

DOWNLOAD PDF ANTIMICROBIAL THERAPY IN THE ELDERLY PATIENT (INFECTIOUS DISEASE AND THERAPY)

Chapter 1 : Infectious Disease

Presents the proper approaches to antimicrobial therapy for all older patients, including the critically ill, the ambulatory, nursing home residents, and those receiving therapy at home! Describing in detail antibacterial, antimycobacterial, antifungal, and antiviral drugs, Antimicrobial Therapy in the Elderly Patient.

Advanced Search Streptococcus pneumoniae is the leading cause of community-acquired pneumonia CAP and accounts for approximately two-thirds of cases of CAP associated with mortality [1]. Thus, bacteremic pneumococcal pneumonia has significant clinical importance, and any new information that may lead to better outcomes is welcomed. This observation has significant therapeutic implications and, therefore, requires close scrutiny and analysis. This recommendation is based, in part, on the results of several observational studies, which indicated that use of a macrolide with a cephalosporin as part of an initial empirical regimen for such patients was associated with a shorter length of hospital stay and lower mortality rate than was treatment with a cephalosporin alone [7-10]. The reason for such a recommendation was the paucity of data regarding use of a respiratory fluoroquinolone as monotherapy for severe CAP and concerns about possible infection due to a resistant bacterial pathogen or an atypical pathogen. This supports the findings of 2 prior studies, which found that dual-antimicrobial therapy including a macrolide reduced mortality associated with bacteremic pneumococcal pneumonia [11 , 12]. However, all of these investigations were retrospective, and, as such, a major concern in assessing their conclusions is the true similarity of the comparator patient groups. Patients were not randomly assigned to either treatment regimen i. In addition, the lack of stratification by severity may have had a confounding effect the McCabe-Jackson criteria used by the authors are based on prognosis and would be of questionable value here. The relatively small size of the groups vs. Indeed, the authors admit that the link between the 2 variables was not straightforward, because univariate analysis did not demonstrate this finding. Only after adjusting for shock in multivariate analysis was the benefit of a macrolide appreciated. Other factors that have been shown to have an effect on the outcome of pneumonia and that do not appear to have been adequately addressed by the authors include determination of death after the first 4 hospital days and the timing of the initial dose [13-15]. Was there more concern for gram-negative pneumonia, or were there risks for methicillin-resistant Staphylococcus aureus, drug-resistant S. As indicated by the authors, perhaps the only way to really answer the question is by a randomized, double-blind, controlled trial. However, the availability of the S. Of these possibilities, we believe that the possible coexistence of atypical pathogens and the immunomodulating effect of the macrolides are the most plausible [18]. It will be helpful for future researchers to explore more extensively the possibility of coinfection by performing comprehensive microbiological studies and by assessing the potential immunomodulating effect of the macrolides with measurements of various proinflammatory markers during the course of severe CAP. However, once a defined pathogen is identified by blood culture, the question then arises as to the proper course of action. If the combination was chosen, do we continue to administer both agents or can we narrow therapy? This will usually occur 48-72 h after the commencement of therapy. Because their finding of macrolide benefit applied only to empirical therapy, it cannot be interpreted to apply to pathogen-directed therapy as well.

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Chapter 2 : Patient's Black Hairy Tongue Linked to Antibiotic Therapy - MPR

There are significant risks and possible adverse consequences of inappropriate antibiotic therapy in the elderly, including risks of drug interactions, side effects related to age or disease-related changes in metabolisms, and risks associated with MDROs and Clostridium difficile.

Yoshikawa From the first three chapters of this book, it is quite apparent that with aging comes a substantial susceptibility to and incidence of serious infections, as well as an increased risk of complications from these infections, including death. Moreover, subsequent chapters of this book describe in detail the most important and serious infectious disease problems of elderly people, and how these infections should be diagnosed and treated. In this chapter, the discussion focuses on general principles and some unique aspects of antimicrobial therapy in older infected patients. Comments will also be made on some of the more useful classes of antimicrobial agents for treating infections in the elderly. For a more in-depth review of various classes of antibiotics and their usage in the elderly, several current references are recommended. Factors contributing to these greater complications include presence of chronic underlying diseases, diminished host defense responses, delays in diagnosis and treatment, complications from diagnostic and therapeutic interventions, and adverse reactions to antibiotics. 1. Early and rapid diagnosis of infection and prompt initiation of appropriate antimicrobial therapy are fundamental to reducing the mortality and morbidity from infections. However, the problem of atypical and nonspecific clinical manifestations of infections in the elderly poses a major challenge to clinicians. Chapter 3. Other sections of this book describe microbial causes of select infections that can vary from those usually anticipated in younger adults. Under these clinical circumstances, it becomes essential that the initial empiric therapy include coverage for such pathogens. For example, the most common pathogen isolated in bacterial meningitis in the general adult population is *Streptococcus pneumoniae* and *Neisseria meningitidis*; viral meningitis also occurs. In elderly patients with this infection, not only is *S. pneumoniae*. Consequently, in elderly meningitis patients, initial empiric treatment must include antibiotics active against these three types of bacteria. Infectious Disease in the Aging Edited by: Yoshikawa and Dean C. It is beyond the scope of this chapter to describe all of these changes, but reviews have been published elsewhere 4,5. The primary concern regarding prescribing of antibiotics in elderly patients is the decline in renal function associated with aging. The classical examples are the aminoglycoside antibiotics streptomycin, gentamicin, tobramycin, amikacin, and netilmicin. These agents have toxicities that affect primarily the kidney and eighth nerve. Coincidentally, with aging, there is a general decline in renal function and loss of hearing. Thus, the elderly are especially at risk for serious and debilitating adverse effects from aminoglycosides. The other major concern in prescribing antibiotics to older patients is the potential harmful effects of drug interactions 6. Examples of adverse interactions include erythromycin with terfenadine or astemizole life-threatening cardiac dysrhythmias ; aminoglycosides and furosemide increase in ototoxicity ; quinolones and multivalent-ion-containing substances such as Fe iron , Al aluminum , Mg magnesium , and Ca calcium decrease in gastrointestinal absorption of antibiotic, which reduces antimicrobial effect ; and metronidazole and warfarin decreased warfarin metabolism causing increased anticoagulation effect. The issue of cost of antimicrobial therapy for patients regardless of age is always an important consideration in the management of infections. The cost of parenteral administration of antibiotics includes not only the price of drug purchase but also costs for preparation and administration drug reconstitution, intravenous administration materials, pharmacy labor , monitoring drug levels, and laboratory tests for adverse reactions. Clearly, antibiotics that have favorable pharmacokinetics permitting once-or twice-a-day dosing would reduce costs of parenteral administration and improve drug compliance when antibiotics are taken orally. Because older patients are often prescribed many different medications, drug compliance is a serious issue. Reducing the frequency of dosing would assist in better adherence to prescriptions and improve therapeutic outcomes 7. Transitioning antimicrobial therapy from parenteral administration to oral treatment impacts greatly on hospitalization costs. This is particularly

