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Case Report

Stenotrophomonas Maltophilia, Opportunistic Multi-Drug Resistant Organism Inducing Pulmonary Infection Complicated with Lung Abscess.

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Abstract

Introduction*: In 1943 Stenotrophomonas maltophilia was first identified under genius of Pseudomonas then in 1993 the organism finally got its name. The name signifies "a unit feeding on few substrates," based on the Greek roots stenos (narrow), trophos (one who feeds), and monas (a unit). It is a ubiquitous, aerobic, non-fermentative, multi drug resistance gram-negative bacillus. The organism usually causes nosocomial infections. In our case, the patient was admitted as Community acquired Pneumonia complicated with multiple pulmonary abscesses. He received empirical antibiotic without clinical improvement where diagnostic bronchoscopy and Bronchoalveolar lavage done and BAL culture grown for Stenotrophomonas Maltophilia. The organism was resistant to all of the tested antibiotics except for sulfamethoxazole / Trimethoprim explaining the reason for non-improvement and complication of multiple pulmonary abscesses.* ***Discussion****: Stenotrophomonas Maltophilia is a multi-drug resistant, aerobic, non-glucose fermenting, non-sporulating, Gram-negative bacillus. The reported incidence of S. maltophilia infections ranges from 7.1 to 37.7 cases per 10,000 discharges. It may cause a variety of infections; however, Pneumonia and bacteremia are the most common manifestations.* ***Conclusion****: Stenotrophomonas Maltophilia is a multidrug resistant organism with multiple complications if not treated early due to lack of response to multiple antibiotics. Early detection and treatment are crucial to avoid progression of the infection and life-threatening complications.*

Key words: Stenotrophomonas Maltophilia, Pneumonia and Pulmonary abscess, Multidrug resistant organism.

Introduction

During the pandemic of COVID infection, we received a case of Pneumonia and multiple pulmonary abscesses after work up BAL culture grown for Stenotrophomonas Maltophilia with significant clinical improvement after she received sulfamethoxazole / Trimethoprim as it was the only antibiotic which was sensitive to it. Stenotrophomonas Maltophilia is an opportunistic multidrug resistant gram-negative bacillus, initially called Bacterium bookeri, when it was first identified in 1943 from a specimen of human pleural fluid. It was later classified as Pseudomonas Maltophilia in 1961, then reassigned to the gamma-proteobacteria class

as Xanthomonas Maltophilia in 1983, and eventually classified as a Stenotrophomonas Maltophilia in 1993 (1).

S. maltophilia can be considered a "newly emerging pathogen of concern" that is being isolated more frequently. It is also recognized as one of the underestimated important multi-drug resistant organisms in hospitals by the World Health Organization (WHO) (2). Risk factors associated with *S. maltophilia* infection include admission to an intensive care unit (ICU), malignancy, cystic fibrosis, neutropenia, mechanical ventilation, central venous catheters, recent surgery, trauma, HIV infection, and previous therapy with broad-spectrum antibiotic (3 - 5). *S. maltophilia* infections are typically hospital-acquired; even in community-acquired infections, most affected individuals have significant health care exposure or predisposing comorbidities (eg, prior trauma, an immunocompromising condition, indwelling devices) (4).

Case Presentation:

Female patient in the six decades of life presented with fever for two weeks associated with cough and expectoration of minimal amount white sputum. No hemoptysis. No chest wheezes. She is complaining of dyspnea. She is complaining of malaise and easy fatigue. Systemic review other than general toxic symptoms was negative. No nasal discharge or obstruction. No chest pains. She is complaining of palpitation mainly during fever spikes. No skin rash. No change in bowel habit. She is complaining of generalized arthralgia without any features of arthritis. No history of chronic diseases. No history of allergy. No family history of TB or other chronic diseases. She is working as a house maid.

On examination the patient is pale and looking tired. Vital signs Temp 38.5, SPO2 95% RA, RR 28, Heart rate 112, regular pulse average volume and Blood Pressure 110/78. No eye redness, no nasal congestion, Mild pharyngeal congestion. Chest vesicular breathing with bilateral crackles infra-mammary on the left side and back. Cardiac examination normal S1S2 no audible murmur. Abdomen lax and freely mobile. No Lower limb edema.

Chest X ray done shows features of left side lung abscess (Figure 1). Laboratory work up showed high inflammatory markers (C-Reactive protein 60 mg/L – WBCs 10.5 Neutrophilic mainly – serum Ferritin 670) The patient received a course of Ceftriaxone 2gm daily and Clarithromycin 500mg Twice daily. After 48 hours the patient is still complaining of recurrent high fever spikes. Laboratory results showed further elevation of WBCs 14.1 and C-Reactive protein 232 mg/L), Sputum culture results grown for commensal organism.

