Management of Common Respiratory Infections in Residential Homes

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Infectious diseases are common among residential care home residents. In a point prevalence study done by the Surveillance and Epidemiology branch of the Centre for Health Protection that surveyed 43 Residential Care Homes for the Elderly (RCHE) by systematic stratified cluster sampling, a total of 1626 residents were interviewed by trained health care workers to determine the prevalence of commonly occurring infections in RCHEs and to identify their associated risk factors. The estimated overall prevalence of residents with infection was 5.8% (95/1626). Upper respiratory tract infection (URTI) was the most common infection among the residents (2.1%), followed by skin & soft tissue infection (1.4%), urinary tract infection (0.6%), lower respiratory tract infection (0.5%), conjunctivitis, influenza like illness (0.25%), tuberculosis (0.25%), gastroenteritis and scabies.1

Infection accounts for substantial morbidity and mortality in elders dwelling in residential homes. Respiratory infections are particularly important in terms of the high incidence and the potential of serious consequences. Age related changes in the local respiratory tract defence mechanism and in the systemic immune response, effects of comorbidities, immobility, malnutrition and iatrogenic factors all interact to increase the elder’s susceptibility to infections.2-4

The spectrum of common respiratory infections in residential home elders spans from viral upper respiratory tract infections, to community acquired pneumonia, nursing home acquired pneumonia and pulmonary tuberculosis.

Upper Respiratory Tract Infections

The clinical presentation of viral upper respiratory tract infections varies. The onset is sudden. Systemic symptoms may include fever, chills, myalgia, malaise, headache, and then followed by local respiratory symptoms of runny nose, sore throat and cough. Occasionally the presentation can be atypical, such as falls, delirium and decline in functional status. Cases can occur sporadically or in outbreaks. Close person-to-person contact, crowded communal living and the lack of infection control measures contribute to the increased risk of contracting viral respiratory diseases. The disease is usually self-limiting but it can lead to viral pneumonia, secondary bacterial pneumonia or even death.

The more common causative agents include influenza A and B, respiratory syncytial virus, parainfluenza virus and adenovirus. Diagnosis can be made by rapid antigen testing or viral culture of nasopharyngeal aspirate or swab. The best strategy to decrease the incidence of influenza and its associated morbidity and mortality is vaccination.5 Currently trivalent influenza vaccination recommended by the World Health Organisation is offered to elders in residential care homes by the Department of Health at around November each year. Influenza vaccination has been proven to reduce hospitalisation for acute and chronic respiratory illness by one third, hospitalisations for pneumonia and influenza by 39%, hospitalisations for congestive heart failure by 27% and death from all causes by 50%.6

Treatment for viral upper respiratory tract infection is supportive. Attention should be paid to relieving fever, myalgia and headache using paracetamol, and to the avoidance of dehydration. Antibiotics should not be given unless there is supervening bacterial infection. Anti-viral agents for influenza such as oseltamivir 75mg bd for 5 days, when given within 48 hours of symptom onset, can reduce the severity and duration of the illness. Anti-viral prophylaxis, oseltamivir 75mg daily for the duration of the influenza outbreak, can also be given to other inmates and health care workers who have come into contact with the index case.

Pneumonia

Pneumonia is a leading cause of morbidity and mortality among residents in long term care facilities.7 Residents are at higher risk of developing pneumonia than community dwelling counterparts.8 Risk factors include functional dependency, chronic pulmonary disease, tracheostomy, difficulty with oral secretions, tube feeding and conditions causing aspiration.3

Clinical presentation of any diseases may be atypical in the elderly, pneumonia included.9 Older adults tend to have fewer symptoms than do younger adults. Only two thirds of nursing home patients with pneumonia will have a temperature greater than 38 degree C at presentation. Cough and dyspnoea may be absent. On the other hand patients with pneumonia may present with alteration in mental state, falls, incontinence, failure to thrive and heart failure.

Streptococcus pneumoniae remains the most commonly identified causative agent, followed by Haemophilus influenzae, Moraxella catarrhalis, Klebsiella spp, Pseudomonas aeruginosa, Enterobacteriaceae, and Staphylococcus aureus. Atypical pneumonia is less common. Legionella pneumonia, while frequently
encountered and reported in Western countries, is uncommon in Hong Kong. The importance of Chlamydia pneumoniae and Mycoplasma pneumoniae is as yet to be determined. Influenza virus, parainfluenza virus and respiratory syncytial virus are the most common aetiology for viral pneumonia. Drug resistant bacteria are increasingly encountered in nursing home acquired pneumonia. Reduced susceptibility of Streptococcus pneumoniae to penicillin and resistance to macrolides are high. Meticillin resistant Staphylococcus aureus (MRSA) is an increasingly recognised pathogen in nursing home population, especially among those with recent hospitalisation and prior use of antibiotics.

A minimal diagnostic evaluation for suspected pneumonia in a nursing home patient should include recording of temperature, respiratory rate, heart rate, assessment by a physician, sputum culture, and chest radiograph. The precise aetiologic diagnosis may be difficult in this group of patient. A satisfactory sputum sample is not easy to obtain. In addition it may not be possible to distinguish colonisation from genuine infection.

Pneumonia prevention should adopt a multi-faceted approach. Influenza vaccination is recommended in people over the age of 65 years, those with respiratory conditions and residents of nursing homes. Pneumococcal vaccination is more controversial and is not generally administered unless the patient has chronic pulmonary disease, has prior history of pneumococcal infections or has conditions that increase the susceptibility and severity of pneumococcal infections. Measures to prevent nursing home acquired pneumonia include (1) minimisation of aspiration and colonisation of the oropharynx (2) cautious use of sedative-hypnotic medications (3) optimisation of nutritional status (4) optimisation of oral hygiene and dental care.