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important for the geriatric population because the elderly account for the vast majority of health care costs, especially those related to hospitalization 8. With select antibiotics having comparable serum levels when administered parenterally or orally e. Additionally, more older patients with infections can be treated on an ambulatory basis with the availability of several effective oral antibiotics 9. With many diseases and illnesses presenting atypically in the elderly, it is often difficult to rely on classic or typical symptoms and signs to make a diagnosis of infection. As described in Chapter 3, fever may be minimal or absent in older infected patients and cognitive impairment or nonspecific complaints may be the initial manifestations of a septic process. Thus, it is imperative that clinicians always consider an infectious disease process whenever an older patient presents with an acute or subacute change in functional capacity, health status, or well-being that cannot be explained by other causes. Once an infectious disease is considered as a primary diagnosis, it is essential to quickly determine the site s of infection by history, physical examination, underlying illness, and residential setting home, hospital, long-term care facility. During the preliminary assessment, it is also important to quickly obtain initial laboratory tests that will assist in diagnosing the primary source of infection, clinical status of the patient, and whether care can be delivered as an outpatient or inpatient e. In seriously ill patients, unnecessary and time-consuming diagnostic tests should be avoided at the outset and reserved for a time when the clinical status of the patient has stabilized. For all patients requiring acute hospital care, at least two sets of blood cultures should be obtained. If hospitalization is deemed to be necessary for managing the infection, most elderly patients will be best managed with initiation of empiric antimicrobial therapy until culture and other laboratory data indicate a specific microbial etiology. Once it is decided that empiric antimicrobial therapy will be initiated, a broad-spectrum antibiotic should be selected. For most elderly patients with septic complications, the p-lactam class of antibiotics, i. After microbiological data become available, indicating a specific causative pathogen s , appropriate changes in the empiric antibiotic regimen should be made. Ideally, a more narrow-spectrum antibiotic that is effective against the offending pathogen, nontoxic, easy to administer, and available in oral preparation should be prescribed. Generally, an aminoglycoside antibiotic is not prescribed for elderly patients because of its inherent ototoxicity and nephrotoxicity However, aminoglycosides should be considered in elderly patients with serious *Pseudomonas aeruginosa* infections usually in combination with another antipseudomonal agent , life-threatening enterococcal infections in combination with ampicillin or vancomycin for synergistic activity , septic shock of unknown cause as part of a combined antibiotic regimen , and infections caused by organisms susceptible only to this drug Under these circumstances, the risk of death related to septic complications outweigh the risks of aminoglycoside toxicities. As with all patients, careful monitoring for adverse effects must be done on a daily basis when administering parenteral antibiotics. Special attention should be directed to potential drug interactions because of the high number of medications elderly patients usually receive. When indicated, laboratory testing may be required to assess adverse effects e. Newly developed cognitive impairment confusion, altered sensorium or worsening of underlying mental disorder e. In addition, the clinician should consider noninfectious complications as the cause of a change in status in hospitalized elderly patients with infections, e. When the clinical status of the patient has improved, parenteral therapy should be changed to oral antibiotics. It should be noted that elderly patients are more likely to have slower or delayed responses to antimicrobial therapy than younger patients with similar infections. Moreover, although there may be objective evidence of effective treatment of an underlying infection e. That is, despite improvement in the infection, the patient is not functionally improvedâ€”the patient is unable return to the same premorbid functional level, such as the ability to independently care for him or herself, walk without assistance or not depend on others to dress, eat, bathe, or use the bathroom. If no abnormalities are uncovered, then the patient may be safely discharged to a lower level of care e. As stated earlier, these drugs have a broad spectrum, favorable pharmacokinetics, and a good safety record, and they do not require measurement of serum concentrations. Penicillins have a limited role in treating infections in elderly patients. Thus, penicillin is no longer recommended as the initial drug of choice for older patients with serious S. Penicillin and ampicillin

