Nursing Case Study Analysis

Introduction

Community Acquired Pneumonia (CAP) is one of the most common causes of death, with over 660,000 people affected every year. As much as 46.5% of all affected people and over 50% of people aged 60 and above are admitted to the hospital for treatment. Patients who are hospitalized with CAP have a mortality rate of around 13%. Even after discharge from the hospital, a lot of people and especially those who are aged suffer from a lot of comorbidities. The predisposing factors for acquiring CAP are age, gender, immunosuppression, acute respiratory insufficiency, and sepsis. Due to its extremely high prevalence among the elderly, it is important to actively identify high-risk patients and administer regular vaccines for pneumonia (Kolditz and Ewig, 2017).

In the present case study, the patient has been diagnosed with Community Acquired Pneumonia (CAP) and presents with shortness of breath and a productive cough with green sputum. He is a 72-year old male, both of which are predisposing factors for CAP. His diagnosis has been confirmed through a chest radiograph and he has been taking an antibiotic for bacterial infections since two days. However, his prognosis hasn't been as expected and his condition has worsened after his diagnosis. He is experiencing lethargy, loss of appetite, tachypnoea, tachycardia, and central cyanosis, all of which point to the worsening of his pneumonia.

Patient Presentation and Medical History

The patient, John Jenkins, is a 72-year old male who presented to the Emergency Department of the hospital, complaining of shortness of breath. Two days earlier, he was diagnosed with Community Acquired Pneumonia (CAP) following a chest X-ray, and he was prescribed Amoxicillin/Clavulanate 2g BD orally. However, the patient's condition has worsened in terms of increased shortness of breath, increased lethargy, inability to walk more than a few steps, inability to speak more than a few words at a time, and loss of appetite. The patient's past medical history includes hypertension and gastro-esophageal reflux disease. His current medications include an angiotensin receptor antagonist,Candesartan, 8 mg daily, and a proton-pump inhibitor, Esomeprazole, 40 mg daily.

Primary Survey

The primary survey assessment framework as per the Department of Health, Queensland, Australia, aims to assess the following five criteria – Danger, Response, Airway, Breathing, and Circulation (Cinical Quality & Patient Safety Unit, QAS, 2016). Applying this framework to the patient, the following assessments were made.

Danger

The patient does not seem to be in any life-threatening or unstable situation where he can cause harm to himself or people around him.

Response

The AVPU scale was used to identify patient's response to stimuli.

- **A**lertness – The patient is alert, is talking, and allows physical examination to take place. It was also noted that the patient was sitting on the edge of the bed. He is found to be febrile with a temperature of 38.2 ˚C via his axilla, which is indicative of infection.
- Response to **V**erbal Stimuli – The patient responds to verbal stimuli, as he refuses to lie down and communicates in short 2 to 3 word sentences.
- Response to **P**ainful Stimuli – Painful stimuli was not used to elicit a response as the patient was responsive to verbal stimuli.
- **U**nresponsive – The patient is responsive.

Airway

The patient has a patent airway that does not seem to be obstructed by any physical object. It is observed that he has a productive cough with green sputum, which needs to be analyzed for the presence of infectious agent(s). A green sputum and a productive cough are generally suggestive of a bacterial infection, and it is possible that his pneumonia has been caused by a bacterial agent. A sputum sample analysis will help in identifying the particular pathogen responsible for the infection, which will in turn help in management and therapy (Akter *et al*., 2015). Also, upon auscultation, crackles were heard over his left middle and lower lung lobe, which is a hallmark symptom of pneumonia (Melbye *et al*., 2016).

Breathing

The patient is complaining of shortness of breath and is speaking in 2 to 3 word sentences. He refuses to lie down. Upon assessment, he is found to be tachypneac with a respiratory rate of 28 per minute. This is considerably higher than the normal respiratory rate of 12 to 20 breaths

per minute. A high respiratory rate is indicative of hypoxia and hypercapnia, and requires immediate intervention (Flenady *et al*., 2017). Also, his SpO_2 is 91% breathing room air, which is lower than the normal value of 95%. It is also observed that the patient is centrally cyanotic, which is indicated by the fact that his lips and tongue are bluish in color. A low oxygen saturation and central cyanosis indicate that the patient's hemoglobin is deoxygenated which is another indicator of hypoxia (World Health Organization, 2011).

Circulation

The patient is found to be tachycardic with a heart rate of 115 beats per minute. Otherwise, the heart beat is regular. The heart rate is high as compared to the normal value of 80 to 100 beats per minute, and tachycardia is a common symptom of pneumonia (Mishra and Rath, 2011). Also, the patient is found to have low blood pressure of 100/58 mmHg as compared to the normal value of 120/80 mmHg (FDA, n.d.).

