



Sari Hotti¹, Riitta Pajukanta¹, Jaana Helenius-Hietala¹, Asko Järvinen², Jussi Furuholm³, Ville Rita⁴, Jukka H. Meurman³, Hannamari Välimaa^{5,6}, Hellevi Ruokonen¹

¹Department of Oral and Maxillofacial Diseases, Helsinki University Hospital and University of Helsinki, Helsinki, Finland

²Department of Infectious Diseases, Helsinki University Hospital and University of Helsinki, Helsinki, Finland

³Department of Oral and Maxillofacial Diseases, University of Helsinki, Finland

⁴Department of Radiology, Helsinki University Hospital and University of Helsinki, Helsinki, Finland

⁵Department of Virology, University of Helsinki, Finland

⁶Department of Oral and Maxillofacial Surgery, Helsinki University Hospital and University of Helsinki, Finland

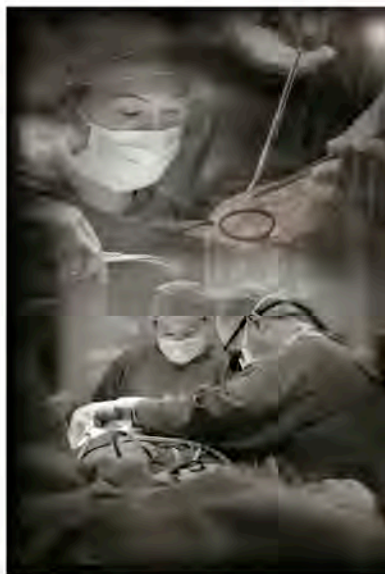
Microbiological findings in septic patients of the Helsinki University Hospital

OBJECTIVES

Bacteria entering the bloodstream through oral mucosa cause bacteremia and lead to septic or metastatic infections. We investigated microbiological blood cultures of patients referred for oral examination by attending physicians due probable oral origin of systemic infection.

METHODS

Bacteremia patients (n = 124) suspected of having generalized infection due to oral infectious foci were referred to the Department of Oral and Maxillofacial Diseases for oral and radiological examinations during years 2012-2017. Patients were identified by WHO ICD-10 diagnoses for systemic or remote infections. Data came from medical and dental records. Each patient was scored according to a modified Panoramic Tomography Index (mPTI). Study groups were formed according to the blood culture findings of probable oral origin, non-oral origin, or culture negative.



Microorganism	n (%)	Microorganism	n (%)
Probable oral origin		Probable non-oral origin	
Viridans group			
Streptococcus viridans	21(16,9)	Streptococcus Agalactiae	1 (0,8)
Streptococcus sanguinis	2 (1,6)	Streptococcus bovis	2 (1,6)
Streptococcus mutans	2 (1,6)	G-streptococcus	2 (1,6)
Streptococcus mitis	1 (0,8)	Staphylococcus aureus	17(13,7)
Mikroaerofil streptococci	1 (0,8)	Pseudomonas aeruginosa	1 (0,8)
Granulicatella adiacens	1 (0,8)	Staphylococcus luadunensis	1 (0,8)
Rothia dentocariosa	1 (0,8)	Peptoniphilus asaccharolyticus	1 (0,8)
Anaerobes	1 (0,8)	Enterococcus faecalis	2 (1,6)
Fusobacterium nucleatum	1 (0,8)	Tropheryma whippei	8 (6,5)
Veillonella parvula	1 (0,8)	Fusobacterium necrophorum	4 (3,2)
Alfahemolytic streptococci	1 (0,8)		
		Blood culture negative	40(31,3)

Table 1 Microorganism identification in 124 sepsis patients with positive blood culture.

	Probable oral origin (n=41;33%), n (%)	Probable non-oral origin (n=43;35%), n (%)	Blood culture negative (n=40;32%), n (%)	p values
No. of teeth, mean; median (min—max)	23.2; 25 (3—32)	23.0; 25 (0—32)	23.8; 26 (5—31)	0.804 ^c
Endodontic foci	16 (13)	17 (14)	21 (17)	0.382 ^b
Periodontal foci	17 (14)	25 (20)	23 (19)	0.229 ^b
PTI, mean; median (min—max)	1.4; 1 (0—8)	3.4; 2 (0—14)	3.1; 2 (0—17)	0.009 ^c
Caries	20 (50%)	37 (88%)	25 (63%)	<0.001 ^b
No. of caries lesions, mean; median (min—max)	1.3; 1 (0—10)	3.3; 1 (0—14)	2.8; 1 (0—17)	0.018 ^c
Need of extracting teeth	27 (65,9%)	32 (74,4%)	31 (79,5%)	
PPD				805 ^b
No pockets deeper than 3 mm	12 (38%)	12 (48%)	15 (54%)	
4—5 mm as deepest pockets	11 (34%)	7 (28%)	7 (25%)	
6 mm or deeper pockets	9 (28%)	6 (24%)	6 (21%)	
Pericoronitis	3 (8%)	4 (10%)	2 (5%)	0.733 ^b
Oral mucosal lesions	2 (5%)	5 (12%)	2 (6%)	0.454 ^b

Table 2 Descriptive and clinical variables stratified by blood culture finding. PPD, Probing pocket depth (data available for 85 patients) Data are presented as number and percentage (%)

^aAnova test

^bChi-square test

^cKruskal-Wallis test

RESULTS

mPTI score was lower in the "probable oral origin" group (1.4; 1 [0-8]), compared with "non-oral origin" (3.3; 2 [0-14]) and "blood culture negative" groups (3.10; 2 [0-17]) ($p < 0.005$), respectively. In the blood cultures, *S. viridans* was identified in 4/14 cases with endocarditis and 15/28 cases with native valve prosthesis. 4/7 patients having *S. aureus* in the blood culture were intravenous drug users.

CONCLUSIONS

Within the limits of this study, *Streptococcus viridans* sepsis was a relatively common finding. Lower mPTI scores were also significantly associated with pathogens from probable oral origin. A clinical oral examination with oral microbiological samples might have given different results. In the present study this had not been possible due to the patients' condition. This finding emphasizes the importance of the oral clinical examination.

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