

Susceptibility of Actinomyces species to potential therapeutic antimicrobials

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Objectives: Actinomycosis is a chronic disease characterized by abscess formation, tissue fibrosis and draining sinuses, caused by Actinomyces species. These bacteria are normal colonising organisms of the oropharynx, gastrointestinal tract and female genital tract, requiring a break in the mucous membranes to invade deeper body structures and cause illness. Infections often develop in tissue adjacent to mucous membranes; oral and cervicofacial infections are most common but any body-site can be infected and, rarely, disseminated spread can occur. Current treatment of actinomycosis is penicillin or amoxicillin. However, these infections are usually polymicrobial requiring treatment which covers all organisms. This study aims to determine the susceptibilities of Actinomyces species to 11 antimicrobials thought to offer alternative therapies. **Methods:** 287 Actinomyces species of varied morphology were used; *A. israelii*, *A. gerencseriae*, *A. graevenitzii*, *A. meyeri*, *A. naeslundii*, *A. odontolyticus*, *A. urogenitalis*, *A. turicensis*, *A. cardiffensis*, *A. funkei*, *A. europaeus*, *A. georgiae*, *A. neuii*, *A. timonensis*, *A. oricola*, *A. hominis*, *A. johnsonii*, *A. oris*, *A. radingae*, *A. honkongensis*. MICs were determined for penicillin (P), amoxicillin (A), ceftriaxone (CX), erythromycin (E), clindamycin (CD), clarithromycin (CM) meropenem (M), rifampicin (R), tetracycline (T), doxycycline (D) and ciprofloxacin (CP) using agar dilution (CLSI). **Results:** MIC50, MIC90, MIC range, percentage resistance, percentage susceptibility are shown in table 1. R was most active with MIC50 and MIC90 of 0.004 and 0.008 respectively. Only a few isolates of *A. neuii*, *A. radingae*, *A. turicensis* & *A. funkei* had MICs greater than 0.03. M was very active against all species, exhibiting MIC50/MIC90 of 0.008/0.12. P, A, CX, E, CD, D, T were all active against most species. All isolates of *A. urogenitalis* exhibited \geq MIC90 MICs to all antimicrobials except R, M & CX. All 10 *A. funkei* showed MICs \geq 0.25. CP & CM were least active against all species. Using EUCAST BPs, no resistance was found to occur with A & M, whilst 6.6% and 4.2% resistance was found in penicillin & clindamycin respectively. **Conclusions:** Rifampicin & meropenem were most active, with meropenem showing efficacy against all species. Some species showed association with resistance to certain antimicrobials therefore species determination is important when choosing therapy.

	MIC Range	MIC50	MIC90	% R
P	0.015-1	0.06	0.25	6.6%
A	0.008-2	0.25	0.5	0%
CX	0.015-4	0.12	0.5	N/A
E	0.008->64	0.06	0.25	N/A
CD	0.008->64	0.12	0.5	4.2%
CM	0.004->64	0.03	>64	N/A
M	<0.002-0.5	0.008	0.12	0%
R	<0.002-0.12	0.004	0.008	N/A
D	0.03-32	0.5	1	N/A
T	0.12-64	0.5	2	N/A
CP	0.25-128	16	32	N/A