Antibiotic prophylaxis for infective endocarditis

Knowledge and implementation of American Heart Association Guidelines among dentists and dental hygienists in Alberta, Canada

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ABSTRACT

Background. Knowledge and interpretation of the 2007 American Heart Association (AHA) guidelines regarding infective endocarditis (IE) prophylaxis among the dental community is not well established. The authors' aim was to determine how dentists and dental hygienists interpret the 2007 AHA guidelines.

Methods. The authors sent a cross-sectional survey to a random sample of 450 dental hygienists and 450 dentists in Alberta, Canada. The survey ascertained whether the practitioner would recommend IE prophylaxis to a high-risk cardiac patient undergoing a variety of dental procedures and for a variety of cardiac lesions in patients requiring gingival manipulation.

Results. One hundred forty-nine hygienists (33%) and 194 dentists (43%) completed the survey. Use of prophylaxis for specific dental procedures was heterogeneous; 43% of hygienists recommended prophylaxis for polishing, 46% did not, and 11% replied "sometimes." Hygienists were more likely than dentists to inappropriately recommend IE prophylaxis for low-risk lesions including mitral valve prolapse (54% of hygienists versus 42% of dentists recommending prophylaxis; $P = .037$) and hypertrophic cardiomyopathy (23% versus 15%; $P = .057$). The authors also observed a failure to recommend IE prophylaxis for high-risk lesions, including mechanical valve (that is, 81% of hygienists and 91% of dentists recommending prophylaxis; $P = .008$).

Conclusions. There is heterogeneity within the dental community with respect to IE prophylaxis. Dental hygienists are more likely than dentists to recommend IE prophylaxis for low-risk cardiac lesions. Both dentists and hygienists did not consistently recommend prophylaxis for all high-risk cardiac lesions.

Practical Implications. Greater emphasis on IE prophylaxis education is required in training programs and continuing professional development.

Key Words. Endocarditis; infective; dental hygienists; dentists; heart valve diseases; practice guidelines; prophylaxis.

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Infective endocarditis (IE) is an uncommon but life-threatening infection. Despite advances in diagnosis, antimicrobial therapy, surgical techniques, and management of complications, IE remains associated with significant morbidity and mortality.[1] The American Dental Association approved revised guidelines for the prevention of IE published by the American Heart Association (AHA) in 2007,[2] which were endorsed by the Canadian Dental Association.[3] The 2007 AHA guidelines stated that dental procedures involving manipulation of gingival tissue or the periapical region of teeth or perforation of oral mucosa, performed on patients who have a limited group of specified cardiac indications (for example, prosthetic valve, prior endocarditis), require antibiotic prophylaxis.

Supplemental material is available online.

One objective of the AHA guidelines was to reduce ambiguities and inconsistencies and to provide greater clarity for patients and health care providers. Nonetheless, the results of surveys of dentists regarding IE prophylaxis have demonstrated that heterogeneity exists among dentists regarding their interpretation of the dental and cardiac conditions for which IE prophylaxis should

be used.[4-10] However, there is a paucity of data regarding the uptake of the AHA guidelines among dentists outside the United States. Similarly, there are no data on the understanding and compliance of the AHA guidelines among dental hygienists, who in some jurisdictions are licensed to practice independently of dentists. Therefore, we sought to determine the extent to which Canadian dentists and dental hygienists follow the AHA guidelines and to ascertain the degree of practice variation among these professionals.

METHODS

Study design. We conducted a cross-sectional survey.

Study population. We included dentists and dental hygienists in full- or part-time practice in Alberta, Canada. We excluded retired professionals and those in training.

Procedure. We used a random number generator to select the 450 dentists and 450 hygienists to whom we sent the survey. We obtained e-mail addresses for dental hygienists and postal mail addresses for dentists from the College of Registered Dental Hygienists of Alberta and the Alberta Dental Association and College, respectively. After we developed the questionnaire, we pilot-tested it by using a small group of dentists and hygienists (n = 8) whose responses helped us test the questionnaire for readability, determine ease of understanding, and reduce ambiguity of questions. We made no changes to the survey on the basis of the results of the pilot test. We gave dentists the option to complete the survey online or to return it by postal mail using a prepaid envelope. All dental hygienists received the questionnaire electronically through e-mail contact. We sent 2 reminders to nonrespondents at 2 weeks and 4 weeks after the initial date of contact. We provided the opportunity to win an electronic tablet as an incentive to participate. Completion of the survey served as consent to study participation. We obtained approval to conduct the study from the University of Alberta (Canada) Health Research Ethics Board.

Questionnaire. The questionnaire consisted of 5 parts. A copy of the survey is available in Appendixes 1 and 2 (available online at the end of this article). Part 1 inquired whether practitioners would use IE prophylaxis for a variety of dental procedures in a patient having a high-risk cardiac lesion, as defined by the AHA.[2] Basing the wording of our questions on each profession's scope of practice, we posed different dental scenarios in the survey that we sent to dentists compared with the survey we sent to hygienists. Part 2 inquired for which cardiac lesions the practitioner would recommend prophylaxis among patients undergoing an invasive dental procedure with gingival manipulation. We referenced the same cardiac lesions in questions being posed to dentists and hygienists. Part 3 inquired about other factors influencing prophylaxis use, such as patient preference. Part 4 requested demographic information, including year of graduation, location of practice (for example, urban, rural) and type of practice (for example, solo, group, university-based, military). Part 5 asked participants to indicate whether they were aware of the 2007 AHA guidelines before they received the survey and whether they referred to these guidelines when they were completing the survey.

Statistical analysis. To have a level of precision within a range of 10%, with a confidence interval of 95%, we calculated that we would require responses from 93 hygienists and 93 dentists; we made this calculation by assuming there would be a 50% "yes" response to a given dental scenario. This was a conservative estimate, as the number of respondents required for the same level of precision would have been even lower if the proportion of "yes" responses for a given scenario was more or less than 50%. We entered data using REDCap (that is, Research Electronic Data Capture) electronic data

TABLE 1

Participant characteristics.

CHARACTERISTIC	DENTAL HYGIENISTS, NO. (%)	DENTISTS, NO. (%)
Scope of Practice		
General or family dentistry	NA*	171 (89.5)
Pediatric dentistry		15 (7.9)
Orthodontics		9 (4.7)
Periodontics		10 (5.2)
Oral surgery		20 (10.5)
Prosthodontics		12 (6.3)
Others		8 (4.2)
Type of Practice		
Independent	8 (6.8)	NA
In conjunction with a dentist(s)	110 (93.2)	
Year of Graduation		
Before 2000	43 (37.4)	123 (65.8)
2000-2004	19 (16.5)	24 (12.8)
2005 or after	53 (46.1)	40 (21.4)
Location of Practice		
Urban	99 (84.6)	160 (83.3)
Rural	18 (15.4)	32 (16.7)
Type of Practice		
Solo	48 (40.7)	72 (37.3)
Group	62 (52.5)	114 (59.1)
University based	1 (0.9)	0 (0.0)
Other	7 (5.9)	7 (3.6)

* NA: Not applicable.

ABBREVIATION KEY. **AHA:** American Heart Association. **IE:** Infective endocarditis. **NA:** Not applicable.