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are still the drugs of choice for infections caused by some other organisms commonly found in the elderly, i. With an increasing incidence of methicillin-resistant *Staphylococcus aureus* MRSA, the role of semisynthetic antistaphylococcal penicillins in treating staphylococcal infections has diminished. MRSA has been frequently isolated from hospitalized patients and now is often found in residents of long-term care facilities. Cephalosporins offer the greatest diversity and choices for antimicrobial therapy of any class of antibiotics. Currently, there are four "generations" of cephalosporins. Of the first-generation cephalosporins, cefazolin has been the preferred drug for surgical prophylaxis, particularly for orthopedic cases such as repairing of hip fractures in the elderly. Cefuroxime, a second-generation cephalosporin, has been an effective agent in treating mild to moderate pneumonia in elderly patients caused by drug-susceptible organisms. Cefoxitin and cefotetan, which are also second-generation cephalosporins, have good spectrum of activity against anaerobic bacteria including *Bacteroides* spp. Third-generation cephalosporins have gained wide popularity in treating a variety of infections in elderly patients. Ceftriaxone may be prescribed for treatment of community- or nursing home-acquired pneumonia and bacterial meningitis in combination with ampicillin; ceftazidime, because of its superior Gram-negative spectrum, is indicated for treatment of nosocomial pneumonia, febrile neutropenic patient, and gram-negative meningitis caused by *P.* Cefepime is currently the only commercially available fourth-generation cephalosporin at the time of this writing. It has enhanced anti-Gram-negative activity including *P.* The role of cefepime in treating infections in geriatric patients has yet to be determined. Aztreonam is the only monobactam on the market and its spectrum of activity is limited to facultative and aerobic Gram-negative bacilli including *P.* It has been successfully used to treat a variety of infections in the elderly including urinary tract infection, sepsis, intraabdominal infections in combination with another agent effective against anaerobes, and pneumonia caused by susceptible Gram-negative bacilli. Imipenem-cilastatin and meropenem are currently the two carbapenems that are commercially available. These drugs have an antibacterial spectrum that includes Gram-positive cocci, Gram-negative bacilli including *P.* However, they are inactive against MRSA, vancomycin-resistant enterococci and some other less commonly isolated gram-negative bacilli. Generally, these agents are reserved for infections involving drug-resistant organisms or in patients with life-threatening infections in whom other antibiotics cannot be used because of potential adverse effects. Meropenem has been administered to elderly patients with serious infections with good therapeutic outcome and relatively few side effects. Meropenem, in contrast to imipenem-cilastatin, does not enhance seizure potential and thus is preferred over carbapenem in elderly patients with seizure activity or central nervous system infections. Fluoroquinolones Fluoroquinolones also called quinolones are the other class of antibiotics that have similar favorable characteristics as β lactams for use in treating infections in the elderly. The earliest marketed quinolones possessed primarily excellent activity against Gram-negative bacilli including *P.* This permitted earlier transition from parenteral therapy for Gram-negative bacillary infections to oral treatment and thus reduced hospitalization days. Also, the need to hospitalize a clinically stable patient for anti-Gram-negative therapy was reduced with the advent of oral quinolones. The early quinolones included ciprofloxacin, ofloxacin, lomefloxacin, norfloxacin, and enoxacin. Presently, ciprofloxacin is the most widely used of these earlier quinolones because of its superior activity against *P.* There have been numerous pharmacokinetic and clinical trial studies of these earlier quinolones in the elderly, which have been reviewed recently. These drugs have been proven to be effective and relatively safe in treating elderly patients with serious Gram-negative infections. More recently, a newer generation of quinolones have been emerging. These quinolones have greater activity against Gram-positive cocci than the older quinolones with comparable Gram-negative activity. In addition, they have improved activity against such pathogens as *Mycoplasma* spp. The currently commercially available newer quinolones include levofloxacin, sparfloxacin, moxifloxacin, grepafloxacin. Grepafloxacin was removed from the market in October, 1998, because of seven unexpected deaths and other cardiovascular events. With these newer quinolones having such broad antibacterial activity including *S.* Some preliminary data indicate that these quinolones may become the first line of therapy for community-acquired pneumonia. However, in a recent study in Canada,

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there was an increased prevalence of reduced susceptibility of *S.* With increased prescribing of quinolones, selective pressures from these drugs will inevitably result in growing numbers and percentages of quinolone-resistant bacteria. Thus, it remains unclear the role of quinolones in the routine management of infections in the elderly. Macrolides Erythromycin, clarithromycin, and azithromycin are the currently available macrolides.

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Chapter 3 : Antimicrobial therapy can prevent sepsis in pneumonia patients

Acute exacerbation of chronic bronchitis (AECB) is a common feature of chronic obstructive pulmonary disease. Antibiotic therapy based on risk-stratified guidelines are recommended.

Advanced Search Abstract This article aims to review the literature relating to the ethics of antibiotic prescription decisions in older adults and to offer some suggestions as to how one might approach these difficult problems. According to many studies, most patients and their family members wish to receive antibiotics even when they are terminally ill or suffering from advanced dementia. Health care professionals are also frequently reluctant to deny the use of antibiotics in such situations. We suggest that the difficult decisions regarding whether one should withhold treatment can be based on consideration of the ethical principles of autonomy, beneficence, nonmaleficence, and justice. From the public health point of view, one should also take into account the need to avoid the emergence of antimicrobial resistance, keeping in mind the balance between the benefit to the specific patient and the cost to future patients. Infectious diseases consultants should actively participate in these ethical dilemmas. Today, the actual demise of many patients with any form of end-stage illness—whether cancer, cardiac or pulmonary disease, dementia, or diabetes—is most likely to be caused by an infection [4 , 5]. Most of the literature regarding the ethics of end-of-life care and the treatment of patients with severe dementia focuses on issues of resuscitation and the use of high technology. The ethical issues concerning the use of antibiotics are discussed much less frequently. This article aims to critically review the literature relating to ethics of antibiotic-prescribing decisions in older adults. We will examine the current use of antibiotics in the terminally ill and frail hospitalized older adults and those studies that have explored the opinions of patients, families, and professionals regarding such therapy. In addition, we urge the inclusion of infectious disease consultants in the decision-making process. Finally, we offer some guidelines for decision making.

