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# *Stenotrophomonas maltophilia* Infection in a Patient with Acute Exacerbation of Chronic Obstructive Pulmonary Disease (COPD): A Colonizer or True Infection?

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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**Conflict of interest:** None declared

**Patient:** Female, 77-year-old
**Final Diagnosis:** Stenotrophomonas maltophilia
**Symptoms:** Cough • shortness of breath
**Medication:** —
**Clinical Procedure:** —
**Specialty:** Pulmonology

**Objective:** Challenging differential diagnosis

**Background:** This article describes a finding of sputum culture positive for *Stenotrophomonas maltophilia* in an elderly woman with past medical history of chronic obstructive pulmonary disease (COPD) and hypertension, presenting with acute hypoxemic hypercapnic respiratory failure secondary to COPD exacerbation from bronchitis/bronchopneumonia.

**Case Report:** Computed tomography (CT) of the chest showed secretions in the lower lobe bronchi and small scattered clustered nodules consistent with bronchitis/mild bronchopneumonia without evidence of pulmonary embolism. A sputum culture was positive for *Stenotrophomonas maltophilia.* She was treated with trimethoprim/sulfamethoxazole for 10 days. She recovered and was subsequently discharged from the hospital.

**Conclusions:** *Stenotrophomonas maltophilia,* previously known as a colonizer, is now being recognized as a true respiratory infection, especially in immunocompromised patients and those with chronic diseases like COPD presenting with signs and symptoms of infection. Therefore, early identification and prompt treatment of *Stenotrophomonas maltophilia* infection is important for a favorable outcome.

**MeSH Keywords:** Pulmonary Disease, Chronic Obstructive • Respiratory Tract Infections • *Stenotrophomonas maltophilia*

**Full-text PDF:** https://www.amjcaserep.com/abstract/index/idArt/924577







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## Background

*Stenotrophomonas maltophilia* is an aerobic, motile, non-fermentative, non-sporulating, gram-negative bacillus that is a multi-drug resistant organism associated with infections such as bacteremia, pneumonia, urinary infection, endocarditis, meningitis, and peritonitis as a nosocomial infection, particularly in immunocompromised patients. It has also been reported in patients with acute exacerbation of COPD with known history of endotracheal intubation or mechanical ventilation [1–8]. *Stenotrophomonas maltophilia* is believed to be a colonizer in patients with chronic lung diseases, such as cystic fibrosis. We present a case of *Stenotrophomonas maltophilia* infection in a patient with acute exacerbation of COPD without history of frequent hospitalization or prior intubation.

## Case Report

A 77-year-old woman with past medical history of chronic obstructive pulmonary disease (COPD) on mometasone-formoterol and albuterol inhalers without bronchiectasis or frequent hospitalizations presented to the emergency room with worsening cough, shortness of breath, and sputum production. She reported having recently had a cold with rhinorrhea, sore throat, and congestion 2 weeks prior to presentation. She noted only 1 hospitalization for COPD exacerbation in the past 5 years. She was a former smoker. Vital signs at presentation included oxygen saturation of 80% on room air, respiratory rate of 55/minute, pulse rate 126/minute, and temperature 37.4°C. She was immediately started on bi-level positive airway pressure (BiPAP) for about 48 hours. On physical exam, she was dyspneic, with increased work of breathing on BiPAP, expiratory wheezing in all lung fields, without crackles. The remainder of the physical exam was normal.

### Investigations

A chest x-ray showed no infiltrate, pleural effusion, or vascular congestion. Arterial blood gas showed pH 7.36, bicarbonate 27.4 meq/L, pCO2 49 mmHg, and pO2 87 mmHg while on bi-level positive airway pressure. BNP was 2598 pg/ml, troponin was elevated at 0.09 ng/ml, and EKG was without ST-T wave changes. A chest CT showed secretions in the lower-lobe bronchi and small scattered clustered nodules consistent with bronchitis/mild bronchopneumonia, without evidence of pulmonary embolism or bronchiectasis. A sputum sample was collected on day 2 of admission. White blood cells were elevated at 22 200/μL. Liver transaminases were within normal limits.

### Differential diagnosis

Based on the history and examination, the initial diagnosis was acute hypoxemic hypercapnic respiratory failure secondary to COPD exacerbation and new-onset congestive heart failure exacerbation based on clinical findings. A diagnosis of community-acquired pneumonia was also considered. Given her elevated troponin at admission, an echocardiogram was performed, showing ejection fraction of 35% and marked hypokinesis of the middle cavity through the apex of the left ventricle circumferentially. However, catheterization showed a normal right dominant coronary artery and normal left main bifurcated into the normal left anterior descending and circumflex arteries.

