



Clinical Challenges for the Management of *Stenotrophomonas maltophilia* Hospital Associated Pneumonia: A Case Report

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(Received: 27 October 2023)

(Revised: 22 November)

(Accepted: 26 December)

KEYWORDS

Pneumonia, hospital acquired pneumonia, broad-spectrum antibiotic, surveillance, bacterial infection.

ABSTRACT:

Hospital-acquired pneumonia is associated with greater rates of morbidity and mortality, which need to be identified and treated immediately and completely. We describe a case of a 70 years old female pneumonia patient, who arrived with abdominal pain and shortness of breath. She later developed mild hyponatremia and was at risk for developing syndrome of inappropriate antidiuretic hormone secretion. *Stenotrophomonas maltophilia*, a Gram-negative bacillus generally cause opportunistic infections in immunocompromised or critically ill individuals, was identified as the causal organism found in patient's blood culture. The patient was treated gently by antibacterial therapy. The patient was discharged with instructions after demonstrating improvement in her health and symptoms. The necessity of identifying and treating pneumonia, hyponatremia, and syndrome of inappropriate antidiuretic hormone secretion in this patient is demonstrated by this case. It also draws attention to the difficulties and disagreements surrounding the diagnosis and management of this infection.

INTRODUCTION

Hospital acquired pneumonia (HAP) is a frequent and possibly fatal lung infection that results in swelling and fluid build-up in the tiny air sacs called alveoli, responsible for gas exchange [1]. A multidisciplinary approach is needed for the diagnosis and treatment of HAP. Identifying the responsible bacteria, choosing the best empirical and tailored antibiotic therapy, monitoring the clinical response, side effects, and minimising the spread and recurrence of infection are the key concerns. HAP need to

be prevented, and this calls for an all-encompassing approach that includes infection control procedures, surveillance programmes, antimicrobial stewardship, immunisation, and education [2]. A few of the most important measures are hand washing, isolation precautions, dental care, raising head of bed, avoiding excessive gastric distension, selective gastrointestinal tract cleansing, and early mobilisation.



Case history

On September 7, 2023, a 70-years-old woman was rushed to the emergency room of the exclusive MM Super Speciality Hospital Mullana, with complaints of breathlessness and abdominal pain that had started at 9:30 pm in the previous day. The patient appeared to be in good health until the next morning, when she suddenly started experiencing shortness of breath, which quickly turned into shortness of breath while at rest. This was linked to anxiousness, a sore throat, and broad bodyache. Additionally, the patient reports attack of diffuse, dull hurting abdominal discomfort that wasn't accompanied by distention, vomiting, or loose stools. Patient with poor GCS (Glasgow Coma Scale) was transferred to medical ICU under general medicine. After receiving detail information and written agreement, she was sedated, intubated, and put on mechanical ventilation.

Physical examination

On examination she had a temperature 97° F, respiratory rate 14 breaths/minute, SPO₂- 100%, pulse rate 102 beats/per minute, blood pressure 130/80 mmHg, on AC/VCV FIO₂ 60% and RBS 318 mg/dl.

On systemic examination

Patient was sedated, B/L planters mute, B/L pupils mid dilated and not reactive to light, neck rigidity absent, respiratory system B/L air entry decreased. Crept present in B/L base, CVS- S1, S2 heard and no murmurs.

Investigations

Regular monitoring of vitals, RBS, and ABG was done (Table 1).

Table 1: Details of laboratory values of patient during hospitalization

Parameter	Normal Value	Day-1 (08/07/23)	Day-2 (11/7)	Day-3 (14/7)	Day-4 (17/7)	Day-5 (20/7)
Haemoglobin	FEMALE 12-15 gm%	12.3	11.5	11.5	-	11.3
TLC	4-10 x 1000/cumm	19.7	15.97	13.85	-	7.23
Polymorphs	40-75%	90%	84%	80%	-	70%
Serum Sodium	135-145 mEq/mol	137	123	130	135	134
Serum chloride	96-106 mEq/mol	99	88	95	94	94
ALP	28-112 U/L	129	-	-	-	-
AST/SGOT	5-35 U/L	47	-	-	-	-

Other than this ESR was found to be 50 mm at 1st hour (slightly high), HbA1c was 5.9% (Normal), blood culture showed *Stenotrophomonas maltophilia* (*S. maltophilia*) growth in culture after 24 hours of incubation. The patient was ticarcillin resistant. NCCT head was suggestive of normal study of brain. USG W/A was grossly normal. Serum osmolality was found to be 268 mosm/kg (lower than normal).

Diagnosis and Management

Patient was diagnosed a case of HAP based on blood culture and sensitivity test reports. On further evaluation patient developed hyponatremia (? Syndrome of inappropriate antidiuretic hormone secretion) based on lab investigations and lower serum osmolality values. Appropriate corrections were applied in form of salt supplementation with RT feed and 3% NS infusion. Regular chest and limb physiotherapy was done. After



symptomatic improvement and multiple attempts patient was extubated on 13/09/2023 and shifted to general ward on 17/09/2023. ENT opinion was taken in virtue of persistent hoarseness of voice and difficulty in swallowing. Gradually patient was shifted from RT feed to oral diet and mobilisation was actively encouraged. Patient became symptomatically better, vitals stable and hence got discharged with advice to follow up in medicine OPD with investigation reports.