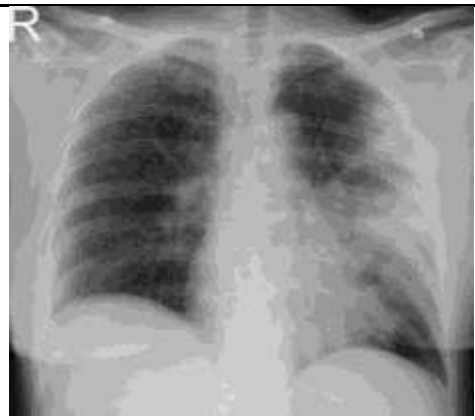

Figure 1: left middle zone lung abscess, left basal consolidation.

The decision was made to change the antibiotic plan to Meropenem 1000mg IV three times daily and Levofloxacillin 750mg IV once daily. After another 48 hours we did not notice any clinical improvement regarding the patient's condition with recurrent high fever spikes. CT chest done showed multiple left side lung abscesses with pulmonary consolidation (Figure 2).

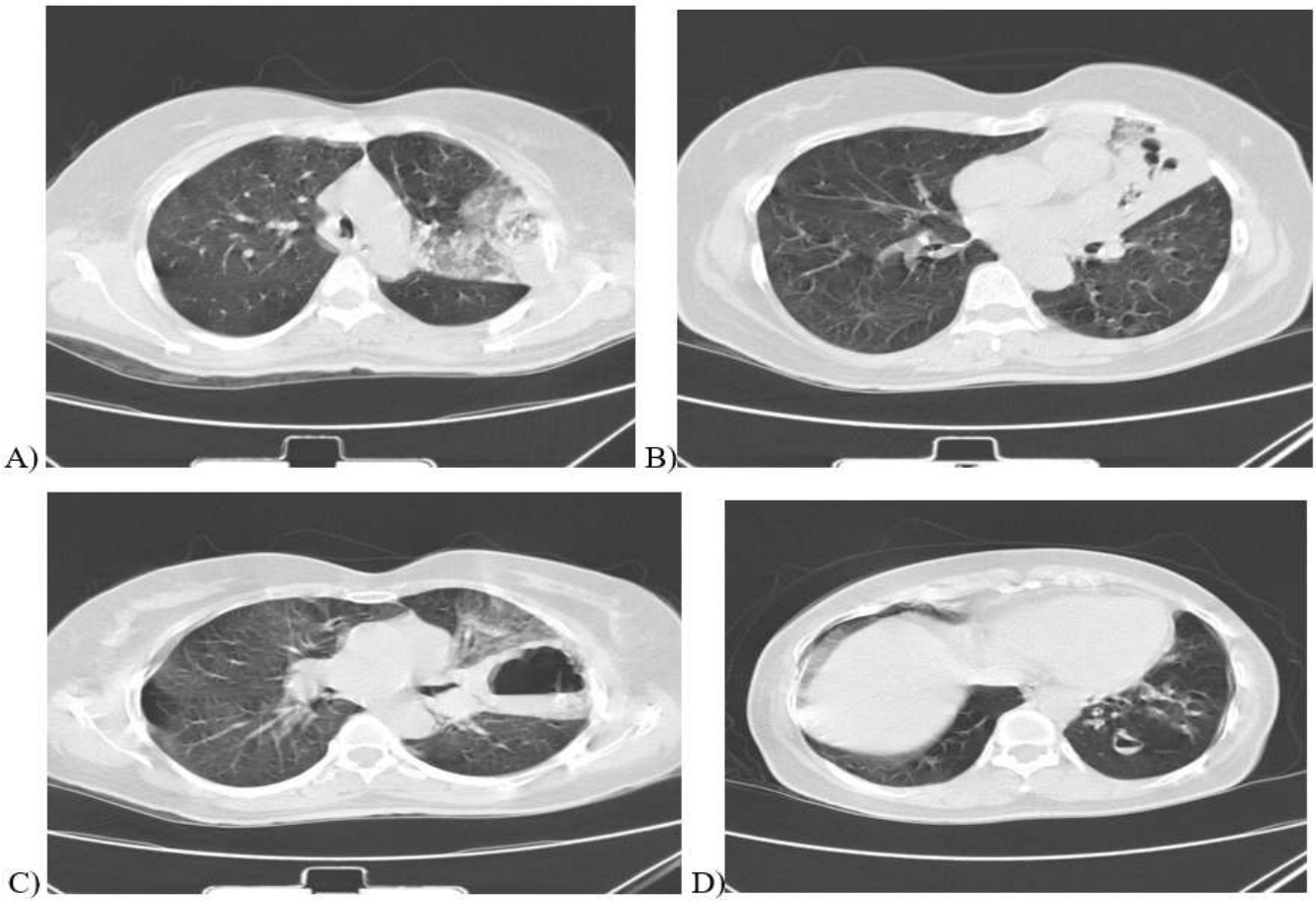

Figure 2:

