

A Case Study on Hospital Acquired Stenotrophomonas Maltophilia

Dr. Blessy Rachal Boban, Dr. Sheethal R Johnson

Clinical Pharmacist, Believers Church Medical College Hospital, Thiruvalla, Kerala, India

ABSTRACT

Stenotrophomonas maltophilia (xanthomonas) is a multidrug – resistant, aerobic non fermentative negative bacillus that is an opportunistic pathogen, particularly a common coloniser of the respiratory tract in hospitalised patients. This hospital acquired organism emerged as an important nosocomial pathogen associated with high mortality rates. This case study is based on an elderly patient diagnosed with Type 2 Respiratory Failure, who was on mechanical ventilation and had multiple organisms found in ET minibal. The patient was treated with beta lactams, macrolide, carbapenem, antifungal and fluoroquinolone. The patient was then found to be hemodynamically and clinically stable.

KEYWORDS: Nosocomial, Tracheostomy, Atelectasis, Mediastinal Pneumothorax, Nystagmus, ET minibal

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INTRODUCTION

Stenotrophomonas maltophilia is a motile Gram-negative non fermentative bacilli which is emerging as an opportunistic, nosocomial pathogen that primarily affects immunocompromised patients [1, 2]. The bacteria frequently colonize patient body fluid ((respiratory aerosols or mucous, urine, and wound exudates)

[3]. It is an etiological agent in bacteraemia, ocular infection, endocarditis and RTIs (associated with cystic fibrosis), wound infection, urinary tract infections (UTI), meningitis, sepsis, skin, and soft tissue infections. *S. maltophilia* is also associated with community-acquired infections. Studies have identified sink drains, faucets, water, and sponges, etc., as environmental sources of *S. maltophilia* in the homes of colonized and non colonized CF patients. [4]. *S. maltophilia* nosocomial pneumonia is associated with mechanical ventilation, tracheostomy and the use of respiratory tract equipment such as nebulizers. [5].

Treatment of infection caused by *S. maltophilia* is complicated as the pathogen exhibits multi drug resistance (MDR). *S. maltophilia* is intrinsically resistant to aminoglycosides and commonly used carbapenems. A high dose of TMP-SMX

(15 mg/kg) is a first line drug for the treatment of *S. maltophilia* infections. However some patients are unable to tolerate TMP- SX due to hypersensitivity reaction, drug toxicity or other adverse reaction. Fluroquinolones, in particular Levofloxacin, are potential alternatives to TMP-SX[6].

CASE PRESENTATION

65 year old female k/c/o dyslipidemia and bronchial asthma, presented with the complaints of breathing difficulty, and cough since 1 week; aggravated for 2 days was admitted under pulmonology department.. No history of chest pain and hemoptysis. On evaluation the patient was tachypneic with noisy breathing and desaturation, ABG showed Respiratory acidosis hence the patient was intubated from the emergency department. Post intubation, patient had cardiac arrest .1 cycle of CPR given and patient was revived. Patient was shifted to ICU and was put on an invasive ventilator. Patient was managed with antibiotics, bronchodilators, steroids and other supportive measures. In view of reduced responsiveness and nystagmus, MRI-Brain and EEG to rule out hypoxic brain injury and seizure activity. Started Inj. Levetiracetam 1g. D-Dimer was also found to be elevated. CT-PA showed Cardiomegaly with right ventricular dilatation and septal deviation to left; Minimal bilateral pleural effusion with basal lung atelectasis (R>L); And no evidence of pulmonary thromboembolism and suggested pulmonary arterial hypertension. Echo showed-Mildly dilated RA/RV, Mild decrease in LV contractility(LVEF=47%), LV diastolic dysfunction, Sclerotic aortic valve, Moderate to severe AR, No AS,Mild MR, Mild to moderate TR, Mild PAH, Intact septae, No visible clot/effusion/vegetation. Inj.Heparin 5000 IU was started prophylactically in view of RA/RV dilatation. Repeated ABG showed no improvement hence invasive ventilation was continued. ET - Minibal culture showed MDRO-Streptococcus pneumonia and antibiotics were escalated and given

