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ROLE OF PHARMACISTS IN THE MANAGEMENT AND PREVENTION OF PNEUMONIA IN ADULTS

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ABSTRACT

Pneumonia is a lung infection that is causing mild to severe illness across all ages and the common causative organisms include viruses, bacteria and fungi. An individual at high risk of experiencing pneumonia including adults in the age group of 65 years or older, the children's younger than 5 years and those who are having poor or underlying health conditions and smokers¹. Common causes of viral pneumonia are influenza and respiratory syncytial virus. Bacterial pneumonia is commonly caused by streptococcus pneumoniae (pneumococcus) and it is important for patients to get the pneumococcal vaccine for prevention.

Keywords: Pneumonia; Pharmacists; Treatment; Community; Hospital;

Community-Obtained Pneumonia (COP)

Treatment recommendations pharmacist can ensure that patients receive appropriate treatment for community-obtained pneumonia (COP), which is received outside of the hospital setting. The COP treatment guidelines were recently updated to recommend amoxicillin as a first-line agent unless patients have a penicillin allergy². Healthy outpatient adults with COP who do not risk factors for antibiotic resistant pathogens should receive one of the following treatments:

amoxicillin 1g 3times a day (first line) or doxycycline 100 mg twice a day or a macrolides (azithromycin 500 mg on the first day then 250 mg daily or clarithromycin 500 mg twice a day or clarithromycin extended release 1g daily)³. Evidence suggests that pneumococcal resistance (over 30%) can be associated with macrolides so this should be taken into consideration when selecting COP treatments³. Pharmacists should need to educate patients about cardiac risks associated with azithromycin, including QTC prolongation and assess for any potential drug interactions³. Patients with community-obtained pneumonia and comorbidities should receive broad spectrum antibiotic treatment in the outpatient setting³. Combination therapy with amoxicillin / clavulanate or a cephalosporin (cefepodoxime, cefuroxime) and a macrolide (azithromycin, clarithromycin) or

doxycycline should be given as initial treatment³. The reserve fluoroquinolone monotherapy (levofloxacin, moxifloxacin, or gemifloxacin) can be given for patients with drug-resistant COP or β -lactam allergies³. Educate patients about serious adverse effects (AEs) that have been associated with fluoroquinolones including tendinitis, tendon rupture, hypoglycemia, peripheral neuropathy and mental health issues⁴.

Individuals who have hospitalized with community-obtained pneumonia will typically require a combination therapy with a β -lactam (ampicillin plus sulbactam, or cefotaxime, ceftriaxone, or ceftaroline) and a macrolide³. Fluoroquinolone monotherapy (levofloxacin or moxifloxacin) can also be used to these patients. Patients with contraindications to macrolides and fluoroquinolones can be advised to give combination therapy with a β -lactam and doxycycline.

Hospital-Attained Pneumonia (HAP)

Hospital-Attained Pneumonia (HAP) and Ventilator-Associated Pneumonia (VAP) Nosocomial pneumonia may occur during a hospital stay and patients may experience ventilator-associated pneumonia (VAP) after being on a ventilator⁵. If conditions are severe, patients can be sending to the intensive care unit (ICU) with pneumonia due to any causative organisms including bacteria,

virus and fungi. Patients admitted to critical care units are also more likely to have complicating comorbidities, baseline immunosuppression, or other risk factors for multidrug-resistant organisms. For example mechanical ventilation, indwelling venous catheters, parenteral nutrition, renal replacement therapy or nursing home residence. "The pharmacists' roles in these cases are essential as they can ensure that patients receive ventilator pneumonia precaution order sets and that certain medications are being replaced regularly to prevent bacterial colonization and administration lines for propofol and lipids. Pharmacists can play an integral role in proper antimicrobial prophylaxis against expected opportunistic infections for immune compromised patients. If a patient has been previously infected by a multidrug-resistant organism or had a recent antimicrobial exposure within the past Ninety days, an infection prophylaxis and treatment regimens must be modified to ensure that the resistance patterns are being adequately covered and to minimize the likelihood of developing an additional resistance⁵.

COVID-19-Based Pneumonia (CBP)

Patients with COVID-19 pneumonia and those who are critically ill with non-COVID-19 pneumonias are having a similar condition and in a similar fashion, as these both conditions are considered as infectious part and an acute respiratory failure component to the illnesses. More information is surfacing to suggest that

recovery from COVID pneumonia is only the beginning, as ICU survivors of COVID pneumonia may still need to battle residual symptoms and a slowing

down to return to baseline functioning upon their discharge.

