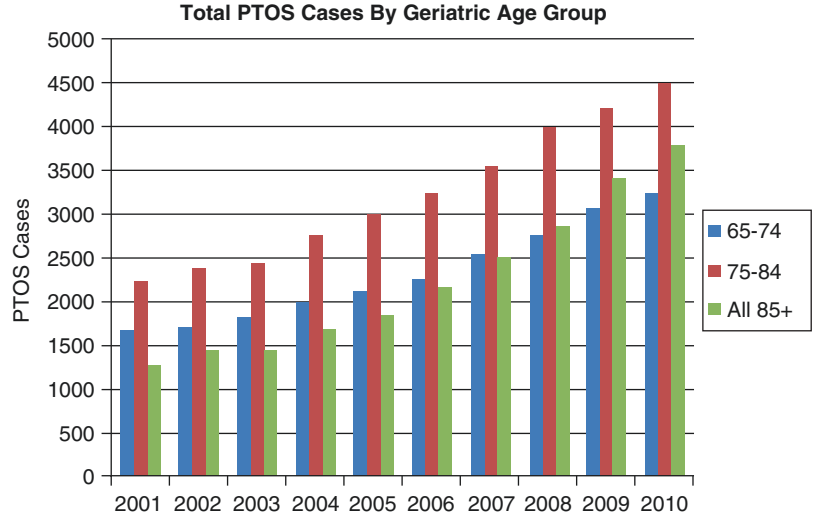

Fig. 2.2 Trauma registry cases age 65 and over in Pennsylvania from 2001–2010

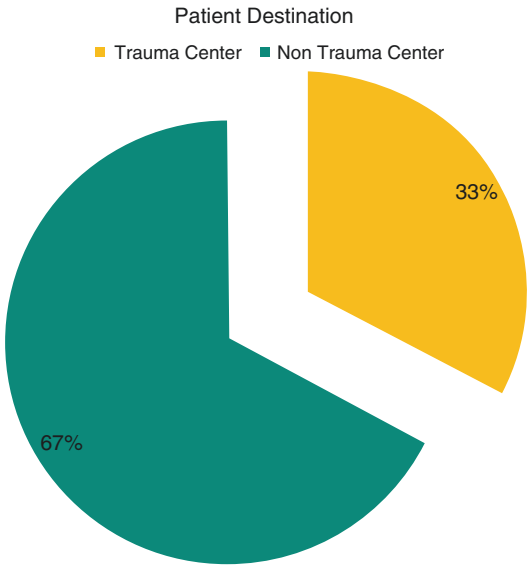

Fig. 2.3 Patient Destination from field age 65 and over in Pennsylvania

What does this mean for healthcare? Globally, leading causes of death will come from noncommunicable chronic diseases [1]. The focus also will shift in the USA from treatment of acute illness to chronic. There will also be a shift from acute to long-term care and a need for better integration in health systems [4]. According to a 2007 report from the American Hospital Association, those in the USA living with more than one chronic condition will increase sevenfold between 2000 and 2030, from over 5 million to over 37 million. This means the potential for much increased healthcare spending. Those with five or more chronic conditions spend almost six times more per person on healthcare than those with one chronic condition [5]. Table 2.1 summarizes the key findings of the AHA report.

Several chronic conditions will be particularly challenging. Cancer, dementia, obesity, diabetes, hypertension, and hypercholesterolemia as well as falls will top the list. The impact of these conditions will be felt in the care of the injured and acute care surgery patients and in all of healthcare. Cancer cases will increase to 27 million by 2030. 115 million people will have Alzheimer's by the year 2050

Table 2.1 Summary of 2007 AHA report on chronic conditions in those born between 1946 and 1964

More than 6 of every 10 will have more than one chronic condition
Over 21 million or 1 in 3 will be considered obese
Over 14 million or 1 in 4 will have diabetes
Almost 26 million or 1 in 2 will have arthritis
24 million or almost 1 in 2 will suffer a nonfatal fall
423,000 hip fractures per year in 2030

worldwide. Obesity will continue to increase, costing Medicare an average of 34% more than those not suffering from obesity. Diabetes among Americans will increase to 46 million in the year 2030. Increases in hypertension will cause increases in cardiovascular disease if prevention is not initiated [6].