accordingly with the sensitivity reports hence the patient was started on Inj. Meropenem. Patient had thick secretions while suctioning. Bronchoscopy showed edematous mucosa, mucous plugging left more than right. Bronchial wash culture showed *Candida albicans*, started on T.Fluconazole. Repeated echo showed-Mildly dilated RA and RV,Mild decrease in LV contractility, Mild LV systolic dysfunction(LVEF=45%),RV dysfunction, Stage II LV diastolic dysfunction, Sclerotic aortic valve; No AS; Moderate AR, Mild MR; No MS, Mild TR, Mild PAH, No effusions, No obvious clot seen. Started antiplatelet -T. Aspirin and T.Atorvastatin. On evaluation the patient was also found to have deranged liver enzymes, started T.Ursodeoxycholic acid. Serial monitoring of ABG showed improvement hence patient extubated on morning .On the same day evening patient had an episode of bradycardia, hypotension with desaturation and patient became unresponsive hence 1 cycle of CPR was given and revived then reintubated. Repeated ABG showed Type II respiratory Failure.

In view of weaning failure, tracheostomy was done. Post procedure patient developed surgical emphysema with facial puffiness and the tracheostomy tube was found to be blocked with secretions and blood hence the tracheostomy tube was decannulated and the patient was reintubated. Post event chest x ray showed Heterogeneous infiltrates in Right hemothorax, Subcutaneous Emphysematous shadow bilateral, Continuous Diaphragm sign, Pneumothorax left side with mediastinal pneumothorax. Repeated chest x ray showed left sided pneumothorax hence emergency ICD inserted and ICD bag showed Bubbling and repeated chest x ray showed lung expansion. Found a tracheostomy block, surgical emphysema and recannulated on the same day. Patient was weaned off from pressure control ventilation to portable BIPAP. Thereby symptomatically better. 2D Echo showed

Normal Chamber Dimensions, RA & RV Normal in size, RV Systolic Dysfunction, Mild Decrease in LV Contractility, Mild LV Systolic Dysfunction(LVEF=48%), Stage II Diastolic Dysfunction, Sclerotic Aortic Valve; No AS; Moderate -Severe AR,Grade II MR; No MS, Trivial TR; Mild PAH, Intact Septae, No clot/Pericardial effusions/Vegetations. Planned for continuing T.Levetiracetam for 2 months. Antiplatelets and anticoagulants which were stopped prior to tracheostomy procedure; thereby stopping Inj.Heparin and to continue T.Aspirin. ICD tube showed no bubbling and Column movement, repeated chest x ray showed no evidence of pneumothorax hence ICD tube was removed and post ICD removal chest x ray showed no evidence of pneumothorax.

On that day, the patient had a sudden episode of bradycardia, desaturation and GCS drop. In view of the event repeated chest x ray showed Right sided pneumothorax and also emphysema with facial puffiness. Emergency ICD tube insertion was done and a patient was found to have bleeding from ICD site in view of this 1 pint PRBC transfusion was given. Then the tracheostomy tube was removed and the patient was intubated in view of desaturation and bradycardia and tension pneumothorax. Repeated chest x ray showed lung expansion with mediastinal pneumothorax. Planned recanalization if extubation fails. In ET Mini Bal culture blood infective markers showed elevated with MDRO-Klebsiella Pneumonia and patient was continued with Inj.Meropenem for a total period of 21 days after discussion with the Antimicrobial stewardship team. Post extubation patients developed hypotension thereby put on

Noradrenaline infusion continuously and was tapered down accordingly. Patient tolerated well with CPAP and repeated ABG showed improvement hence the patient was weaned off from CPAP to portable CPAP and was shifted out. Deferred elective management in view of the present respiratory condition of the patient. Serial monitoring of ABG showed improvement hence Non invasive ventilation was made as intermittent with Nasal prong oxygenation. Patient improved symptomatically hence non invasive ventilation was weaned off and the patient was put on continuous nasal prong oxygenation. Continuous chest physiotherapy with vibrator was given to the patient as chest x ray showed Right sided mucous plug. Repeated chest x ray showed improvement and was continued with the chest physiotherapy.

