

Pneumonia in Elderly and Intensive Care Management

**Abdulhadi Salem Towairqi¹, Lujain Hamed Mutwally², Yasser Ali Baateyyah³,
Rakan Ahmed I Alshuwaier⁴, Ismail Nizar O Kraiz⁴, Hamzah Mohammed Alarfaj⁵,
Ohood Abdulrazaq Alsomali⁶, Rahaf Sadiq Omar Bukhari⁷**

1 University of Jeddah, 2 King Fahad Hospital Jeddah, 3 Umm Alqura University, 4 King Saud University,
5 King Faisal University In Alahsaa, 6 Yanbu General Hospital, 7 King Khalid University
Corresponding author: Abdulhadi Salem Towairq - LL2007LL@hotmail.com - +966 56 256 2566

ABSTRACT

Introduction: The incidence of pneumonia among elderly is 4 times higher than younger individuals, with elevated risks of hospital admissions and high mortality rates. The most important and common infectious cause of death among old patients remains to be community acquired pneumonia. It is essential to properly assess severity of the disease to decide appropriate management ranging from antibiotics, hospitalization, and intensive care. **Methodology:** We conducted this review using a comprehensive search of MEDLINE, PubMed, and EMBASE, January 1985, through February 2017. The following search terms were used: pneumonia, elderly pneumonia, intensive care unit, community acquired pneumonia, management and prevention **Aim:** In this review, we aim to study the prevalence, etiology and intensive care management of pneumonia in the elderly. **Conclusion:** Community acquired pneumonia continues to be the leading cause of death due to infectious diseases among patients older than 65 years. It is also associated with significant amounts of long term morbidities. Proper assessment will have a significant impact on the burden of healthcare use, diagnostic and therapeutic approaches, and consequently, clinical and survival outcomes.

Keywords: community acquired pneumonia, pneumonia in elderly, ICU management, pneumonia vaccination

INTRODUCTION

Pneumonia is a more important concern in old people older than 65 years than younger individuals. Actually, the incidence of pneumonia among elderly is 4 times higher than younger individuals, with elevated risks of hospital admissions and higher mortality rates. A previous study found that incidence of community acquired pneumonia can be as high as 18.2 and 52.3 per 1000 among patients aged 65-69 years, and older than 85 years, respectively, making the incidence corresponds with the age. The most important and common infectious cause of death among old patients remains to be community acquired pneumonia (CAP). Moreover, mortality from community acquired pneumonia among elderly can be as high as 30% making it significantly higher than mortality among young patients. It is essential to properly assess severity of the disease to decide appropriate management of elderly with pneumonia. Thus, proper assessment will have a significant impact on the burden of healthcare use, diagnostic and therapeutic approaches, and consequently, clinical and survival outcomes ^[1].

METHODOLOGY

• Data Sources and Search terms

We conducted this review using a comprehensive search of MEDLINE, PubMed, and EMBASE, January 1985, through February 2017. The following search terms were used: pneumonia, elderly pneumonia, intensive

care unit, community acquired pneumonia, management and prevention

• Data Extraction

Two reviewers have independently reviewed the studies, abstracted data, and disagreements were resolved by consensus. Studies were evaluated for quality and a review protocol was followed throughout.

The study was done after approval of ethical board of University Of Jeddah.

Microbiology

Causative organism of pneumonia in the elderly population is very similar to younger populations. The most common organism responsible for CAP in an old patients remains to be streptococcus pneumonia; streptococcus pneumonia is identified in up to 58% of cases. Another frequently identified organism is haemophilus influenza that accounts for up to 14% of CAP among elderly, and is associated with chronic obstructive pulmonary disease 'COPD'. Moraxella catarrhalis and methicillin-sensitive staphylococcus aureus can also be found in CAP cases but with relatively lower incidence (about 7%) ^[2]. When it comes to gram-negative organisms, there are usually responsible for hospital acquired pneumonia cases (HAP) rather than CAP. The most common gram-negative organisms responsible for HAP include

Pseudomonas aeruginosa, *Burkholderia cepacia* complex, *Klebsiella pneumoniae*, and *Escherichia coli* [3].

Aspiration pneumonia

The prevalence of pneumonia due to aspiration varies according to many factors, and can range between 6% up to 53.2%. Aspiration normally occurs in all people as they inhale, especially while sleeping. However, when aspiration occurs in large volumes, or when the immune system is compromised, aspiration pneumonia will be the result. Dysphagia is also considered a significant risk factor for the development of aspiration pneumonia, therefore, patients with central nervous system dysfunction causing dysphagia, have higher risk of developing aspiration pneumonia. Other risk factors for aspiration pneumonia include dehydration, sputum suctioning, and dementia. In aspiration pneumonia, usually oral flora and anaerobic bacteria are identified [4].