Falls are already a major cause of morbidity and mortality in elders. Over one-third of elders fall, resulting in significant injuries in up to 30% [5]. As a result of an increasing number of falls, hip fractures will more than double in 2050. These patients with more chronic conditions will create more challenging and complex care problems for caregivers.

The impact will be felt among providers and hospitals with increases needed in resources. Hospital admissions will more than double and elders will make up over half of all hospital admissions [5]. As a result, this will exacerbate the projected nursing and physician shortages. By 2020, the nursing gap will approach one million nurses [7] and the physician gap will approach 200,000 [8]. In addition to shortages in these areas, there are also shortages in ancillary services such as lab and imaging technologists and pharmacists [5]. As a result of increased arthritis, hip fractures, and other orthopedic trauma, the demand for orthopedic surgeons will outstrip the supply [5].

Systems Response

As was mentioned earlier, interdisciplinary team care needs to be the focus of the future. Hospitals and healthcare systems have already begun such

a transition. Crew Resource Management techniques and teamwork tools such as TeamSTEPPS are being taught to healthcare workers. Training of nurses in NICHE (Nurses Improving Care for Healthsystem Elders) programs improves geriatric education of staff and models of care for the patients. Also, several programs have been created and shown early success in the interdisciplinary care of geriatric trauma patients. The G-60 program by Dr. Mangram, one of the authors of the book, will be covered in her chapter [9]. Additional programs by two of the editors of this book, Dr. Rodriguez and his Geriatric Trauma Institute and Dr. Barraco and the Geriatric Trauma Section at Lehigh Valley Health Network, have also shown great promise [10, 11]. The former showed a decreased length of stay and decreased hospital charges of patients admitted to the geriatric trauma service compared to patients admitted to a nontrauma service. The latter showed decreased hospital and ICU length of stay and mortality with implementation of a geriatric interdisciplinary trauma team compared to historical controls.

Combatting the shortages in personnel involves a two-pronged approach. The first is more efficient utilization of facilities and providers. This can involve workflow and patient flow improvements, new technology, and mobile-based access for patients. Lean methodology for process improvement and studying workflow has spread from the business world to healthcare and achieved some significant results. New electronic health records are revolutionizing healthcare. With mobile applications, patients can see results, schedule appointments, message their healthcare team, and even be seen in virtual visits by providers. The second is recruitment and retention of healthcare personnel as well as increasing the pool via increases in medical school and nursing school numbers. Concern for provider wellness, reducing burnout, and allowing frontline staff's increased participation in improving care have been pursued to increase employee satisfaction and thereby patient satisfaction.

The growing chronic and long-term care needs will need special attention in this era of population health and increased utilization data. Complex care teams are being created in some health systems to address the needs of the highest utilizers in order to prevent their admission. Use of wearable technology to monitor patients as outpatients has also begun to help spot potential problems before they require admission. These technologies can help patients stay at home and avoid hospitals or long-term care facilities by making care in the home easier.

Injury prevention needs to play a major role, especially in the area of falls. Examination of medications, including that of anticoagulants, needs to be a part of any initiatives in this area. Studying frailty and interventions to help mitigate its effects are critical. Physical and occupational therapy can play a role here. Exercise programs, vitamin D, and environmental modifications were recommended in the Evidence Based Review from the Eastern Association for the Surgery of Trauma in 2016 [12].

This book will examine many other changes in the systems as well as the care of the geriatric trauma and acute care surgery patient. It is interdisciplinary as geriatric care must be to achieve optimal outcomes. We hope that you will find the following pages useful and within it the impetus for future changes in your practice.

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Part II

General Evaluation, Risk Assessment and Goals of Care (Trauma and Acute Care Surgery)