Ethical Principles When discussing ethical issues, it is helpful to refer to the 4 basic ethical principles as offered by Beauchamp and Childress [6]:

Prevalence and Impact of Antibiotic Use Among Terminally Ill and Frail Older Adults A few surveys have explored the prevalence of the use of antibiotics in terminally ill patients [7—14], the results of which are summarized in table 1. Physicians may feel more comfortable in continuing to try to correct a theoretically reversible condition by use of antibiotics even in the face of an irreversible dying process. Table 1 Prevalence of antibiotic use among terminally ill, hospitalized, elderly patients. Table 1 View large Download slide Prevalence of antibiotic use among terminally ill, hospitalized, elderly patients. Indeed, withholding antibiotics may sometimes cause an increase in mortality rates. In contrast, and perhaps not surprisingly, given the attitude toward physician-assisted suicide, the attitude toward withholding antibiotics is often different in The Netherlands. In 2 national surveys, antibiotics were among the interventions withheld from dying patients most frequently [16 , 17]. A debate regarding antibiotic therapy for patients with advanced dementia has also begun. Their patients were not randomly assigned to receive antibiotics or not in part for ethical reasons ; rather, the assignments were made according to a joint decision of staff and family. Surprisingly, the incidence of fever was similar for both groups. Survival analysis revealed that, for the patients with more-severe dementia, there was no difference in survival rates between the groups. Among the less severely affected patients, survival rates were approximately twice the rates for those who received antibiotics. This lack of efficacy of antibiotics in persons with severe dementia may be explained, at least in part, by the fact that infections in this patient population tend to be recurrent and are increasingly caused by resistant organisms [20]. The same authors reported that a significantly higher degree of discomfort occurred during episodes of fever in patients with dementia who had been treated aggressively in standard long-term care units, as compared with those who were looked after in a hospice [21—23]. However, the estimated mortality rate for patients with lower severity of dementia was 7 times higher in the hospice approach than it was for those who received antibiotics. Those authors argued that, because antibiotics did not prolong the duration of

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survival in patients with severe dementia, such therapy may be considered futile. They did feel that, in patients with less-severe dementia, one should weigh the burden of treatment against its possible benefits. We do not claim that all of the difficulty in making such decisions evolves purely from ethical concerns. In all systems of care, the specific structure, payment mechanism, and clinical culture can all influence decision making. For example, the recent rise in the influence of managed care in the United States could well have pushed physicians toward decisions other than those that they would ideally have preferred [In that document, 4 paradigmatic scenarios were delineated: In each scenario, the patient is to indicate whether he or she would or would not want interventions ranging from cardiopulmonary resuscitation CPR to antibiotic therapy. The attitudes of different patient populations toward administration of antibiotics has been investigated in many studies by use of questionnaires that present different hypothetical scenarios [14 , 26â€”34] corresponding either to their current health status or to scenarios similar to those mentioned in the advance medical directive form.

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Chapter 4 : Antimicrobial Therapy for Community-Acquired Pneumonia

UNIQUE CONSIDERATIONS IN THE ELDERLY. Infectious diseases in older persons compared with younger individuals are relatively more frequent and severe. 44 The elderly also suffer greater complications of these infections, which eventually contribute to a higher mortality.

Alternative regimens for anti-infective agents for parenteral empiric antimicrobial therapy 2. Other key therapeutic modalities Patients with severe presentations, including hemodynamic instability, high fever, vomiting, or acute onset of confusion, require supportive therapy, including rehydration, antiemetics, pain control, and management of comorbidities. Considering advance directives and available institutional resources, some severely ill residents may require transfer to an acute care hospital for additional care. The clinical response to empiric antimicrobial therapy should be reviewed at hours, when urine culture results are usually available. Consider modifying to more specific antimicrobial therapy once culture results are available. For patients receiving parenteral therapy, step down to oral therapy if there has been a satisfactory clinical response. When the infecting organism isolated is not susceptible to the initial empiric regimen, antimicrobial therapy should be modified to an effective agent, even if there has been a satisfactory clinical response. What complications could arise as a consequence of urinary tract infection in the nursing home patient? Diabetic patients are at increased risk of complications, such as perinephric or renal abscesses, emphysematous pyelonephritis or cystitis, or papillary necrosis. Residents with infection with some urease producing organisms i. Metastatic infection at distant sites may be a complication of bacteremia. The skeletal system is most frequently involved, with the vertebral column the single most frequent site. Endocarditis may also occur. Infection does not progress to renal failure in the absence of complicating factors, such as obstruction or renal stones. The prognosis is excellent when effective treatment is initiated promptly. Patients who experience an initial symptomatic UTI are at increased risk for subsequent infections. If there is not a clear clinical response by hours following initiation of antimicrobial therapy, reassess the patient considering: If the organism is susceptible, consider investigations to determine whether there is an underlying urologic abnormality that may require intervention. For the rare patient who experiences frequent symptomatic episodes and has a persistent underlying abnormality that cannot be corrected, such as a persistent infected stone, infected non-functioning kidney or, for men, chronic bacterial prostatitis, long-term suppressive therapy may be considered for control of symptoms. How do you contract urinary tract infection in the nursing home and how frequent is this disease? Detailed epidemiology Symptomatic urinary infection is one of the most common infections diagnosed in nursing home residents. The reported incidence ranges from 1 to 2. The incidence of urinary infection presenting with fever is 0. The prevalence of bacteriuria increases with increasing functional disability and correlates with mental impairment and incontinence of bladder and bowel. Bacteriuria in nursing home residents is dynamic. Some residents, however, will have persistent bacteriuria with the same organism for years. Mode of spread Residents develop infection by the ascending route following periurethral and, for women, vaginal colonization by endogenous flora from the gut. Colonizing organisms may also occasionally be transmitted between patients by environmental exposures or on the hands of residents or health care workers. What pathogens are responsible for this disease? The single most common organism is *Escherichia coli*. In some reports, *P. A* wide variety of other organisms may be isolated. These include *Klebsiella* species, *Enterobacter* species, *Citrobacter freundii*, *Serratia* species, *Pseudomonas aeruginosa*, *Acinetobacter* species, *Enterococcus* species, *Streptococcal* species, coagulase-negative staphylococci, and *Candida* species. *Staphylococcus aureus*, including methicillin-resistant *S.* How do these pathogens cause urinary tract infection? Nursing home residents have "complicated UTI"; host factors rather than organism virulence is the important determinant of infection. Urease producing organisms, particularly *Proteus mirabilis* and *Providencia stuartii*, are associated with crystalline biofilm formation that may cause bladder or renal infection stones. There is a robust host response to infection, both local i. This host response