A)Left upper lobe consolidation, B)Consolidation with central necrosis, C)Lung abscess, D)Left lower lobe small abscess

After the result of CT chest, we planned for diagnostic Bronchoscopy for evaluation and Bronchoalveolar lavage. The procedure was done under conscious sedation which revealed normal mobile vocal cords. Thick white secretions seen in the trachea and main bronchi are associated with mucosa inflammation (figure 3).

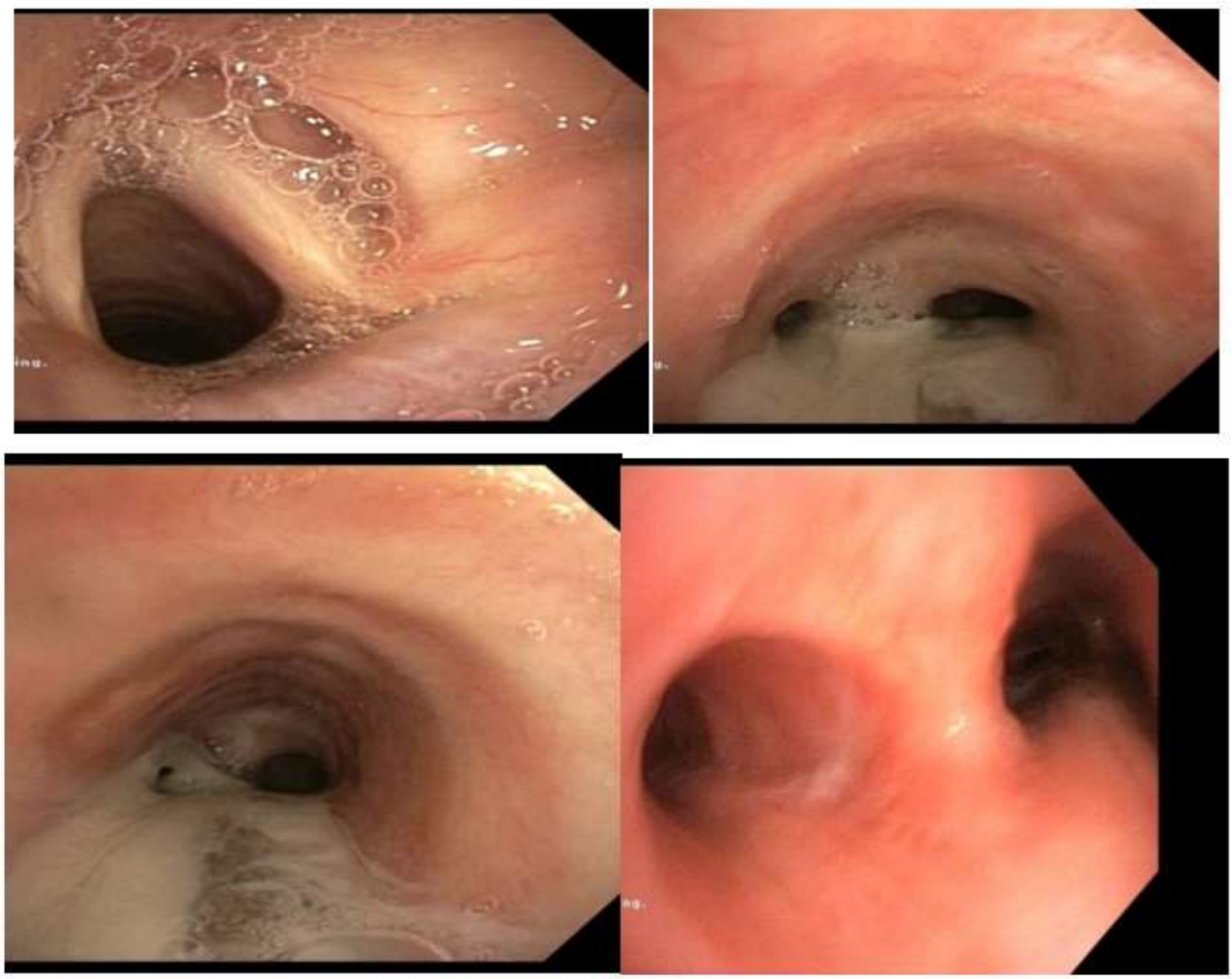

Figure 3

Bronchial alveolar fluid showed mainly neutrophilic cells, AFB and Mycobacterial PCR were negative. BAL culture grown to Stenotrophomonas Maltophilia culture result in (Table 1).