Treatment

The patient's in-patient management included following medications:

- PIPTAZ 4.5 gm Injection (piperacillin 4000 mg and tazobactam 500 mg). It was given through IV route 8 hourly for 14 days.
- LEVOFLOX 500 Infusion (levofloxacin 500 mg). It was given through IV route 24 hourly for 9 days.
- ENCLEX 40 Injection (enoxaparin 40 mg), It was given through SC route once daily for 8 days.
- PANTOP 40 Tablet (pantoprazole 40 mg). It was given through oral route once daily.
- NEOSPORIN Dusting Powder (bacitracin 400 IU, neomycin 3400 IU, and Polymyxin B 5000 IU). It was topically applied on skin for long acting twice daily.

Patient was discharged on 21/09/2023 with following medications:

- Tablet PANTOP 40 mg, once daily.
- Regular physiotherapy.
- Table CO-AMOXICLAV 625 mg (amoxicillin-500 mg and clavulanic Acid- 125 mg). It was given through oral route thrice daily for 5 days.
- Tablet NEUROBION Forte (optimal combination of nerve-nourishing vitamins B like B1, B6, and B12). It was given through oral route 1 tab once daily.

DISCUSSION

S. maltophilia, an environmental bacteria can colonise the blood, skin, respiratory tract, urinary tract, and other parts of the human body [2]. Numerous illnesses, including

bacteraemia, endocarditis, skin and soft tissue infections, pneumonia, and urinary tract infections, can be brought on by it. It frequently evades the effects of several antibiotics, including beta-lactams, aminoglycosides, macrolides, tetracycline, and chloramphenicol [3]. Because of this, there are few and limited therapeutic options available for the treatment of *S. maltophilia* infections, especially, in individuals who have had previous exposure to antibiotic therapy or who have underlying lung illness. A positive culture from a sample of the lower respiratory tract taken during bronchoscopy or tracheal aspiration is necessary for the diagnosis of *S. maltophilia* infected HAP or VAP. The findings of the susceptibility testing and the patient's health determine the best course of antibiotic selection [4]. Trimethoprim-sulfamethoxazole (TMP-SMX) has strong activity against *S. maltophilia*, making it the first-choice antibiotic for infections caused by this pathogen. Alternative medications, such as ceftazidime, levofloxacin, minocycline, ticarcillin-clavulanate, or doxycycline, may be recommended since some strains of *S. maltophilia* may be resistant to TMP-SMX. For serious or resistant instances, combination therapy including two or more antibiotics may also be taken into account. One of the newer tetracyclines with broad-spectrum antibacterial action, tigecycline, have demonstrated good susceptibility to *S. maltophilia* resistant to levofloxacin and/or TMP-SMX [3]. Antibiotic treatments for *S. maltophilia* pneumonia (HAP or VAP) are typically given for 7 days, while immunocompromised patients may require 10 to 14 days [5].

CONCLUSION

For HAP patient, major underlying illnesses, or both, additional signs can be examined, including the size and make-up of the peripheral WBC count, chest radiographs, and blood gas tests. Combining serum procalcitonin levels with clinical response criteria allows one to decide whether to discontinue or continue the antibiotics. The most common combination medications used to treat *S. maltophilia* infection include antipseudomonal, antistaphylococcal fluoroquinolones (levofloxacin) and antipseudomonal, antistaphylococcal lactams (piperacillin/tazobactam or cefepime). The risk of developing VAP should be reduced, by avoiding aspiration



(head lifted 45° degree) and extended mechanical breathing of patients.

DECLARATION OF PATIENT CONSENT

The authors declare that they have obtained all appropriate patient consent. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed

CONFLICT OF INTERESTS

There is no conflict of interests.

ABBREVIATIONS

ABG: Arterial blood gases; **AC/VCV:** Assist control/Volume control ventilation; **ALP:** Alkaline phosphatase; **AST:** Aspartate transaminase; **B/L:** Bilateral; **CVS:** Cardio vascular system; **ESR:** Erythrocyte sedimentation rate; **ENT:** Ear nose throat; **FiO₂:** Fraction of inspired oxygen; **GCS:** Glasgow coma scale; **HAP:** Hospital-acquired pneumonia; **HbA1c:** Glycated haemoglobin; **ICU:** Intensive-care unit; **NCCT:** Non-contrast computerized tomography; **NS:** Normal saline; **OPD:** Out-patient department; **RBS:** Random blood sugar; **RT:** Ryle's tube; **SIADH:** Syndrome of inappropriate antidiuretic hormone secretion; **TMP-SMX:** Trimethoprim-Sulfamethoxazole; **USG** **W/A:** Ultrasonography whole abdomen; **VAP:** Ventilator-associated pneumonia.

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