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Dental implants in patients at high risk for infective endocarditis: a preliminary study

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Abstract. The safety of dental implant placement in patients at high risk for infective endocarditis (IE) has never been shown. The outcome of osseointegrated implants in patients with artificial heart valves or with a history of an infected valve is not known. In this article we describe our experience of dental implant placement in patients at high risk for IE. A retrospective study was conducted on patients at high risk for IE who underwent dental implant placement. All the patients received prophylactic antibiotic treatment before the surgical procedure, in accordance with the relevant American Heart Association guidelines. A total 13 patients underwent 16 surgical procedures for the placement of 57 dental implants over a period of 17 years. Within the follow-up period, no case of IE was reported. Two implants failed before exposure in one patient, one patient suffered from mitral valve thrombosis 14 days after the dental procedure, and another patient suffered a stroke 6 months following treatment. Despite the limitation of the small group of patients and the known low incidence of IE, dental implants may be regarded as a legitimate procedure for patients at high risk for IE.

Key words: dental implants; high risk patients; infective endocarditis..

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Patients at high risk for infective endocarditis (IE) may be at risk of an endocardial infection in the case of bacteremia[1]. The oral cavity is known to be a source of pathogens that may affect the heart valves and other heart anatomic anomalies[2]. In the case of IE, bacterial seeding takes place by direct hematogenous spread. It has been suggested that bacteremia occurs during dental treatments, as well as during everyday activities such as tooth brushing and mastication. It is believed that some patients are more susceptible than others, and therefore at higher risk[3].

Major medical authorities have recently published new clinical guidelines for the prevention of IE. These protocols suggest that the use of antibiotics as a prophylactic measure for reducing the incidence of IE should be reserved only for those at high risk for IE. In 2006, the British Society for Antimicrobial Chemotherapy (BSAC) was the first to call for the use of prophylactic antibiotics to be minimalized[4]. Nevertheless the new protocol still recognizes the group of patients at high risk for IE as being exposed to an increased risk of infection.

From 2006 to 2009, four new evidence-based clinical guidelines[4–7] were

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Table 1. Patient characteristics, diagnosis, implants, anti-thrombotic treatment, thrombotic events, and implant failure.

Patient	Procedure	Diagnosis	Sex	Age, years	Follow-up, years	Number of implants	Number of implants, maxilla	Number of implants, mandible	Failure of implants	Discontinued anti-thrombotic treatment	Thrombotic events
1	1	AVR	F	75	8	7	7	0	0	Yes	Valve thrombosis
	2	AVR		80	3	2	0	2	0	No	
2	3	MVR	M	71	6	2	2	0	0	No	
	4	MVR		72	5	3	0	3	0	No	
3	5	MVR	F	59	3	4	0	4	0	No	
4	6	TOF	F	45	7	2	2	0	0	No	
5	7	MVR	M	70	13	4	0	4	0	No	
6	8	AVR + MVR + IE	M	65	18	1	0	1	0	No	Stroke
7	9	AVR	M	N/A	7	16	9	7	2	Yes	
8	10	MV plasty	M	N/A	5	1	0	1	0	No	
9	11	AVR	M	82	4	1	0	1	0	No	
10	12	AVR	M	N/A	4	1	1	0	0	No	
11	13	MV plasty	F	65	2	1	0	1	0	No	
12	14	MV plasty	F	64	2	1	1	0	0	No	
13	15	MVR	M	78	3	4	0	4	0	No	
	16	MVR		79	2	7	7	0	0	No	

F, female; M, male; AVR, aortic valve replacement; MVR, mitral valve replacement; MV plasty, mitral valvuloplasty; IE, infective endocarditis; TOF, tetralogy of Fallot; N/A, not available.

published, providing a definition of high-risk patient groups and the dental treatments requiring prophylactic therapy. In general, patients with an artificial heart valve, those with a history of IE, and those with certain congenital defects remained the only patients considered at high risk. The National Institute for Health and Care Excellence (NICE; Department of Health, UK), which provides recommendations and clinical guidelines for the UK National Health Service, revised its guidelines in 2008 and ended the concept of pre-treatment with antibiotics, except in the group of patients at high risk for IE[6]. The list of dental treatments requiring prophylactic antibiotics included periodontal procedures and peri-apical manipulation, but with no specific reference to dental implants[4–7]. This begs the question whether the use of dental implants is safe and justified in patients at high risk for IE.

The spread of infection from dental implants may occur at various stages. The early stage is the time at which the implant is inserted[8,9]. A later stage relates to bacterial mucositis – the implant equivalent to gingivitis. This infection is evident in the peri-implant mucosa following the healing phase[10]. Following implant exposure and placement of the prosthesis, bacteremia may originate from extensively inflamed and infected tissue around the implant with loss of alveolar bone, known as peri-implantitis[11]. This risk remains for as long as the implant is in place and is similar to periodontitis around natural teeth.

No information regarding the safety of dental implant placement is available in the medical literature. This article summarizes our experience of dental implant placement in patients at high risk for IE.

Patients and methods

Data on patients at high risk for IE who underwent dental implant procedures were collected retrospectively from the registries of two oral medicine clinics in Israel. Between 1995 and 2012, 13 patients underwent 16 implant placement procedures in which 57 implants were inserted by several dentists. The surgical procedure for all patients was a two-stage implant placement. Data retrieved from the medical records included demographic details, number of procedures performed and implants placed, medical diagnosis, and anti-thrombotic and antibiotic prophylaxis therapy provided. Patient follow-up was at least 2 years. The institutional ethics board approved the data collection.

Results

Between 1995 and 2012, 13 patients at high risk for IE, eight males and five females ranging in age from 45 to 82 years (mean 69.5 years), underwent 16 surgical procedures for the insertion of 57 implants (three patients had two separate procedures). A total of 29 implants were placed in the maxilla and 28 in the mandible. Four of the patients had an aortic valve replacement (patients 1, 7, 9, 10), four had a mitral valve replacement (patients 2, 3, 5, 13), one had combined aortic and mitral valve replacement (patient 6), one had a cyanotic congenital malformation with an incomplete repair (patient 4), and three were after repair of the mitral valve with synthetic material (patients 8, 11, 12) (Table 1).

All patients received prophylactic antibiotic treatment with 2 g of amoxicillin orally at 1 h prior to the surgery, followed by 1.5 g per day for 5 days postoperatively. All patients rinsed their mouth with chlorhexidine prior to the surgical procedure.

Two implants in the mandible of one patient failed to osseointegrate before exposure and had to be removed. No case of IE or suspected IE was reported in the entire patient group. All the patients were on anti-thrombotic treatment, which was discontinued only in two patients 3 days prior to surgery and was resumed thereafter. During the postoperative period, two patients developed major thrombotic events. One patient had a stroke 6 months after implant placement. The second patient suffered from mitral valve thrombosis that developed 14 days after the dental procedure. This patient was one of the two patients who discontinued their anti-thrombotic treatment (Table 1).

Discussion

In the 1997 American Heart Association/American College of Cardiology (AHA/ACC) guidelines for a prophylactic antibiotic treatment by Dajani et al., dental implant placement was one of the indications for prophylactic treatment[12].

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