The first decision to make in the treatment of pneumonia is whether to send the patient to the hospital or to treat the patient in the residential home. This would depend on the severity of the respiratory illness and the availability of resources in the residential home. Mild cases can be managed in the residential homes if medical and nursing supports and basic investigations are readily accessible. Initial empirical antibiotic therapy should be a beta-lactam / beta-lactamase inhibitor combination e.g. amoxicillin and clavulanic acid, or ampicillin and sulbactam. Another alternative is an oral second generation cephalosporin. Fluoroquinolones is not recommended as a first line agent to treat community acquired pneumonia by the local IMPACT guideline because of the risk of emergence of resistance among Streptococcus pneumoniae. The presence of risk factors may prompt the physician to modify the initial empirical antimicrobial therapy to cover Gram negative micro-organisms. These factors include age over 65 years, beta-lactam therapy within the past 3 months, alcoholism, multiple medical comorbidities, impaired functional status, history of Gram negatives chest infections and history of Pseudomonal respiratory infections. Macrolide monotherapy is not recommended because of high cross resistant among penicillin resistant Streptococcus pneumoniae. However macrolide is inferior in the treatment of Legionella pneumonia and therefore should be given if atypical pneumonia is suspected.

Factors that are identified to associate with failure of treatment of pneumonia in the nursing home are (1) pulse rate > 90/min (2) temperature > 100.5 deg F (consider to use degree C) (3) respiratory rate > 30/min (4) Feeding tube dependence and (5) mechanically altered diets. Physicians should be alerted to transfer the patient to an acute care facility.

Elders hospitalised for pneumonia are commonly prescribed intravenous beta-lactam / beta-lactamase inhibitors. With more severe pneumonia or patients with risk factors for Gram negative infections, more broad-spectrum antibiotics should be considered e.g. ceftriazone. Pseudomonas aeruginosa is an important hospital acquired micro-organism as well as in patients with bronchiectasis. Antibiotics with anti-pseudomonal activity should be chosen e.g. ceftazidine, piperacillin / tazobactam, ciprofloxacin, cefepime, imipenem. Once the pathogen is identified the anti-microbial treatment should be narrowed down to cover the specific micro-organism. Vancomycin should be instituted if MRSA is isolated from an adequate sputum specimen. Supportive care is another important element in the total management of pneumonia in frail elders. The goal is to prevent complications such as dehydration, pressure sores, delirium and deep vein thrombosis. Respiratory failure should be recognised early and appropriate support given without undue delay e.g. oxygen therapy, non-invasive positive pressure ventilation, or even intensive care with intubation and mechanical ventilation. Ethical considerations arising from life-sustaining treatment in chronically debilitated elders living in nursing homes is a constant issue for debate in aged care medicine, which is beyond the scope of the present article.

Aspiration Pneumonia

Aspiration pneumonia in its narrow sense refers to a more indolent type of chest infection caused by chronic aspiration of oral secretion, particulate or liquid food substances, or gastric regurgitation contents into the lower airways. A predisposing condition for aspiration such as old stroke or dementia is often evident in the history. Aspiration pneumonia is also associated with poor oral and dental hygiene. The presenting findings in aspiration pneumonia due to bacterial infection are highly variable depending upon the bacteria involved and the status of the host. Most cases involve anaerobic bacteria that normally reside in the gingival crevices. Fever may not be present and is usually of low grade. Rigour is often absent. Sputum may be purulent and putrid to reflect anaerobic infection. Many patients with aspiration pneumonia do not present with the acute infection but later with complications characterised by suppuration and necrosis e.g. lung abscess and empyema. Treatment of aspiration pneumonia involves antibiotic therapy against anaerobic micro-organisms. Clindamycin, amoxicillin-clavulanate or metronidazole can be used. Micro-organisms other than anaerobes may also be responsible for aspiration pneumonia when these microbes (e.g. Gram negative bacilli, MRSA) colonise the secretion from the oropharynx as a result of prior antibiotic use, chronic illnesses and hospitalisation.
Aspiration Pneumonitis

Aspiration pneumonitis is defined as acute lung injury after the inhalation of regurgitated sterile gastric contents. It usually occurs within 4 to 6 hours after an aspiration event. Symptoms are similar to pneumonia, making it difficult to distinguish the two conditions. Treatment is mainly supportive for uncomplicated chemical pneumonitis. Antimicrobial therapy is indicated for aspiration pneumonitis that fails to resolve within 48 hours after aspiration.

Tuberculosis

Tuberculosis is still endemic in Hong Kong. The tuberculosis notification rate for the 85 years plus age group is 8 folds that of the 30-34 years age group. The reasons for this are: poverty, socioeconomic disadvantage, decline in immune functions due to ageing and comorbid diseases. Older persons tend to present late and with atypical features such as lower lobe involvement. A high index of suspicion is required for the diagnosis of tuberculosis in inmates of care homes. Chest radiograph and sputum acid-fast bacilli smear and culture remain the mainstay diagnostic investigations. Anti-TB chemotherapy regime in this group of patients often needs modifications. In the elderly tolerability to anti-TB drugs is poor. Adverse effects are more common and more severe. Hence the number of drugs contained in the regime may be reduced and the dosage decreased. As a consequence of the drug regime alteration, along with other factors like co-existing diseases, prior TB treatment history, prolongation of duration of therapy may be required.

References

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