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Host Resistance and Immune Responses in Advanced Age 463
Steven C. Castle, Koichi Uyemura, Tamas Fulop,
and Takashi Makinodan

Immunosenescence results in populating immune tissues with less functional T cells, and perhaps B cells dendritic cells, that do not function well and produce more type 2 cytokines and fewer type 1 cytokines. Impaired immunity, distinct from immunosenescence, correlates more with disease burden than chronologic age. Older adults who have chronic diseases or chronic infections are more susceptible to common infections and have poor vaccine responses. Understanding specific mechanisms and targeting interventions are dependent on research to resolve the relationship between frailty-associated impaired immunity and the role of chronic infection versus immunosenescence in developing impaired immunity.

Principles of Antimicrobial Use in Older Adults 481
Ashley R. Herring and John C. Williamson

The fundamental principles of treating infectious diseases apply to elderly patients, but certain aspects of therapy such as the selection of empiric regimens and risk stratification for severe or atypical disease are influenced by comorbidities, lifestyle, and immunosenescence. Knowledge of age-related changes in pharmacokinetic parameters and potential drug-drug interactions assists the clinician in determining appropriate dosing and monitoring parameters. Based on current evidence, the recommended approach includes careful selection and aggressive dosing of initial broad-spectrum antimicrobials followed by de-escalation to appropriate agents to maximize clinical outcomes and minimize toxicity and adverse effects. Greater enrollment of the elderly in therapeutic studies is needed to detect differences in the efficacy and safety of antimicrobials

Infection Control Issues in Older Adults

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Lona Mody

Older adults receive care from various settings, including acute care hospitals, skilled nursing facilities, nursing homes, group homes, outpatient primary care, specialty clinics, and home. In these various settings, older adults are exposed to pathogens, which makes them “vectors” that transport pathogens from one setting to another and makes them vulnerable to care fragmentation. These health care settings face unique challenges that require individualized infection control programs. Infection control programs should address: surveillance for infections and antimicrobial resistance, outbreak investigation and a control plan for epidemics, isolation precautions, hand hygiene, staff education, and employee and resident health programs.

Bacterial Community-Acquired Pneumonia in Older Adults

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Gerald R. Donowitz and Heather L. Cox

Pneumonia in the elderly remains a major source of morbidity and mortality in an age group that is growing in numbers. It remains unclear whether the propensity of older adults to develop community-acquired pneumonia represents an aging of host defenses, secondary effects of comorbid disease, or both. The signs and symptoms of pneumonia in the elderly are more subtle than in younger populations, which may lead to a delay in diagnosis. Although therapy for community-acquired pneumonia in the elderly is the same as for younger populations, mortality is higher, leading to an important role for prevention.

Community-Acquired Viral Pneumonia

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Ann R. Falsey

Advanced age often is associated with functional and immunologic decline and chronic cardiopulmonary diseases that predispose to pneumonia when viral infection occurs. Influenza virus remains the primary viral pathogen in the elderly, although the impact of the other respiratory viruses remains to be defined. The clinical syndromes associated with respiratory viruses frequently are indistinguishable from one another or bacterial pathogens; often, viral illness in older adults exacerbates underlying conditions, complicating diagnosis. Antiviral therapy is available for influenza A and B; specific viral diagnosis, particularly with the use of rapid antigen detection, may be useful for clinical management. Treatment for other viruses primarily is supportive.

Nursing Home–Associated Pneumonia

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Joseph M. Mylotte

Nursing home–associated pneumonia (NHAP) is associated with considerable morbidity and mortality. The etiology of NHAP continues to be debated and has influenced treatment guideline recommendations. Diagnosis may not be straightforward but at least

one respiratory symptom usually is present and the presence of hypoxemia is a key finding. Treatment recommendations vary depending on the organisms believed the predominant cause of NHAP. Pneumococcal and influenza vaccination remain the most important methods for prevention of NHAP at present.

HIV Infection in Older Adults

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Vera P. Luther and Aimee M. Wilkin

The incidence and prevalence of HIV infection in older adults is rising, with disproportionate increases in women and minorities. Compared with younger adults, older patients who have HIV often are diagnosed later in the course of the disease and may have an accelerated decline in immune function. Although the prognosis for older adults has improved with the initiation of highly active antiretroviral therapy, there remains a higher risk for comorbid illness. Additional efforts to diagnose and prevent HIV infection in this older age group are necessary to decrease the transmission of HIV and to reduce the morbidity and mortality associated with this infection.

