Correspondence

Chronic Granulomatous Disease, Catalase, and Actinomyces

To the Editor—We read with interest the article “Actinomyces in Chronic Granulomatous Disease: An Emerging and Unanticipated Pathogen” by Reichenbach et al [1]. However, we do not believe this series of patients with chronic granulomatous disease (CGD) and Actinomyces infection demonstrates compelling evidence to dismiss the traditionally recognized risk factor of microbial catalase as the most important virulence factor in patients with CGD unless phenotypic-negative catalase results from the species isolated in this series are made available.

Actinomyces infection in patients with CGD should not necessarily be considered as supporting evidence for a different mechanism of virulence, because Actinomyces species are not universally catalase-negative, as was suggested in the article [1]. It is notable that, of the 8 Actinomyces isolates identified to the species level, 7 were identified as Actinomyces naeslundii (6 specimens had positive culture results, and 1 specimen had positive serological test results). The genospecies type 2 of A. naeslundii is catalase-positive in ~55% of isolates, and 30% of all genospecies isolates of A. naeslundii were catalase positive in one dental study [2]. Occasionally, other Actinomyces species can be catalase positive, as well [3]. In a recent review of 92 clinically significant strains of Actinomyces species identified by 16S ribosomal DNA analysis, no isolates were identified as A. naeslundii, which highlighted the infrequency of this organism as a cause of clinically significant disease in patients without CGD [4].

Without this essential biochemical data, the conclusion that the “susceptibility of patients with CGD to infection with catalase-negative Actinomyces species confirms that catalase production is neither necessary nor sufficient for microbial virulence in CGD” is not supported by this article [1, pp 1708–1709]. Rather, catalase positivity, which is frequently found in A. naeslundii, may still explain most of these infections. In conclusion, this series may not significantly depart from the traditional association of catalase-positive microbial infections and CGD. Although catalase-negative infections in patients with CGD have been described, the frequency of such infections, compared with those due to catalase-producing organisms, and the importance of alternative mechanisms require further investigation.

Acknowledgments


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References


Reply to Agger and Kowalski

To the Editor—We appreciate the comments of Drs Agger and Kowalski, which echo the traditional assumption that microbial catalase production is the “most important virulence factor in patients with chronic granulomatous disease [CGD]” [1, p. 1325]. They rightly point out that Actinomyces can be variable in terms of catalase production, and although the majority of strains are catalase negative, a significant number may be catalase intermediate or even catalase positive. However, because Actinomyces are generally considered to be catalase negative, and because most are, we thought it important to point out that they do, in fact, cause significant morbidity in CGD. Although it is true that most pathogens associated with CGD are catalase positive, that is a generaltruism applicable to all pathogens that affect humans: most pathogens are catalase producing, with the broad exception of the streptococci. We cited several strong lines of clinical and basic evidence that support our assertion that catalase is not per se a necessary virulence factor in CGD infections. First, deletion of catalase from Staphylococcus aureus did not change its virulence in a mouse model of CGD [2]. Second, deletion of catalase from Aspergillus nidulans did not change its virulence in a mouse model of CGD [3]. Third, numerous case reports and cases from our current series are clearly caused by catalase-negative organisms, negating catalase as a necessary virulence factor in CGD [4]. Drs Agger and Kowalski are correct that we did not study every strain of Actinomyces for catalase production, and there are indeed catalase-positive strains of Actinomyces naeslundii. We did study the National Institutes of Health–isolated strains for catalase production with use of standard techniques and found them (from patients 3, 4, 5, and