### Treatment

The patient was diuresed with intravenous furosemide for new-onset heart failure. She was also administered azithromycin 500 mg daily for 5 days, albuterol and ipratropium nebulization, formoterol fumarate, and budesonide for a presumed COPD exacerbation. At day 5, the result of the sputum culture showed *Stenotrophomonas maltophilia,* and she was started on trimethoprim/sulfamethoxazole for 10 days. A decision was made to treat this as a true infection because she was not improving on the empiric antibiotics and continued to have persistent mucus stasis. She improved after the initiation of trimethoprim/sulfamethoxazole for *Stenotrophomonas maltophilia*. She was also started on carvedilol and lisinopril for stress-induced cardiomyopathy, but developed hypotension and acute kidney injury, leading to subsequent discontinuation of these medications.

### Outcome and follow-up

Her respiratory symptoms improved after initiation of trimethoprim/sulfamethoxazole, but she developed acute kidney injury in the setting of treatment with trimethoprim/sulfamethoxazole, lisinopril, and reduced oral intake. She also developed hypotension from treatment with carvedilol and reduced oral intake. With discontinuation of lisinopril, carvedilol, and fluid repletion, her acute kidney injury resolved, and blood pressure stabilized. She was then discharged to short-term rehabilitation.

## Discussion

Although COPD exacerbations are often triggered by respiratory viral infections, bacterial infections may also contribute to or trigger these events [9]. *Stenotrophomonas maltophilia* has been described more recently as a nosocomial infection, particularly in immunocompromised people, with comorbidities, and those with chronic diseases, and patients with bacteremia





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have a high mortality rate [3,10–12]. It has been isolated in nosocomial sources such as mechanical ventilators, central venous catheters, and other medical devices in the hospital setting [13]. It has also been reported as a community-acquired infection among immunocompetent patients in a systematic review by Falagas et al. in 2009 [14]. It has also been found in patients with acute exacerbation of COPD and bronchiectasis or requiring intubation and mechanical ventilation. Other factors that could increase the risk of COPD patients to these multidrug-resistant organisms include frequent hospitalization, long-term corticosteroid use, prior antibiotic use, and nutritional impairment [15,16]. Many of these reported cases were admitted to the intensive care unit.

However, for many clinicians there is still the question of whether *Stenotrophomonas maltophilia* is a colonizer or a true infection. Isolation of this organism in patients with severe COPD or signs and symptoms of infection, including pneumonia, should not be ignored [17–19].

Our severe COPD patient did not have frequent hospitalizations, prior invasive mechanical ventilation, or antibiotic use, but was found to have a sputum culture positive for *Stenotrophomonas maltophilia*. A decision was made to treat this infection because the patient was not improving on the empiric antibiotics and continued to have persistent mucus stasis. Her condition improved after the initiation of trimethoprim/sulfamethoxazole for *Stenotrophomonas maltophilia*.

*Stenotrophomonas maltophilia* identification is frequently delayed awaiting growth of sputum culture and is not typically covered for in empiric antibiotic regimens for acute exacerbation of COPD, which may lead to higher mortality rates among these patients [20]. It has been recommended that a sputum culture be obtained from patients with frequent exacerbations, severe airflow limitations, and/or acute exacerbations requiring mechanical ventilation. Early sputum culture identification is very helpful in effective management of *Stenotrophomonas maltophilia*, as strains are frequently resistant, and given the limited treatment options available for this infection [13,21]. Resistance is thought to be due to slow bacterial growth and a high rate of mutation [7]. However, trimethoprim/sulfamethoxazole still remains the drug of choice and is typically very effective in treating this infection [1]. Alternatives for treatment include ciprofloxacin, ceftazidime, ceftriaxone, and ticarcillin/clavulanate if co-trimoxazole cannot be taken [14,22].

## Conclusions

Although *Stenotrophomonas maltophilia* was previously thought to be a colonizer, it can be a true infection in immunocompromised patients or those with chronic diseases such as severe COPD. Therefore, early identification with sputum culture and prompt treatment of *Stenotrophomonas maltophilia* infection is important for a favorable outcome.

### Department and Institution where work was done

Department of Internal Medicine, Reading Hospital, West Reading, PA, U.S.A.

### Conflict of interest

None.

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