Asymptomatic Bacteriuria and Urinary Tract Infection in Older Adults

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Manisha Juthani-Mehta

Asymptomatic bacteriuria (ASB) and urinary tract infection (UTI) are common in older community dwellers (ages 65 and older) and nursing home residents. The challenge involved in distinguishing ASB from UTI in this population results from other comorbid illnesses that may present with symptoms similar to UTI and from elderly adults who have cognitive impairment not being able to report their symptoms. This article reviews the most updated information on diagnosis, microbiology, management, and prevention of ASB and UTI as they pertain to older community dwellers and nursing home residents.

Skin and Soft Tissue Infections in Older Adults

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Deverick J. Anderson and Keith S. Kaye

Skin and soft tissue infections (SSTIs) are a common cause of morbidity in older patients. Because of changes in skin consistency, immunosenescence, and the presence of underlying skin conditions and comorbid conditions, elderly persons are at high risk for SSTIs. Specific community- and hospital-associated SSTIs are reviewed in this article with particular emphasis on the epidemiology, prevention, risk factors, and treatment of SSTIs in older patients.

Herpes Zoster and Postherpetic Neuralgia in Older Adults

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Kenneth Schmader

Herpes zoster (HZ) afflicts millions of older adults annually and causes significant suffering from acute and chronic pain, or postherpetic neuralgia (PHN). HZ is caused by the reactivation of

varicella-zoster virus (VZV) in sensory ganglia in the setting of age, disease, and drug-related decline in cellular immunity. VZV-induced neuronal destruction and inflammation cause the pain, interference with activities of daily living, and reduced quality of life. The optimal treatment of HZ requires early antiviral therapy and pain management. For PHN, evidence-based pharmacotherapy can reduce pain burden. The zoster vaccine is effective in reducing pain burden and preventing HZ and PHN in older adults.

Bacteremia and Sepsis in Older Adults

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Timothy D. Girard and E. Wesley Ely

Bacteremia and sepsis are common complications of infection in older patients. Comorbidities, institutionalization, instrumentation, and immunosenescence place older persons at high risk for bacteremia and sepsis, and clinicians must have a heightened suspicion for these infectious disorders in older patients because nonspecific clinical manifestations of infection are common in this vulnerable population. Although increasing age is associated with a high risk of death due to bacteremia and sepsis, recent evidence suggests that many older patients respond well to treatments of proven efficacy. This article discusses the epidemiology, pathophysiology, diagnosis, and prognosis of bacteremia and sepsis in older patients and provides evidence-based recommendations regarding the treatment of these infectious disorders in older persons.

Fever of Unknown Origin in Older Adults

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S. Tal, V. Guller and A. Gurevich

Evaluation of elderly patients who have fever of unknown origin (FUO) requires a different perspective from that needed for young patients. Differential diagnosis often varies with age, and presentation of the disease frequently is nonspecific and symptoms difficult to interpret. Noninfectious diseases are the most frequent cause of FUO in the elderly and temporal arteritis the most frequent specific cause. Tuberculosis is the most common infectious disease associated with FUO in elderly patients. FUO often is associated with treatable conditions in the elderly. Therefore, intensive, accelerated evaluation is necessary, as the lack of physiologic reserve makes this population vulnerable to irreversible changes and functional deterioration.

Immunizations in Older Adults

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Kevin P. High

Older adults disproportionately sustain morbidity and mortality due to vaccine-preventable illnesses. Despite this observation, adult immunization rates continue to lag behind national goals. Reduced vaccine efficacy in older adults leading to apathy regarding the need for vaccine administration, unrealistic expectations for disease prevention rather than reduced illness severity, and system

issues that make vaccine administration and tracking difficult all contribute to this problem. In this review, the biologic and system-based causes for vaccine failure in aged adults are reviewed, issues of efficacy and cost-effectiveness in older adults are summarized for influenza and pneumococcal vaccine, and ways to improve vaccine effectiveness in older adults, now and in the future, are outlined.

Travel Recommendations for Older Adults

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Christie M. Reed

Older age is an important factor in preparing travelers owing not only to physiologic changes and the increased probability of underlying medical conditions and prescription medications but also to immune status with regard to naturally acquired immunity versus immunization for vaccine-preventable diseases. Cardiovascular events (including myocardial infarctions and cerebrovascular accidents) account for most deaths abroad, followed by injuries. To plan for healthy travel, international travelers should be advised to seek care at least 4 to 6 weeks before departure. Travel medicine is a dynamic field because conditions worldwide are subject to rapid change. Clinicians must maintain a current base of knowledge if they will be regularly advising travelers or must set a threshold for referral to a travel medicine specialist.

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