Stenotrophomonas maltophilia

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Stenotrophomonas maltophilia was first isolated in 1943 as *Bacterium bookeri*, renamed in 1961 to *Pseudomonas maltophilia* and later renamed again to *Xanthomonas maltophilia* in 1983, based on ribosomal RNA analysis. Further analysis revealed that this organism merits its own genus, and was renamed a final time to *Stenotrophomonas maltophilia* in 1993.

General characteristics of *S. maltophilia:*

- Gram-negative obligate aerobe that is rod shaped and motile with a few polar flagella. It is able to persist in nutrient-poor aqueous environments.
- A global emerging environmental, multi-drug resistant organism that is most commonly associated with respiratory tract infections in humans.
- A significant feature of *S. maltophilia* is its ability to form biofilms on surfaces including Teflon®, glass, and plastics and on host tissues, including lung cells.
- It is NOT an extremely virulent pathogen, but it has emerged as an important nosocomial pathogen, with mortality rates up to 69% in patients with bacteraemia. Risk factors associated with increased mortality include organ failure, severe septic shock and malignancy.

Sources of S. maltophilia[1]

Stenotrophomonas maltophilia has been isolated from various sources associated with water, both inside and outside the hospital setting.

Clinical / Medical	Non-clinical
Electronic ventilator temperature sensors	Plant rhizosphere
Ventilator inspiratory/expiratory circuits	Washed salads
Central venous catheter	Soda fountain machines
Nebulizers	Yellowtail fish, snakes, goats, buffalo, West-African dwarf crocodile
Endoscopes	Deep-sea invertebrates
Dental suction system hoses	Water treatment process and distribution system
Dental solid waste	Returned liquor from wastewater plant
Haemodialysis water and dialysate from renal units	Biofilms on fracture surfaces in aquifers
Contaminated chlorhexidine-cetrimide disinfectant	Sinkholes of the Yucatan Peninsula
Hand-washing soap	Saline subterranean Lake Martel (Spain)
Irrigating solutions	River water
Sink drains	Water fountain drains and sink drains
Faucets/faucet aerators, showerheads	Showerheads
Water fountain drains	Tap water and bottled water
Patients' medical charts	Micro-filtered water dispensers
Cystic fibrosis patient cough-generated aerosols	Home-use nebulizers of cystic fibrosis patients
Ice machine	Contact lens stock solutions
Tap water	
Water treated by filtration, reverse osmosis, UV exposure, or deionization	
Micro-filtered water dispensers	

S. maltophilia-associated infections[1,4]

Infection with *S. maltophilia* has been associated with the following clinical conditions:

- Pneumonia
- Acute exacerbations of chronic obstructive pulmonary disease
- Bacteraemia
- Cellulitis/myositis
- Osteomyelitis
- Catheter-related bacteraemia/septicaemia
- Meningitis
- Endophthalmitis/keratitis/scleritis of the eye; dacryocystitis
- Endocarditis
- Urinary tract infection
- Biliary sepsis

Risk factors for *S. maltophilia* infections include:

- Immunocompromised patients, including cancer patients receiving chemotherapy, transplant recipients on immunosuppressive therapy and patients with AIDS
- Chronic respiratory disease, including cystic fibrosis
- Presence of indwelling catheters
- Mechanical ventilation
- Prior broad-spectrum antibiotic use
- Prolonged hospitalisation or ICU stay

Treatment strategies for *S. maltophilia* infections

S. maltophilia is generally considered to be resistant to anti-pseudomonal beta-lactams and aminoglycosides[2].

The preferred treatment of *S. maltophilia* infections has been the bacteriostatic compound trimethoprim-sulfamethoxazole (TMP-SMX), but resistance to TMP-SMX is slowly emerging.

Levofloxacin may be used as an alternative antibiotic to treat infection. A recent study indicated that levofloxacin is non-inferior to TMP-SMZ for the treatment of *S. maltophilia* infection[3]. Rapid development of resistance to fluoroquinolones has been observed *in vitro* and *in vivo*.

There is ongoing debate about the use of monotherapy versus combination therapy to treat *S. maltophilia* infections. New treatment strategies include the use of select antibiotics in synergy, e.g. TMP-SMX and tigecycline.

Other alternative treatment strategies for treating *S. maltophilia* infections include:

- Aerosolized colistin
- Aerosolized levofloxacin
- Tigecycline
- Moxifloxacin

Several studies are also investigating the use of antimicrobial peptides (including peptide inhibitors of beta-lactamase) and cationic compounds for the treatment of *S. maltophilia* infections.

References

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