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may facilitate resolution of acute infection but does not prevent subsequent recurrence. What other clinical manifestations may help me to diagnose and manage urinary tract infection in nursing home patients? During the physical exam, look for purulent discharge from the urethra and, in men, swollen or tender prostate or epididymis. How can urinary tract infection in nursing home residents be prevented? Identification and correction of urologic abnormalities that contribute to infection may prevent subsequent episodes. Prophylactic antibiotics are not recommended. In the context of complicated urinary infection, resistant organisms emerge rapidly. Topical vaginal estrogen has not yet been shown to decrease recurrent bacteriuria or symptomatic infection in female nursing home residents. Cranberry products or probiotics have not been shown to be beneficial for preventing bacteriuria or symptomatic infection for nursing home residents. *Scand J Prim Health Care*. There were no differences in the presence or severity of chronic genitourinary or non-specific symptoms in women in an assisted living facility when they were bacteriuric or not bacteriuric. *J Am Geriatr Soc*. These practice guidelines recommend that, when a diagnosis of urinary tract infection is considered [acute onset of genitourinary symptoms or signs, source of fever, or other clinical deterioration] a urine culture should be obtained to confirm infection only if the urine specimen shows pyuria. Only dysuria, increased mental confusion, or change in character of the urine were independent predictors of a positive urine culture with pyuria. The observed associations with mental status and changes in character of the urine, however, are subject to confounding, as residents with these characteristics are more likely to be bacteriuric at any time. *Infect Control Hosp Epidemiol*. These consensus guidelines recommend clinical criteria for initiating antimicrobial therapy for residents of long-term care facilities. Empiric antimicrobial therapy for presumed urinary tract infection should be considered for residents without an indwelling catheter only when there is either acute dysuria or one or more of temperature greater than This prospective randomized cluster controlled trial evaluated the consensus guidelines for institution of antimicrobial therapy. The application of the consensus guidelines for respiratory or urinary tract infection had similar outcomes to "standard therapy" for efficacy and safety and, overall, lower antimicrobial use. A randomized controlled trial in older women". This prospective randomized double blind trial reported that mL cranberry juice daily versus placebo was not effective for prevention of urinary tract infection in the hospitalized elderly. Symptomatic urinary infection occurred in 7. A detailed review of asymptomatic and symptomatic urinary infections in elderly populations, including nursing home residents. These evidence-based guidelines recommend not screening for or treatment of asymptomatic bacteriuria in nursing home residents with grade 1A evidence. In a prospective 2-year study in two nursing homes, 87 episodes of gross hematuria were identified in 49 residents [3. Only 1 of these episodes was considered hematuria directly caused by infection [i. *Antimicrob Res Infect Control*. Antimicrobial stewardship programs for long-term care facilities should include components which limit prophylaxis for urinary tract infection or treatment of asymptomatic bacteriuria. For 98 residents, This prospective cohort study measured antibody response to uropathogens to identify urinary infection as a source of fever in institutionalized individuals. Antimicrobial treatment of bacteriuria did not decrease the frequency or volume of incontinence in women with chronic incontinence. The occurrence of falls did not correlate with the presence of bacteriuria and pyuria in women residents in nursing homes. Falls were not a symptom of urinary tract infection. A state-wide surveillance program for infections in long-term care facilities used standardized surveillance definitions for symptomatic infection and uniform training of individuals performing surveillance. The incidence of symptomatic urinary tract infection was 0. The rate was 0. Evidence based criteria developed for surveillance of urinary infection in long term care facilities. Definitions differ for residents with or without a chronic indwelling catheter. No sponsor or advertiser has participated in, approved or paid for the content provided by Decision Support in Medicine LLC.

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Chapter 5 : Treatments for recurrent UTI in elderly patients - The Clinical Advisor

Clinicians should carefully evaluate risk versus benefit and consider the arrhythmogenic potential of antimicrobial therapy, especially in the elderly population with underlying cardiovascular diseases, when designing a treatment regimen for pneumonia.

Pneumonia, including community-acquired pneumonia, is a common lower respiratory tract infection associated with high rates of hospital readmission and mortality. Numerous antibiotics are approved for the treatment of pneumonia; however, the rapid rise in antibiotic resistance coupled with increased risk of adverse events such as fatal cardiac arrhythmias poses a challenge in the selection of antimicrobial therapy. Given these factors, it is imperative for pharmacists to recognize the crucial role they play in the optimal treatment selection and management of pneumonia. Despite the availability of preventive measures, pneumonia remains one of the leading causes of hospital readmission and mortality, particularly in the elderly population. The inclusion of HCAP to differentiate it from CAP was the result of reports that multidrug-resistant organisms MDRO were being isolated more frequently in patients residing in the community who have had recent contact with the healthcare system. Further complicating the selection of an antimicrobial regimen are recent reports on the risk of fatal adverse events associated with the use of some antibiotics. Macrolides and fluoroquinolones, commonly used for treatment of pneumonia, have been implicated in increased risk of cardiovascular death. This article focuses on identification and current management strategies for CAP in adult patients with an emphasis on proper antibiotic selection and preventive measures to curb the incidence of pneumonia. TABLE 2 categorizes the most common etiologies by patient type. Despite the relative infrequency of CA-MRSA infection, expanded empirical coverage is warranted when this infection is suspected. Oral anaerobic bacteria and Streptococcus species in the oral cavity are the primary causative pathogens of aspiration pneumonia associated with swallowing of oropharyngeal or gastric contents. It is often difficult to distinguish other respiratory tract infections like bronchitis from pneumonia based on these nonspecific findings. Moreover, an elevated white blood cell WBC count is not useful for distinguishing between the various causative microorganisms. The presence of infiltrates on chest x-ray is usually indicative of pneumonia. However, specific findings on radiograph can guide the practitioner as to whether antimicrobial therapy is warranted upon diagnosis. Invasive diagnostic techniques including bronchoscopy, bronchoalveolar lavage, and direct aspiration can be performed, especially in severe cases of CAP, when a sputum sample is unobtainable. In addition, urinary antigen testing for Legionella species and S pneumoniae should be considered, and Gram stain and culture of expectorated sputum should be performed. In contrast, the CURB criteria are easily remembered. However, the PSI is more complicated and requires arterial blood gas sampling among other tests; given this, the CURB score is more easily used in primary care settings. However, when diagnostic tests cannot identify causative organisms, broad-spectrum empirical therapy effective against most probable pathogens is often initiated. The approach to patient care is based on classification of patients into two broad categories, outpatient and inpatient, with further division by comorbidities and location of care within the hospital. In addition to antibiotics, supportive care often requires provision of adequate hydration plus bronchodilators for dyspnea and acetaminophen or ibuprofen for fever control. Response to treatment is based on severity of infection, pathogens isolated, and patient comorbidities. Improvement in subjective clinical symptomatology is usually seen 3 to 5 days after antimicrobial initiation. Objective findings such as fever, leukocytosis, and chest radiograph abnormalities resolve at different time periods. Two antibiotics are approved for a 5-day duration, levofloxacin and azithromycin. Considerations in Antibiotic Selection The majority of patients with CAP are treated with a respiratory fluoroquinolone or macrolide with or without a beta-lactam. In , the FDA issued a statement linking azithromycin with increased risk for cardiovascular death from QT prolongation and the associated ventricular arrhythmia torsade de pointes. Ciprofloxacin carries the lowest risk. Clinicians should carefully evaluate risk versus benefit and consider the arrhythmogenic potential