Vaccine Recommendations

The Food and Drug Administration issued an Emergency Use Authorization for remdesivir for the treatment of hospitalized patients with COVID-19. The National Institutes of Health⁶ (NIH) treatment guidelines were recently updated recommending prioritizing limited supplies of remdesivir for hospitalized patients with COVID-19 who require supplemental oxygen but who are not on high-flow oxygen, non-invasive ventilation, mechanical ventilation, or extracorporeal membrane oxygenation (ECMO), as there is an inadequate evidence of clinical benefit for these individuals⁷. The NIH guidelines were also recently updated to recommend the corticosteroid such as dexamethasone based on the preliminary results obtained from the randomized evaluation of COVID-19 therapy trial^{7,8}. Preliminary data revealed that the mortality rate was lower among patients who were randomized to receive dexamethasone than among those who received standard of care⁸. Based on these results, the NIH recommends using dexamethasone 6 mg per day for up to 10 days for the treatment of COVID-19 to the patients who are mechanically

ventilated and in those individuals who require supplemental oxygen but who are not mechanically ventilated. Clinicians should not use dexamethasone for the treatment of

COVID-19 in patients who do not require supplemental oxygen. The dexamethasone access has become challenging because many wholesalers have run out of the drug. Clinicians may use alternative corticosteroids such as prednisone, methylprednisolone, or hydrocortisone if dexamethasone is not available.

Conclusion

Tactics for Pneumonia Prevention

The main role of pharmacists is they should educate patients about the pneumococcal vaccine and its administration to the recommended population given in table no1. As individuals with influenza can also have a chance to develop pneumonia, it is important for pharmacists to encourage patients to get an annual flu vaccine to prevent this complication. Patients get a lowering the risk of pneumonia by ensuring that chronic medical conditions are controlled and also by quitting smoking habits. Additionally, a frequent hand washing with soap and water, wearing a mask and social distancing are effective ways to prevent COVID-19 and complications including pneumonia.

TableNo.1. Adult Pneumococcal Vaccine Administration Recommendations

S.NO	Adult Pneumococcal Vaccine Administration Recommendations
	Pharmacists should consult CDC's PneumoRecs VaxAdvisor mobile app as a point –of-care resource to determine which pneumococcal vaccine patients require.
1.	<p>Adults aged 19-64 years(Not previously vaccinated) Patients with cerebrospinal fluid leaks or cochlear should receive 1 dose of pneumococcal conjugate vaccine (pcv13 or prevnar13) followed by a dose of pneumococcal polysaccharide vaccine (ppsv23 or pneuvax23) at least 8 weeks later.</p>
2.	<p>Immunocompromized Adults aged 19-64 years(Not previously vaccinated) Conditions: Sickle cell disease or hemoglobinopathies, asplenia, congenital or acquired immunodeficiency, HIV infection, chronic renal failure, neprotic syndrome, cancer (leukemia,lymphoma,multiple myloma, Hodgkin disease, iatrogenic immunosuppression (immunosuppressive drugs, radiation therapy, solid organ transplant) Individuals should receive one dose of PCV13 first, followed by the first PPSV23dose at least 8 weeks later. The secondPPSV23 dose should be given at least 5 years after the first PPSV23 dose.</p>
3.	<p>Adults aged 19-64 years with the following chronic conditions (Not previously vaccinated) should receive one dose of PPSV23.</p> <ul style="list-style-type: none"> ▪ Alcoholism ▪ Chronic Heart Disease ▪ Chronic Liver Disease ▪ Chronic Lung Disease ▪ Diabetes (COPD, asthma, emphysema) ▪ Complications from cigarette smoking
4.	<p>Adults 65 years and older without an immunocompromising conditions, cochlear implant, cerebrospinal fluid.</p> <ul style="list-style-type: none"> ▪ Receive 1 dose of PPSV23 <p>Updated recommendation to engage in shared clinical decision making regarding PCV13(For individuals who have not previously received the vaccine) Patients who received any doses of PPSV23 before age 65 should have 1 final dose at 65 years or older. The last dose should be administered at least 5 years after the prior PPSV 23 dose.</p>

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