

Importance of coryneform bacteria in infective endocarditis

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Coryneform bacteria have been defined as *non-sporing Gram-positive rods with an irregular outline*.¹ Almost all can be grown aerobically and assigned to the class *Actinobacteria* which are characterized by a high guanine-cytosine content (>50%) and specific 16S rDNA signature nucleotides.² Some of the genera in this class are environmental bacteria but some (*e.g.*, *Actinomyces*, *Brevibacterium*, *Corynebacterium*, *Dermabacter*, *Propionibacterium*, and *Rothia*) belong to the human microbiome and have also been reported as agents of human and animal disease. *Coryneform* genera and species have been either confirmed or newly outlined since the 1990s when biochemical and molecular tests (PCR, 16S rDNA sequencing) were undertaken on a large scale.³

Coryneform endocarditis is rare. In an international study on infective endocarditis coryneforms,⁴ although not specifically mentioned, probably figured among the 4 to 5% of causative microorganisms other than staphylococci, streptococci, enterococci, HACEK, fungi, and those causing polymicrobial or culture-negative infections. By now, species of *Actinomyces*, *Arcanobacterium*, *Arthrobacter*, *Brevibacterium*, *Cellulosimicrobium*, *Cellulomonas*, *Corynebacterium*, *Gardnerella*, *Propionibacterium*, and *Rothia* have been reported as agents of infective endocarditis, albeit for most of them the number of cases has been so small as to exclude an evaluation of pertinent features of the disease and its treatment. This is even true for the genera *Actinomyces* and *Rothia*,^{5,6} since reported cases of individual species are not numerous enough yet for a satisfactory analysis. At this time, the only exceptions are cases due to *Corynebacterium diphtheriae*, *C. pseudodiphtheriticum*, *C. striatum*, and *Propionibacterium acnes*. Cases reported earlier as coryneform or diphtheroid endocarditis cannot be included in evaluations since they lack species diagnoses.⁷

A 2007 review article has listed risk factors and outcomes of infective endocarditis due to various species of the genus *Corynebacterium*.⁸ Aortic and mitral valves were affected in most instances. Non-toxicogenic strains of *C. diphtheriae* have caused endocarditis in homeless and HIV-positive individuals as well as in drug addicts who transmitted the organisms through needle sharing as proven by ribotyping.⁹ Treatment with penicillin alone or in combination with an aminoglycoside was mostly successful, in contrast to cases due to toxigenic strains.^{8,10}

Toxigenic strains of different clonal groups have exhibited an aggregative-adhering pattern in HEp-2 cells.¹¹ While strains of *C. pseudodiphtheriticum* affected males and those with prosthetic valves more frequently and showed higher mortality than non-toxicogenic strains of *C. diphtheriae*,¹² strains of *C. striatum* causing endocarditis were frequently nosocomial and multiply antibiotic-resistant but the majority of patients survived under appropriate treatment.^{8,13}

P. acnes is probably underestimated as an agent of infective endocarditis. While the percentage of isolates from blood cultures that can be attributed to endocarditis is very small – most isolates are skin contaminants – approximately 50 cases have been reported in the literature.¹⁴ Males and patients with prosthetic valves were affected predominantly; and complications such as myocardial abscesses and valvular insufficiency were frequent.¹⁵ In spite of treatment with antibiotics that were effective *in vitro* (penicillin alone or with an aminoglycoside) 75% of the patients had to undergo surgery. Interestingly, only 62% showed positive blood cultures;¹⁵ in the rest, the diagnosis was made by histopathology of the excised valves.¹⁶

It is to be hoped that species identification and susceptibility testing of microorganisms in cases of coryneform endocarditis will lead to characterization of more species-specific features.

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