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of antimicrobial therapy, especially in the elderly population with underlying cardiovascular diseases, when designing a treatment regimen for pneumonia. As healthcare providers, pharmacists are uniquely positioned to advocate the prevention of diseases through promotion and administration of vaccinations. Vaccines are cost-effective preventive services that should be adequately utilized in an attempt to curb hospitalization for and mortality from pneumonia. Despite the availability of safe and effective pneumococcal vaccines, the rates of immunization in the elderly remain low. Two types of pneumococcal vaccines are approved for use in the United States: The pipeline for new antibacterial drugs is essentially dry, and many agents that were once effective in treating infections are now ineffective. Pneumonia, which was once easy to treat, is becoming difficult to manage due to increased rates of antibiotic resistance. Thus, it is becoming increasingly important to preserve the efficacy of existing antibiotics by minimizing the development and spread of resistance. Antimicrobial stewardship programs promote judicious use of antibiotics through implementation of diverse strategies aimed at reducing inappropriate use while optimizing antibiotic selection, dosing, and duration of therapy through application of pharmacodynamic and pharmacokinetic principles. Successful implementation of stewardship strategies has been shown to improve antimicrobial utilization, decrease hospital length of stay and costs, and optimize patient care and outcomes. Readmission following hospitalization for pneumonia: Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia. Outcomes of health care-associated pneumonia empirically treated with guideline-concordant regimens versus community-acquired pneumonia guideline-concordant regimens for patients admitted to acute care wards from home. Epidemiology and outcomes of health-care-associated pneumonia: Low incidence of multidrug-resistant organisms in patients with healthcare-associated pneumonia requiring hospitalization. Clin Microbiol Infect Dis. Fluoroquinolone- and ceftriaxone-based therapy of community-acquired pneumonia in hospitalized patients: Am J Infect Control. Fluoroquinolones and the risk of serious arrhythmia: Azithromycin and the risk of cardiovascular death. N Engl J Med. Use of azithromycin and death from cardiovascular causes. Aging population and future burden of pneumococcal pneumonia in the United States. Rethinking the concepts of community-acquired and health-care-associated pneumonia. Pharmacotherapeutics for Advanced Practice: FDA drug safety communication. Azithromycin Zithromax or Zmax and the risk of potentially fatal heart rhythms. Accessed May 26, Accessed March 23, Impact of antimicrobial stewardship in critical care: Application of antimicrobial stewardship to optimise management of community acquired pneumonia. Int J Clin Pract. Implementing a pharmacist-led sequential antimicrobial therapy strategy: Int J Clin Pharm. Implementation of a care bundle for antimicrobial stewardship. Am J Health Syst Pharm. To comment on this article, contact rdavidson@uspharmacist.com.

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Chapter 6 : Principles of Antimicrobial Therapy - Elderly Patients

One of the most common mistakes in antimicrobial use is continuing to add or switch antibiotics when a patient does not appear to be responding to therapy, even though there is no clear evidence of an infectious disease.