Severity assessment & criteria for intensive care unit admission

When an old patient presents with CAP, it is crucial to properly assess the severity of the case in order to decide most suitable management. This field has had many research recently, to develop management guidelines that provide the best outcomes with the least possible costs. Mortality can be predicted by a severity assessment tool, thus providing a better vision to decide the more appropriate setting for the patient. The most commonly used tools are the CURB-65 and the pneumonia severity of illness (PSI) score. The PSI score includes twenty parameters that cover demographic data, comorbidities, physical examination, and laboratory/imaging findings. PSI serves mainly in deciding whether to treat the patient in an outpatient or an inpatient setting. The most important factor in the PSI score is age; in a male patient, every year will add one point to the total score [5].

On the other hand, the CURB-65 provides a simpler less complex tool to assess severity, with only the following variables: age, blood pressure, blood urea nitrogen, respiratory rate, and confusion. However, studies have found the CURB-65 tool to provide similar outcomes in predicting severity of CAP [6].

Strategies to manage pneumonia in elderly patients

The most important modality of treatment of CAP is antibiotics (regardless of age). However, when dealing with elderly, differences in treatment may occur due to the fact that CAP will additionally cause a more

severe systemic manifestations. In fact, most elderly with CAP present with non-pulmonary symptoms like cognitive impairment and/or renal dysfunction [7].

Antibiotic

Old patients with CAP are strongly recommended to receive aggressive antibiotics treatment immediately. The most recent guidelines recommend to classify treatment according to the site (the ward service or the ICU). Old patients with CAP who are admitted in the ward will receive antibiotics against *S. pneumoniae*, *H. influenzae*, *M. pneumoniae*, *C. pneumoniae*, and other common pathogens. Recommended antibiotics include fluoroquinolone (like moxifloxacin and levofloxacin) given alone, or B-lactams (ertapenem, third-generation cephalosporin, or ampicillin with sulbactam) along with macrolides, given together [8].

However, when dealing with patients admitted to the ICU, the risk of *Pseudomonas* species must be evaluated. The presence of a concomitant structural lung disease like bronchiectasis is considered the most significant factor predisposing to the infection with *Pseudomonas*. Generally, elderly CAP patients who are admitted to the ICU are recommended to receive a B-lactam along with a macrolide or a fluoroquinolone (to provide coverage for organisms that cause atypical pneumonia). However, ICU patients with a high risk of acquiring *Pseudomonas*, empiric treatment with antibiotics that cover *Pseudomonas* should be added to the present regimen. In severe infections, it is also recommended to provide double coverage against *Pseudomonas*. Elderly with CAP are not recommended to receive aminoglycosides, due to their high rates of ototoxicity and nephrotoxicity. However, severely ill patients can receive aminoglycosides. When the exact pathogen is isolated and identified, specific narrow-spectrum antibiotic use should be administered [9].

Nonantibiotic therapies

Other than antibiotics, critically ill elderly with CAP (especially those admitted to the ICU) are recommended to receive systemic corticosteroids, recombinant human activated protein C (in cases of sepsis and multiple organs failure), and lung protective-ventilation strategies (in cases of acute respiratory distress syndrome, although solid evidence about these treatments is still not present. Other than corticosteroids, some immunomodulatory agents (like statins and ACEIs) can positively affect CAP outcomes, but their use has not been properly studied yet, and further RCTs are needed before recommending their routine use [10].

Prevention

Vaccination is the most important preventive way of CAP among elderly. Unfortunately, not all old patients get the proper vaccination, making them more vulnerable to pneumonia. The efficacy of vaccines among elderly has been debated with some researchers suggesting weaker effects in this population. However, this is still a controversial topic, and therefore, the use of vaccination is still widely recommended, and considered to provide significant decrease in incidence of pneumonia among the elderly population. Current guidelines suggest that individuals aged 50 years or older are recommended to receive influenza vaccine annually, and individuals aged 65 years or older are recommended to receive pneumococcal vaccination^[11].

Reports suggest that smoking can contribute to 35% of CAP cases, and its cessation will significantly decrease CAP incidence especially among elderly. Oral care is also essential especially in hospitalized patients or in nursing homes. However, the role of oral care in decreasing the incidence of CAP still needs further research to be confirmed^[12].

CONCLUSION

Community acquired pneumonia continues to be the leading cause of death due to infectious diseases among patients older than 65 years, and the fifth cause of death overall. It is also associated with significant amounts of long term morbidities. *S. pneumonia* is the most common organism causing CAP. Other atypical organisms can be also detected. The proper selection of antibiotic for treatment is essential for better prognosis. Early treatment with strict adherence are both associated with better outcomes and decreased mortality. Prevention of CAP depends mainly on vaccinations against influenza and *S. pneumonia*. Smoking cessation

is also important and will help decrease incidence of pneumonia.

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