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Research Article

Infective Endocarditis Caused by Oral Microorganisms and Entrance Door and Previous Dental Procedures: Does a Relationship Exists?

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ABSTRACT

There are no recent studies that have evaluated the epidemiological relationship between dental manipulations the etiology of IE by these microorganisms, basically *Streptococcus viridans*. Our objective is to analyse the relationship between these variables and the possible therapeutic implications. For this, we have analysed a prospective single-center series of IE in patients not addicted to parenteral drugs collected and followed between 1987 and 2018. 403 cases of native and late prosthetic IE were diagnosed and followed up in our center. Of them, 91 were produced by oral streptococci (22.6%). The percentage of this microorganism has remained constant throughout the 30 years (24.8% of the cases from 1987-1997, 25% of those from 1998-2007 and 19.1% from 2008-2018. Although there was a history of dental manipulation in a greater proportion in cases of IE due to *Streptococcus viridans* (24% vs. 6.5%, $p < 0.001$), in most cases due to *Streptococcus viridans* (76% of them) there was no previous dental manipulation. In these cases, the infection may be due to the usual daily manipulations of the mouth (brushing, dental floss) or periodontal disease. Given this low sensitivity, it cannot be ruled out that IE is caused by this microorganism in the absence of a history of visiting the dentist, with the implications for empirical antibiotic treatment that this entails.

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Introduction

The classic pathogenesis of infective endocarditis (IE) is based on the infection of a previous cardiac lesion by microorganisms originating from bacteremia produced through an entrance door from outside the bloodstream, the typical example being the passage of bacteria from the microoral flora produced during dental procedures and manipulations [1]. This is the basis of the recommendation for endocarditis prophylaxis [2]. However, there are no recent studies that have evaluated the epidemiological relationship between dental manipulations and visits to the dentist and the etiology of IE by these microorganisms, basically *Streptococcus viridans*. Our objective is to analyse the relationship between these variables and the possible therapeutic implications.

For this, we have analysed a prospective single-center series of IE in patients not addicted to parenteral drugs collected and followed between 1987 and 2018. The diagnostic criteria of Von Reyn, Durack and the European Society of Cardiology were used, depending on the time [2, 3]. A history of a visit to the dental office, with orodental procedures, in the 6 months prior to the diagnosis of IE, was prospectively collected in all cases of IE, and this variable was correlated with the causative microorganism. Due to their different pathogenesis, early cases of prosthetic IE were excluded.

Between 1987 and 2018, 403 cases of native and late prosthetic IE were diagnosed and followed up in our center (in addition, there were 59 early prosthetic IE). Of the 403 cases, 91 were produced by *S. Viridans* (22.6%). The percentage of this microorganism has remained constant

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throughout the 30 years (24.8% of the cases from 1987-1997, 25% of those from 1998-2007 and 19.1% from 2008-2018, NS) (Figure 1).

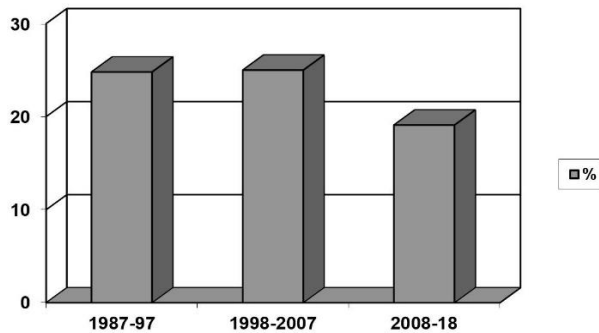


Figure 1: Proportion of endocarditis caused by *Streptococcus viridans* in our hospital during the study period.

Although there was a history of visiting the dentist and oral manipulation in a greater proportion in cases of IE due to *S. viridans* (24% vs. 6.5%, $p < 0.001$), in the vast majority (76%) of cases due to *S. Viridans* there was no previous dental manipulation, while up to 6.5% of IE due to other microorganisms did. Furthermore, 3 cases of early prosthetic IE were caused by *S. viridans*, with no history of visiting the dentist (5.1% of all early prosthetic IE). Thus, the history of a visit to the dentist had a sensitivity of 24%, a specificity of 93%, a positive predictive value of 52% and a negative predictive value of 19% to identify cases of IE due to *S. viridans*. There were no differences between the clinical characteristics, treatment or prognosis of *S. viridans* IE cases with or without a history of visits to the dentist (Table 1).

Table 1: Characteristics of infective endocarditis due to *Streptococcus viridans* with or without history of a visit to dental clinic within previous 6 months in our series.

	Yes (n=22)	No (n= 69)	p
Age (years)	53,63±18,73	53,34 ± (18,62)	0,167
Sex (male)	14 (63,6%)	50 (72,4%)	0,216
Prior endocarditis	1 (4,5%)	0	0,975
Location of infection			0,124
Mitral	10 (45,4%)	35 (50,7%)	
Aortic	12 (54,6%)	34 (49,3%)	
Vegetations in transthoracic echocardiogram	13 (59,1%)	60 (76,8%)	0,681
Vegetations in transoesophageal echocardiogram	80 (98,8)	105 (86,9%)	0,346
Vegetation diameter (mm)	11,13±4,35	11,60 ± (4,23)	0,725
Epidemiological features			
Entrance door			
Dental	22 (100%)	0	<0,001
Respiratory	0	0	0,968
Digestive	1 (4,5%)	2 (2,9%)	0,788
Urinary	1 (4,5%)	1 (1,4%)	0,835
Intravascular catheter	0	0	0,968
Unknown	0	66 (95,6%)	<0,001
Underlying cardiac lesion			0,351
Rheumatic	6 (27,3%)	18 (14,5%)	
Congenital	5 (22,7%)	16 (23,2%)	
Degenerative	7 (31,8%)	19 (27,5%)	
No cardiac lesion	4 (18,2%)	16 (23,2%)	
Permanent vesical caterer	3 (2,8)	0 (0,0)	0,266
Endocarditis related to sanitary assistance	38 (36,1)	13 (9,6)	<0,001
Nosocomial	10 (9,5)	1 (0,7)	0,042
Nosohusial	28 (26,6)	12 (8,8)	0,035
Complications, mortality and surgery			
Severe complications (overall)	87 (83,6)	103 (76,3)	0,143
Type of complications			
Herat failure/Valvular dysfunction	66 (63,4)	74 (54,4)	0,159
Embolisms	21 (20,2)	34 (25,0)	0,380
Central nervous system	25 (24)	25 (18,4)	0,285
Uncontrolled infection	24(23,1)	21 (15,4)	0,133
Acute renal failure	10 (9,6)	8 (5,9)	0,277
Intracardiac abscess	18 (17,5)	22 (16,2)	0,790
Cardiac surgery during active phase of endocarditis			
Urgent/Emergent	20 (19,2)	29 (21,3)	0,714

Elective	43 (41,3)	53 (39,0)	0,697
Overall	63 (60,5)	82 (60,3)	0,985
Early in-hospital mortality	32 (30,8)	30 (22,1)	0,172

From our results it is possible to conclude that although the antecedent of a visit to the dentist in the previous 6 months is more frequent in cases of IE due to *S. viridans*, three-quarters of these IE did not have such antecedent, the infection may be due to the usual daily manipulations of the mouth (brushing, dental floss) or periodontal disease [4, 5]. Given this low sensitivity, it cannot be ruled out that IE is caused by this microorganism in the absence of a history of visiting the dentist, with the implications for empirical antibiotic treatment that this entails [3].

Disclosure

None.

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