Received Apr 8; Accepted Jul This article has been cited by other articles in PMC. Abstract Background Antibiotic resistance is a problem in nursing homes. Presumed urinary tract infections UTI are the most common infection. This study examines urine culture results from elderly patients to see if specific guidelines based on gender or whether the patient resides in a nursing home NH are warranted. Methods This is a cross sectional observation study comparing urine cultures from NH patients with urine cultures from patients in the same age group living in the community. Results There were positive urine cultures in the NH group and in the community group. There were no clinically significant differences in resistance. Combined, there were positive urine cultures from females and from males. Conclusions Differences in resistance rates for patients in the nursing home do not warrant separate recommendations for empiric antibiotic therapy, but recommendations based on gender seem warranted. Urinary tract infection, Antibiotic resistance, Antibiotic stewardship, Nursing home, Geriatrics, Guidelines Background Antibiotic resistance is a worldwide problem threatening our ability to treat infections [1]. Infections caused by multi-resistant bacteria are increasing among the elderly living in nursing homes NH [2 – 4]. The elderly are the age group with the highest prevalence of antibiotic use in Norway [5]. Anatomical and physiologic changes caused by aging [6 , 7], usage of urinary catheters, nasogastric and percutaneous feeding tubes and intravenous catheters are common in NH, all predisposing to bacterial colonization and infections [8]. However, a considerable proportion of antibiotic prescribing for presumed UTI is questionable. Treatment of asymptomatic bacteriuria ASB , and non-specific symptoms inaccurately interpreted to be caused by UTIs is prevalent in the NH despite no evidence of benefit and guidelines dissuading this practice [11 – 14]. Inappropriate antibiotic use is an important factor contributing to antibiotic resistance [1]. It is therefore necessary to optimize antibiotic prescribing for UTI in the institutionalized elderly. To accomplish this, knowledge of antibiotic resistance in the NH is essential. Studies from abroad indicate that the bacterial etiology and resistance rates of UTI in NH patients resemble hospitalized patients more than they do the elderly living in the community [15 , 16]. Results from a recent Australian study suggests that guidelines for empiric treatment of elderly patients with UTI should take into consideration differences in antibiotic resistance patterns in bacteria causing infections in the elderly living in NH versus the elderly living at home [17]. However, antibiotic resistance varies greatly between countries. Whether these findings are relevant in Norway or other countries is unknown. Several articles address differences in the prevalence and microbiologic etiology of UTI in elderly women or men, but separate therapy suggestions based on gender are not specified [10 , 18]. In addition, guidelines often lack specific recommendations based on gender in the elderly [19 , 20]. We aim to assess whether the difference in resistance rates of bacteria isolated from NH patients compared to community dwelling elderly is so great that separate recommendations for empiric antibiotic therapy for UTI for the two groups is necessary. Second, we aim to assess if gender specific recommendations for antibiotic therapy of UTI are warranted in the elderly. NH patients resided in 34 different NHs in Vestfold County, were 65 years and older with a positive urine culture in the time period from Nov through Des NH group. Results were compared to all positive urine cultures from non-hospitalized patients in Vestfold County 65 years or older not living at a NH in the same time period, the community dwelling group CD. We registered both microbes when two microbes with significant bacteriuria were present. Study design The study is a cross-sectional observational study. In the CD group we excluded hospitalized patients, urines ordered by the visiting nurse service and urines taken in the emergency room. Appropriate antibiotics were selected for each bacterial species according to recommendations from the Norwegian Working Group on Antibiotics NWGA [22]. Resistance values were recorded either as susceptible S , intermediate I , or resistant R. Pivmecillinam,

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trimethoprim-sulfamethoxazole, ciprofloxacin, ofloxacin. Outcomes Frequency and susceptibility of bacteria cultured in urine specimens. Susceptibility for each of the five most common uropathogens: Escherichia coli E coli , Klebsiella pneumoniae K pneumoniae , Proteus mirabilis P mirabilis , Enterococcus faecalis E faecalis , and Pseudomonas aeruginosa P aeruginosa. Calculating the theoretic risk of therapy failure The theoretic risk of antibiotic failure depends on two factors; the prevalence of the microbes in the patient population and the resistance rate of these microbes to the chosen antibiotic [24]. We calculated the theoretical risk of therapy failure by multiplying the relative percentage each microbe was responsible for e. We performed these calculations for each of the five most commonly isolated microbes; E coli, E faecalis, K pneumoniae, P mirabilis, and P aeruginosa. We used Pearson Chi2 test to compare differences in gender distribution between the NH group and the CD group and the t-test for independent samples to compare the mean age in the two groups. Ethical considerations The study has been approved by the Norwegian regional ethics committee. The ethics committee waived the requirement for informed consent for this study. Females contributed The mean age of females in the NH group was The mean age for males in the NH group was E coli was the most common and E faecalis the next most common pathogen isolated in both groups.

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Chapter 7 : Antibiotic Therapy: Adverse Effects and Dosing Considerations

Not only an adequate antibiotic therapy, but also an early antibiotic treatment seems to play an important role for the outcome of elderly with CAP. A study of Meeham et al. [46] MEEHAN TP, FINE MJ, KRUMHOLZ HM et al.: Quality of care, process, and outcomes in elderly patients with pneumonia.

An age-associated, less-capable immune response to an infectious challenge renders seniors more susceptible to infection. In addition to waning immunity, there are other contributors that predispose the elderly to infection. In order that dosing regimens may be designed with a targeted approach, the study of pharmacodynamics is utilized in distinguishing the relationship between the modification of antimicrobial drug concentrations over time and their therapeutic and toxicologic effects. In seniors, age-related physiological changes and complex medication regimens alter antibiotic pharmacokinetics and require dosage adjustments. Pharmacists, by using evidence-based data, can help identify, resolve, and prevent adverse reactions and complications of antibiotic therapy. TABLE 1 , and the sections below addressing adverse reactions more commonly seen in seniors and general concepts for the prevention of antibiotic-associated adverse reactions, can assist with medication therapy management MTM and the development of pharmaceutical care plans for vulnerable seniors. Antibiotic-Related Adverse Events in Seniors Dizziness, the troubling sensation of spinning, unsteadiness, or light-headedness, and vertigo, a false sensation of movement of the body or the environment, can be caused by malfunction of the vestibular labyrinth inner ear secondary to certain antibiotics e. A decline in the number of functioning nephrons that, in turn, results in decreased renal function is the major physiological change in persons over the age of 65 years. For example, aminoglycoside-induced renal toxicity may present earlier in the course of therapy in an older adult than in a younger individual. Risk factors for renal, vestibular, and auditory toxicity include older age; frequent or very high dosages; very high drug blood levels; long duration of therapy e. Clostridium difficile-associated diarrhea has a disease spectrum ranging from mild diarrhea with little or no inflammation to severe colitis often associated with pseudomembranes, which are adherent to necrotic colonic epithelium pseudomembranous colitis. TMP can decrease renal tubular potassium excretion, leading to hyperkalemia. Hyperkalemia can be problematic in patients who have renal impairment or cardiac disease and who may be receiving drugs that increase potassium, such as ACE inhibitors and potassium-sparing diuretics. Folic acid deficiency may lead to megaloblastic anemia. Fluoroquinolones are associated with central nervous system CNS stimulatory effects; the most prominent CNS effects are headache, dizziness, and light-headedness. While seizures are rare, these agents should be used with caution or avoided in patients with CNS disorders, such as epilepsy. While the esophagus is not easily damaged, the esophageal lining may incur erosion from gradual insult over months to years secondary to gastroesophageal reflux and many drugs, including antibiotics e. A doxycycline capsule or tablet should be administered orally with at least 8 oz. Amoxicillin plus clavulanic acid is considered one of the drugs of choice in the outpatient treatment of community-acquired pneumonia in the elderly. Superinfections, resulting from a difficult-to-treat overgrowth of opportunistic organisms e. Hypersensitivity adverse reactions to an antibiotic e. An example of the result of direct toxicity is ototoxicity secondary to aminoglycosides. Conclusion An age-related decline in the immune system, in conjunction with comorbidities and other factors, increases susceptibility to infection; age-related physiological changes predispose seniors to the risk of antibiotic-related adverse reactions as well. Considering evidence-based data, in conjunction with clinical experience and judgment, is an important aspect of individualizing antibiotic regimens for seniors. With anticipation and prevention of antibiotic-associated adverse reactions, positive therapeutic outcomes in addition to positive pharmacoeconomic and health-related quality-of-life outcomes may be achieved. Predisposition to infection in the elderly. Aging of the immune system as a prognostic factor for human longevity. Physiology Bethesda ; Infection and immune response in the elderly. Infection in the elderly. Impact of pharmacodynamics on dosing of macrolides, azalides, and

