Gaps in Aging Research as it Applies to Rheumatologic Clinical Care

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KEYWORDS

• Older adults • Rheumatology • Barriers • Education • Research

KEY POINTS

- The incidence and prevalence of rheumatologic diseases (including osteoarthritis, rheumatoid arthritis, systemic lupus erythematosus, and polymyalgia rheumatica) are increasing and the rheumatology workforce must be aware of aging-specific issues.
- Understanding the biology of aging and aging-related mechanisms that underlie rheumatologic diseases may help identify treatment targets and improve outcomes for older adults.
- Older adults pose unique challenges to the assessment and management of rheumatologic disease because this population often has multimorbidity, polypharmacy, frailty, cognitive impairment, and fragmented social support systems.
- An effective approach to older adults with rheumatologic conditions requires a better understanding of the mechanisms underlying the disease, time horizons and expectations of the patient, and outcomes that are mutually relevant to patient and provider.
- Training rheumatologists in principles of geriatric medicine, and geriatricians in musculoskeletal health as it applies to an aging population, will be critical.

By 2030, the size of the 65 years and older age group is expected to reach 71.5 million, or 20% of the total US population. Most of the older population is projected to be between age 65 and 74 years until 2034, when all of the baby boomers will be more than 70 years old.[1] By extension, the number of older adults with degenerative and

Disclosure: The authors have nothing to disclose.
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Clin Geriatr Med 33 (2017) 119–133
http://dx.doi.org/10.1016/j.cger.2016.08.009
0749-0690/17/Published by Elsevier Inc.

inflammatory rheumatologic diseases will increase in the subsequent decades and both the rheumatology and geriatric medicine workforce must be prepared to manage these conditions.

Osteoarthritis (OA), a degenerative joint disease commonly affecting hands, knees, hip, and spine, is the most common source of chronic joint pain among older adults. Estimates from 2005 suggest that OA affects approximately 27 million people in the United States alone.[2] Because age is a major risk factor for OA, its incidence and prevalence is expected to increase with aging of the population.[3] Besides OA, advanced age is also associated with a higher incidence and prevalence of inflammatory rheumatologic diseases, such as rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), polymyalgia rheumatica (PMR), and giant cell arteritis (GCA). The incidence of RA continues to increase until age 75 to 80 years.[4] Although SLE is an autoimmune multisystem disease that most commonly affects women of child-bearing age, up to 18% of cases have an onset after age 50 years.[5] There are conflicting data regarding whether late-onset SLE has a more benign clinical course than SLE in younger populations.[6,7] Some reports suggest lower disease severity in late-onset SLE compared with younger patients with SLE.[6] Other research suggests greater disease activity and damage, and poorer survival; these findings are likely caused by greater frequency of comorbid conditions and greater organ damage at the time of diagnosis.[5] Rheumatologic diseases such as PMR and GCA exclusively affect older adults. Although the exact mechanisms leading to the development of PMR and GCA remain unclear, aging-related changes in the innate and adaptive immune systems are implicated.[8]

The reasons underlying the increasing incidence of these rheumatologic diseases in older age, especially for those conditions traditionally thought to affect mostly younger populations, are not fully understood. Rheumatologists' primary goals are to maintain function, reduce progression to chronic deformities, and minimize toxicity from therapy. Furthermore, these diseases may manifest very differently in older populations than in younger populations. In addition, clinicians still have much to learn about the process of aging and its impact on rheumatologic diseases. In 2014, a seminal publication by the Trans- National Institutes of Health (NIH) Geroscience Interest Group outlined what they called 7 pillars of aging discussed how these biological processes intersect and connect with chronic disease.[9] Although not specifically focused on rheumatologic disease, many of these pillars and the mechanistic relationships between aging and chronic diseases can be applied to clinical rheumatology. For example, the pillars of inflammation, epigenetics, adaptation to stress, and proteostasis are all known or suspected to play prominent roles, to different degrees, in rheumatologic conditions. These relationships, and especially the interphase with behavioral and social sciences, are slowly being uncovered. In addition, understanding of the processes that promote aging and how these influence rheumatologic diseases may help identify treatment targets, thus helping in clinical care and decision making unique to older adult populations.

Further, older adults pose unique challenges to the assessment and management of rheumatologic disease. This population often has multimorbidity (defined as $\geq$2 chronic conditions), polypharmacy, frailty, cognitive impairment, and fragmented social support systems.[10–12] Rheumatologic diseases and their clinical manifestations must be understood and managed in the context of these unique challenges and multifactorial pathways that often lead to disability in older adults.[13] This article discusses specific barriers to understanding the biology of aging in rheumatology, and gaps in the assessment, outcomes measurement, and treatment of this unique population. It highlights potential solutions to these barriers and how to bridge the gap