BAL Grown for Stenotrophomonas Maltophilia **Antibiotic sensitivity results**	
Amikacin	Resistant
Ampicillin	Resistant
Amoxyclav	Resistant
Ceftazidime	Resistant
Ceftriaxone	Resistant
Gentamycin	Resistant
Ciprofloxacillin	Resistant
Cefuroxime	Resistant
Meropenem	Resistant
Sulpha Methoxazole Trimethoprime	Sensitive

Table 1

After the results of the culture, the antibiotic plan changed to Sulfamethoxazole Trimethoprime DS tablet twice daily. After 48 hours the patient is feeling much improvement, she became afebrile. After 5 days the patient's respiratory symptoms, cough and dyspnea are improving. Chest X ray repeated after 5 days of treatment showed significant improvement (Figure 3).

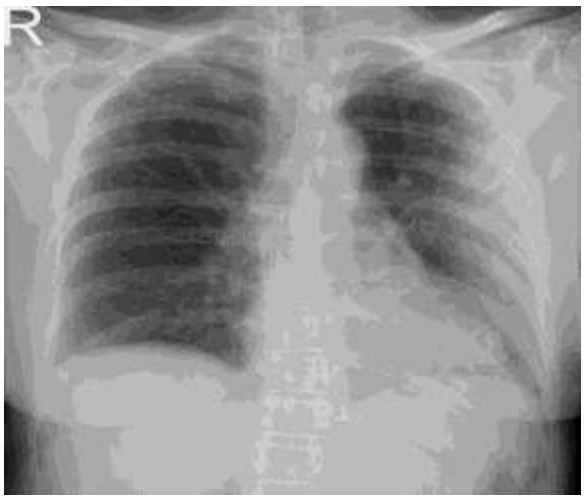

Figure 4

After 10 days CT chest repeated showed significant radiological improvement (Figure 4).