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Chapter 8 : Prophylaxis and empiric therapy of Infection in Cancer patients

Outpatient Antibiotic Therapy for Elderly Patients JOSE V. G. ANGEL, M.D., Des Moines, Iowa, AND THE HIAT STUDY GROUP The purpose of this study was to determine.

Prophylaxis of Infection in Cancer Patients Description of the Problem Malignancies and their treatments can result in immune defects which predispose patients to infections. Hematologic malignancies such as multiple myeloma and chronic lymphocytic leukemia can cause defects in humoral and cellular immunity, Acute leukemia causes mostly neutropenia but also may cause lymphocyte defects. Solid tumors can infiltrate and replace the bone marrow causing neutropenia. More often, though, the treatment of malignancy by steroids, monoclonal antibodies, conventional chemotherapy, radiation therapy, and surgery can predispose the patient to infection. Prevention of infection in the setting of predisposing therapy has therefore become an important part of effective cancer treatment. Some controversy exists as to the benefits versus the risks of infection prophylaxis in certain situations, such as the neutropenic patient with leukemia. Susceptibility to Infection in Non-neutropenic Patients with Malignancies The most common problem predisposing to infection in patients with cancer is neutropenia. However, susceptibility to infection and indications for prophylaxis exist in non-neutropenic settings as well: Pneumocystis jirovecii monoclonal antibody therapy with bortezomib: Pneumocystis jirovecii, herpesviruses, invasive fungal infection purine analogue therapy: Pneumocystis jirovecii, herpesviruses temozolamide therapy e. Since antibiotic prophylaxis for these organisms has become more widely used, gram-positive enteric bacteria have assumed greater importance. Attempts at prevention of infection in neutropenic cancer patients have included selective gut decontamination trimethoprim-sulfamethoxazole preventive therapy, most recently fluoroquinolone preventive therapy. Studies of fluoroquinolone prophylaxis in neutropenic cancer patients have compared the incidence of infectious complications such as fever, bacteremia, and mortality but it has been difficult to assess the role of prophylaxis in the development of infections by resistant bacteria. These have been reexamined by metaanalyses, and in two prospective, blinded, randomized studies were performed in an effort to clarify the potential benefits of prophylaxis. This metaanalysis demonstrated that fluoroquinolone prophylaxis reduced the incidence of gram negative rod bacteremia but not gram positive bacteremia or infection-related mortality. In the same publication, another metaanalysis of 6 randomized controlled trials with patients demonstrated that fluoroquinolone prophylaxis not levaquin plus a gram positive-active agent reduced the incidence of gram positive bacteremia versus fluoroquinolone or a non-absorbable antibiotic alone. Studies included patients with hematologic malignancies, bone marrow transplants, and solid tumors. This metaanalysis demonstrated quinolone prophylaxis significantly reduced gram-negative rod bacteremia, microbiologically documented infection, total infection, and to a lesser extent, fever, No effect on clinically documented infection, gram-positive bacteremia, or infection-related mortality. This metaanalysis concluded that prophylaxis reduced the incidence of fever, infection-related mortality, and bacteremia. This outpatient trial did not include G-CSF support and included up to six cycles of chemotherapy. The patients received seven days of trial medication, beginning just before the development of neutropenia. Significant reduction in incidence of fever, probable infections, and hospitalizations for infection occurred during the first cycle of chemotherapy for the levaquin-treated group compared to the placebo-treated group. No differences in mortality or severe infections were seen, few deaths occurred during the study. Emergence of resistant organisms was not assessed in this study. The incidence of fever, gram-negative bacteremia, polymicrobial bacteremia, and microbiologically documented infection were significantly lower in the levaquin group, In subgroup analysis remained lower whether the patients had leukemia or not. No difference in overall mortality No difference in infection-related mortality, between the levaquin and placebo groups. Given the problem of bacteria resistant to commonly used antibiotics, and the ever-increasing problem of hospital-related infections with resistant bacteria, it is reasonable to be concerned that infections which do develop in neutropenic patients who receive antibiotic

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prophylaxis may well be resistant to our usual antibiotic armamentarium and therefore more difficult to treat. The recent appearance of multidrug resistant Enterobacteriaceae, including resistance to carbapenems, is especially frightening. As MDR Enterobacteriaceae become more common, analyses of large numbers of patients for colonization with and infection by these resistant gram negative bacilli will need to be done.

Chapter 9 : Urinary Tract Infection (UTI) in the Nursing Home Patient

Antimicrobial therapy targeting specific cells in the immune system could prevent sepsis and life-threatening disease in people suffering from pneumonia, new research led by the University of.