Pathophysiology of Community Acquired Pneumonia (CAP)

Community Acquired Pneumonia (CAP) is an infection of the lungs that is caused due to contact with an infectious person or object. It differs from nosocomial pneumonia which is acquired from a healthcare center. CAP is commonly caused by the bacterium *Streptococcus pneumoniae*, but there may be other bacterial or viral causes too (Watkins and Lemonovich, 2011). It is an acute infection of the respiratory tract, especially of the lung parenchyma, which results in abnormal breath sounds and localized rales in the patient. It begins when the infectious microbe lodges in a healthy person's lung alveoli, which results in an inflammatory response in the body. As a result of this inflammatory response, the lung alveoli are infiltrated

by inflammatory cells resulting in the buildup of pus. This causes stiffness in the lungs which results in tachypnoea, irregular breath sounds, and shortness of breath, as seen in the patient (Atker *et al*., 2015).

When the lung alveoli become filled with inflammatory cells and fluid, the normal function of the alveoli which is to allow gas exchange is impaired. Thus, the alveoli are unable to provide enough oxygen into the circulation resulting in low levels of oxygen and accumulation of carbon dioxide in the body. This is characterized by a lower oxygen saturation rate in the patient, low blood pressure, tachycardia, and central cyanosis (Nursing Care Plan for Pneumonia, 2017).

CAP is mainly characterized by fever, chills, chest pain, and a cough producing sputum. The presence of fever and sputum is very important for the diagnosis of pneumonia, both of which are present in the patient. People that are older may also exhibit weakness and decreased functions and emotional coherence, which is also present in the patient to a certain extent. Apart from these symptoms, other findings that are consistent with pneumonia in the patient include tachycardia, tachypnoea, and crackles in the lung (Watkins and Lemonovich, 2011).

Nursing Interventions for CAP

1. **Improve airway patency**

As the patient is clearly short of breath, tachypneoc, tachycardic, and cyanotic, it is evident that the levels of oxygen in the body are low. Hence, the primary intervention would be to improve the oxygen levels in the body to alleviate the above mentioned symptoms and to improve gas exchange in the lungs. This can be achieved through the following steps:

- *Hydration* – Sufficient amount of fluid intake will help mobilize the secretions in the lungs by thinning them and eventually leading to their clearance.
- *Coughing Exercises* – Helping the patient cough can also improve airway patency by dislodging the pus buildup in the lung alveoli. It can also remove phlegm from the body leading to airway clearance.
- *Chest Physiotherapy* – This is an effective way of loosening lung exudates and it should be performed for improving the airway patency.
- *Use Suction* – If the patient is unable to cough and clear out his phlegm, suction and an advanced airway should be used to improve gas exchange in the lungs (Belleza, 2019; Nursing Care Plan for Pneumonia, 2017).

If patient's symptoms pointing towards lung blockade are not addressed promptly, they can lead to a life-threatening situation due to extremely low levels of oxygen in the body. Upon assessment, a low oxygen saturation level and cyanosis have been identified. The patient is already experiencing shortness of breath, tachypnoea, and tachycardia. All these symptoms warrant immediate attention to prevent the airway of the patient from getting completely blocked.

2. Bring down the patient's temperature

The patient has a temperature of 38.2 ˚C, indicating high fever due to infection. It is essential to bring down the fever either with the help of antipyretics or by keeping the patient cool. This in turn promotes balanced oxygen consumption thus improving the oxygen saturation rate of the patient. It also helps in relaxing the patient, enabling their participation in airway clearance

interventions. At normal body temperature, the patient is more likely to eat well and consume fluids, both of which affect the outcome of pneumonia in the patient (Nursing Care Plan for Pneumonia, 2017).

3. **Administer supplemental oxygen**

As the levels of oxygen in the body are low, even after implementing airway clearance strategies, it might not lead to an immediate improvement in the oxygen saturation levels of the body. If this is the case, then the patient might need supplemental oxygen to increase the oxygen levels in blood circulation. This will help address patient symptoms such as central cyanosis, tachycardia, and low oxygen saturation level in the body (Nursing Care Plan for Pneumonia, 2017).

4. **Promote Fluid Intake**

As the patient is febrile, he is also at a risk of getting dehydrated, and so it is important to promote adequate intake of fluids. Based on factors such as age and patient condition, the patient should be administered at least 3000 ml of fluids per day. If the patient is incapable of oral intake of fluids, intravenous administration of fluids should be considered (Vera, 2019).

5. **Promote Food Intake**

Helping the patient get adequate amount of nutrition will help in the overall prognosis of the infection by improving the metabolic rate of the body and providing the patient with energy to participate in disease management. The first step to ensuring food intake would be to maintain oral hygiene, as the taste and smell of sputum might lead to loss of appetite and nausea in the

patient. The meals given to the patient must be rich in calories and proteins, and they must be soft and easy to swallow. Milk and milk products should be avoided as they may lead to increase in sputum production (Vera, 2019).

Conclusion

In conclusion, the patient's condition has worsened considerably since his diagnosis of CAP two days back. As he is an elderly person, this is expected as he is more susceptible to respiratory illness. Now, it is extremely important to use suitable methods to treat his present condition and address future vulnerability to infection. Immediate nursing interventions include ensuring clearance of airway so that his breathing gets back to normal. This will also help bring in more oxygen in the body to address circulation-related issues such as cyanosis, tachycardia, and low blood pressure. All in all, the patient is alert, conscious, and verbally responsive. Hence, if immediate steps are taken for clearing the airway and managing the fever, there is a considerable chance that the patient will undergo complete recovery.

References

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