Speech language therapists (SLT) advised to continue Ryles Tube Feed Microaspiration. ET Minibal culture showed a second organism *Stenotrophomonas maltophilia* with sensitivity to Levofloxacin and co trimoxazole and patient was started on Inj.Levofloxacin 750mg. Repeated x ray showed no evidence of pneumothorax and ICD tube showed no column movement and bubbling hence Right sided Chest tube was removed and the repeated chest x ray showed no evidence of pneumothorax. Patient improved symptomatically with no further events hence the patient was shifted to room. VDL scopy showed no evidence of aspiration and retained the NG tube for a period of 10 days and started oral feeds, hence the patient started on an oral soft diet and the patient tolerated well with no aspiration. Repeated Blood infective markers showed a rising trend hence URE was repeated which showed numerous RBC with 6-8 pus cells. Raising CRP levels with numerous RBC but no evidence of Infective Endocarditis at that time since parameters are not meeting modified Duke's criteria and started T.Spironolactone, T.Furosemide 40mg BD and T.Ramipril 1.25mg HS. On evaluation, the patient right sided ICD suture site seems to be unhealthy with slough. Hence, removed suture and C&D. Daily dressing with debridement and the tissue was sent for culture. Tissue culture report showed Heavy growth *Klebsiella Pneumonia* and antibiotics were started accordingly. Then removed ryles tube, serial limb and chest physiotherapy was given to the patient during hospitalisation. Patient improved symptomatically hence nebulisations were tapered down and switched to MDI. Serial monitoring of arterial blood gas was done and advised to continue oxygen therapy at home at 2lit O₂/min via nasal prongs for 24 hours per day. Patient was hemodynamically and clinically stable hence being discharged with the advice to follow up after 1 week.

DISCUSSION

ICU-acquired *S. maltophilia* is associated with high ICU mortality and morbidity rates. In addition, ICU-acquired infection related to *S. maltophilia* is an independent risk factor for ICU mortality [7].

Although skin is probably not a favorable environment for the development of *S. maltophilia*, this bacterium may be transiently present on the hands of staff members during nursing practices [8]. *S. maltophilia* has also been isolated

from multiple nosocomial sources, including disinfectant solutions [9]. *S. maltophilia* can adhere to medical equipments (eg, tracheal intubation) and increases the chances of lower respiratory tract infection, which may be the reason why patients with *S. maltophilia* infection tend to

have a history of medical invasive operation [10]. In this patient, ICD tube insertion was done and in view of bleeding from the ICD insertion site, the tracheostomy tube was removed. The patient was intubated in view of saturation drop. Initially the organism found in ET mini bal was *Streptococcus pneumoniae* followed by *Candida albicans*. Later on developed *Klebsiella pneumoniae* (MDRO) and finally colonised with *Stenotrophomonas maltophilia*. Patient was managed with appropriate antibiotics. Infection control and antibiotic stewardship measures are important to minimise the incidence of *S. maltophilia* infection and for reducing emergence of resistant strains. These include appropriate use of antibiotics, avoidance of prolonged or unnecessary use of foreign devices and adherence to hand hygiene practices.

ABBREVIATIONS

S. maltophilia – *Stenotrophomonas maltophilia*

ET mini bal – Endotracheal mini bal

ICU – Intensive Care Unit

ICD – Intercostal Drainage

MDRO – MultiDrug Resistant Organism

ABG – Arterial Blood Gas

MDI – Metered Dose Inhaler

SLT – Speech Language Therapists

CRP – C Reactive Protein

CPAP- Continuous Positive Airway Pressure

CTPA- Computed Tomography Pulmonary

Angiography

PAH – Pulmonary Arterial Hypertension

RA/RV- Right Atrium/Right Ventricle

MR – Mitral Regurgitation

AR – Atrial Regurgitation

TR – Tricuspid Regurgitation

LVEF– Left Ventricle Ejection Fraction

CPR – CardioPulmonary Resuscitation

BiPAP- Bilevel positive airway pressure

PRBC- Packed Red Blood Cells

VDL – Video Laryngoscopy

NG – Nasogastric

URE - Urine Routine Examination

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