

Preface

With the aging population increasing worldwide, there is a growing interest in age-related diseases and their functional and mental consequences. Osteoporosis is a common disease in older persons with significant impact on their functionality and quality of life. Additionally, osteoporotic fractures represent an important burden to health care budgets around the world.

Since the first description by Riggs and colleagues of a particular syndrome known as “senile osteoporosis,” there has been a common agreement that there is a type of osteoporosis closely associated with the aging process. There is considerable controversy regarding the concept of “senile osteoporosis.” Several experts in the field think that it is just “osteoporosis,” a condition and disease that mostly affects post-menopausal women but also affects men after the age of 60. Unfortunately, because most of the resources and interventions have focused on post-menopausal women, a significant number of old men and women are not receiving appropriate treatment.

Fortunately, the concept of senile osteoporosis has been reconsidered as a real syndrome that affects a significant percentage of the elderly population. In fact, new findings on the pathophysiology, epidemiology, and treatment of senile osteoporosis have demonstrated that this entity is independent of the estrogen-related osteoporosis known as post-menopausal. This book focuses on these new findings in a bench to population model.

From the bench side, the fact that with aging there is a shift in the differentiation of mesenchymal stem cells within the bone marrow, from predominant osteoblastogenesis in the young bone to increasing adipogenesis in the old bone, has improved the understanding of the pathophysiology of senile osteoporosis. This process is independent of estrogen levels, as demonstrated by lack of increasing bone marrow adipogenesis in estrogen receptor knock-out mice. In fact, the increasing levels of bone marrow adipogenesis starts in humans even when normal serum levels of estrogens are present in the third and fourth decade of life, suggesting that this is an age-related process independent of sex hormones.

One additional feature in the pathophysiology of senile osteoporosis is the fact that it affects men and women after the sixth decade of life in a similar manner. Although estrogens seem to play a role in the pathophysiology of osteoporosis in men, it is well known that the predominant changes in bone

cells in osteoporosis in men correspond mostly to those seen in age-related bone loss than in peri-menopausal women.

In this book, the chapters dedicated to bone biology illustrate the particular cellular and molecular features of senile osteoporosis from mice to human. Additionally, the authors look at the potential role that hormones, both calcitropic and sexual, may play in the pathophysiology of this syndrome.

Concerning the predominant fractures seen in older adults, the chapters on epidemiology make a complete appraisal of the particular incidence of osteoporotic fractures in the elderly. In fact, hip fractures are the predominant fracture after the seventh decade of life. This type of fracture correlates with the pathophysiology of osteoporosis, because the hip neck area is mostly dependant on osteoblast activity, which is severely affected by the aging process in bone. By contrast, the incidence of fractures owing to increasing osteoclastic activity, a typical feature of post-menopausal osteoporosis, decreases in the older population. These differences in the incidence and type of osteoporosis fractures in the elderly could correlate with genetic determinants of osteoporosis in older adults. The chapter on genetics of osteoporosis focuses on the identification of the genes that are directly associated with osteoporosis in older adults.

Concerning the treatment of osteoporosis, although there is increasing awareness about the importance of preventing fractures in older adults, the evidence shows that the number of patients at risk who are not receiving treatment is increasing. It is probably owing to a combination of factors that include ageism, lack of evidence of the effectiveness of the treatment in old patients, and treatments mostly directed to the regulation of osteoclastic activity that, although effective in geriatric populations, have not been shown to be effective in non-vertebral fractures, the most prevalent in the older population. One of the important messages throughout this book is that clinicians should be aware of the importance of treating of osteoporosis in older adults in order to prevent fractures, disability, and even death.

The chapter on pharmacological treatment of osteoporosis highlights very important points. First, osteoporosis, once diagnosed or suspected, should be treated independently of the patient's age. Second, there is poor evidence on most of the treatments available specifically in the older population, and furthermore in some cases treatment effectiveness in older persons is doubtful because most of the therapeutic agents regulate bone resorption without increasing bone formation. Third, the optimal therapeutic agent for osteoporosis in older individuals would be the one that decreases bone resorption while increasing bone formation. In their conclusion the authors state that the optimal therapeutic agent for senile osteoporosis does not exist yet, and that more research should be pursued in order to find the right approach to the particular features of senile osteoporosis.

A particularly unique aspect of this book is the inclusion of two chapters on falls. This important geriatric syndrome has been historically separated from the osteoporosis syndrome because of the fact that very few osteoporosis clinics considered the importance of fall prevention as a pivotal intervention to prevent fractures. As explained by the authors of the chapters, there could not be an effective preventive or therapeutic intervention for fractures in the elderly without an assessment of the risk of falls and the

initiation of preventive measures. There are important links between the risk of falls and that of fractures. Probably the most relevant at this time is vitamin D, which has been proven essential for the prevention of both falls and fractures. Indeed, vitamin D is mentioned extensively in some of the chapters of this book as an essential intervention in the elderly population at risk. The evidence supporting this notion is reviewed in the chapters on calciotropic hormones as well as the one on the treatment of falls. Furthermore, because falls result from the interaction between multiple factors, non-pharmacological interventions are also considered in this book, where one chapter is dedicated to a review of the evidence on the effectiveness of non-pharmacological interventions for fall prevention.

Finally, we wanted to include a chapter on the surgical interventions for osteoporotic fractures. We know that this is an important element when caring for patients with fractures. Its understanding would help the clinician to interact with their surgical colleagues when treating old patients with acute fractures. Using outstanding illustrations, the author explains in detail the characteristics of fracture stabilization in the hip and the particular challenges the surgeon faces when treating fractures in very old patients. Additionally, a review on the potential alternatives for surgical treatment of vertebral fractures was included.

In summary, this textbook has brought together experts in the field of osteoporosis in older persons from four continents. We feel that we have reviewed the evidence supporting the notion that senile osteoporosis exists as a real geriatric syndrome with a particular pathophysiology and treatment. We expect that the information included in this book will be useful to all health professionals involved in the care of our aging population in order to understand the particular features of this syndrome and the importance of its prevention. This was our intention and we hope that after reading its chapters the reader will join us in this purpose.

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