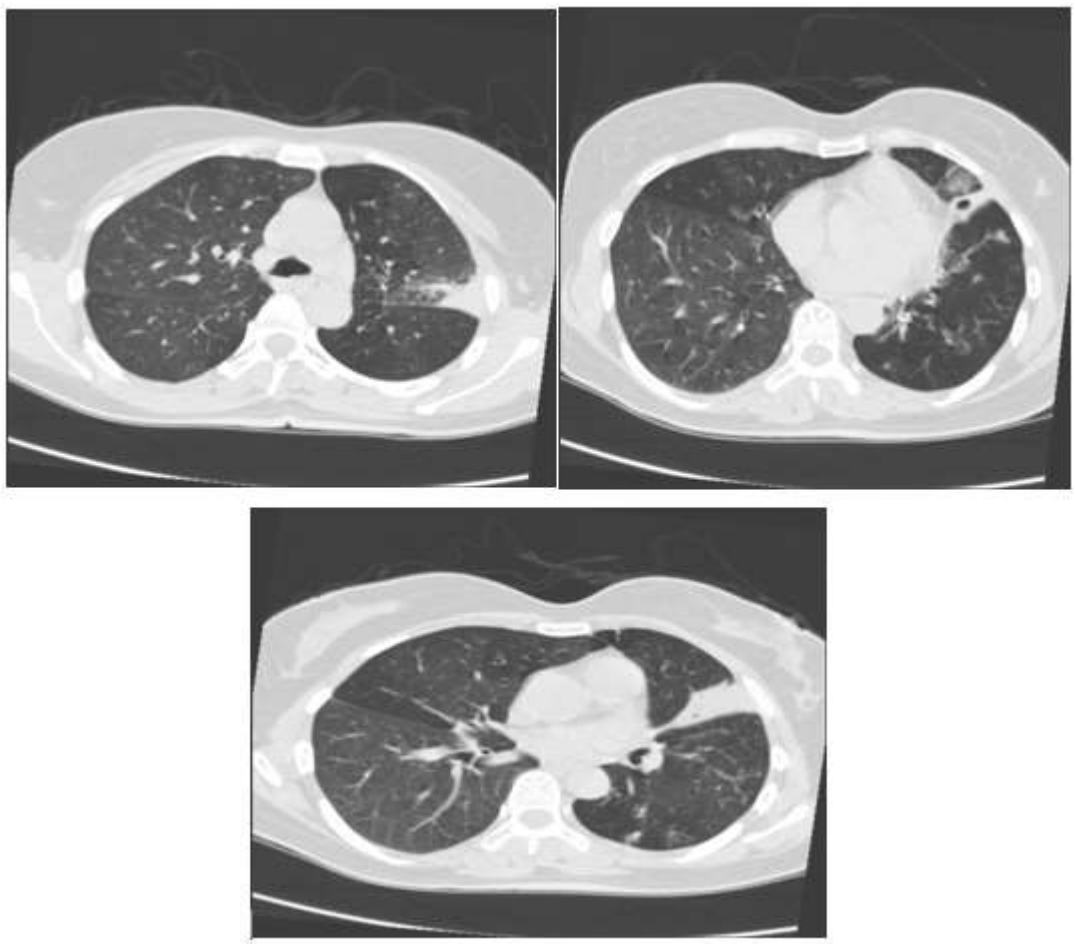

Figure 5

Discussion

Stenotrophomonas Maltophilia is an opportunistic multidrug resistant gram-negative bacillus, primarily an aerobic plant pathogen that is also isolated in soil and water. Although S. Maltophilia is considered a pathogen with low virulence, it has been increasingly reported as a nosocomial pathogen responsible for serious infectious complications in immunocompromised hosts (6 - 7). In that case, the patient was presented with progressive respiratory symptoms and persistent fever. The patient was isolated in the ward and started ceftriaxone without improvement, where further work up and diagnostic bronchoscopy done, and culture result revealed Stenotrophomonas Maltophilia. Usually, Pneumonia and bacteremia are the most common manifestations of infection of Stenotrophomonas Maltophilia but not commonly complicated with multiple lung abscesses. The predisposing factors for Stenotrophomonas maltophilia infection associated with medical factors affecting the immune system like malignancy, transplant recipients, cytotoxic therapy, chronic

respiratory disease, indwelling urinary catheter, breakdown of mucocutaneous defense barriers, neutropenia, intensive care unit stay, use of broad-spectrum antibiotics, and long-term hospitalization. The risk factor associated in our case cloud be related to her socioeconomic condition (7 – 8). Stenotrophomonas Maltophilia can be readily identified in the culture of relevant clinical specimens. However, differentiating colonization from true infection can be difficult and depends on the anatomic site from which the culture sample was obtained and the patient's clinical presentation. In that case the sample was bronchoalveolar lavage in addition to the radiological finding and clinical symptoms, so we confirm that is true infection (9). Infections should be treated promptly because a delay in appropriate treatment can contribute to significant mortality. Treatment options include Trimethoprim-sulfamethoxazole is the preferred one , for infections other than cystitis, the typical dose is 8 to 12 mg/kg/day of the trimethoprim component intravenously in 2 or 3 divided doses, with a maximum dose of 960 mg of trimethoprim component per day. An equivalent oral dosage is two double strength tablets every 12 hours for a patient who weighs 70 kg. alternative antibiotic, Minocycline 200 mg intravenously or orally every 12 hours. Minocycline is not recommended as monotherapy for UTIs or bacteremia due to low concentrations in the blood and urine. Another alternative is Levofloxacin 750 mg intravenously or orally once daily (10). In our case we started on monotherapy on Trimethoprim-sulfamethoxazole according to the culture sensitivity result. There is extensive clinical experience with TMP-SMX, and observational studies and case series report somewhat favorable clinical outcomes (11 – 12). In observational studies, in-hospital or 30-day mortality rates ranged between 21 and 31 percent with monotherapy with TMP-SMX. Outcomes were similar when compared with other antimicrobials (11 – 12). The duration primarily depends on the site of infection. For bacteremia, we favor 14 days of therapy. Although studies have suggested that shorter courses are similarly effective for gram-negative bacillary bacteremia, *S. maltophilia* was not well represented in those studies. In our case we continue treatment for 28 days with significant clinical and radiological improvement.

Conclusion

Multidrug resistant organisms like Stenotrophomonas Multophilia should be considered in some patients who have persistent fever with progressive respiratory symptoms, especially in immune compromised patient. Further work up and prompt treatment is crucial for prognosis and avoid further complications.

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