

INVASIVE DENTAL TREATMENT IN PATIENTS WITH TYPE 2 DIABETES

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ABSTRACT

INTRODUCTION: Diabetes mellitus (DM) is disease resulting in high levels of blood sugar. As a general disease it affects the whole organism through the mechanisms of impaired insulin secretion, insulin resistance or both. However, dental practitioners need to perform invasive treatment in these patients in order to provide accurate dental treatment.

AIM: The aim of this publication is to track the success rate of invasive treatment in diabetics.

MATERIALS AND METHODS: During the research 125 invasive dental procedures were done on males and females in the age group 45–84 years.

RESULTS: We achieved 98% success rate.

CONCLUSION: Invasive dental treatment, including dental implants and surgeries, can be done in patients with DM with good and moderate control of the disease. It is mandatory to follow the protocols and the contemporary guidelines even more strictly than in the group of healthy patients.

Keywords: *diabetes, invasive dental treatment*

INTRODUCTION

Diabetes mellitus (DM) is systemic disease resulting in high levels of blood sugar. The mechanisms involved are impaired insulin secretion, varying degrees of insulin resistance, or both (1). Dental practitioners have to be aware of the concomitant oral manifestations in diabetic patients in order to provide accurate dental and surgical treatment (2). Oral infection can lead to higher levels of blood sug-

ar, therefore proper and timely dental care is mandatory for these patients. On the other hand, diabetes can lead to complications after invasive therapeutic procedures.

Diabetes mellitus can be classified into four general categories, according to the American Diabetes Association (3):

1. Type 1 diabetes (due to autoimmune β -cell destruction)
2. Type 2 diabetes (due to a progressive loss of β -cell insulin secretion frequently on the background of insulin resistance)
3. Gestational DM (diagnosed in second and third trimester of pregnancy)
4. Specific types of diabetes due to other causes—monogenic diabetes syndromes, diseases of the exocrine pancreas, and drug- or chemical-induced diabetes

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The most common type of DM is type 2. Most patients with type 2 DM are older individuals with obesity, hypertension, or other systemic diseases. As every other disease, diabetes can be mild, moderate, and severe.

Type 2 diabetes treatment is aimed at increasing the effectiveness of the endogenous insulin using metformin and glitazones (4). Insulin is used for the severe cases.

As an endocrine disease, DM affects the whole organism, including the oral cavity, and the effect matches the levels of blood sugar. Inflammation on the other hand leads to higher blood sugar levels. Therefore, patients with DM should undergo dental treatment in full volume. Some of these patients need invasive treatment as well, though the best solution for patients with underlying diseases, including diabetes, is preventive treatment.

Invasive treatment includes tissue wounding and healing. These processes are impaired through high levels of blood sugar. Therefore, dentists have to measure blood sugar levels (glycemic hemoglobin) to consider the severity of the disease (5, 6) and create a premise for proper healing after invasive treatment.

Dentists and dental surgeons are often the first doctors, who perform invasive procedure over patients with diabetes. Therefore, they have to be aware of the contemporary guidelines for treatment of patient with underlying diseases.

AIM

The aim of this article is to consider the possibility of predictable invasive dental treatment in patients with diabetes.

MATERIALS AND METHODS

We've done 125 invasive dental procedures in diabetics and 83 procedures in patients without underlying diseases. When we plan invasive treatment in diabetic patients and need to predict its future positive control, we have to assess the general treatment before the surgical procedure. The best way to do this is to measure HbA_{1c} levels (7, 8). According to HbA_{1c} levels we separated the patients into three groups:

- ◆ Well-controlled DM—HbA_{1c} up to 7.5;
- ◆ Moderately controlled DM—HbA_{1c} from 7.6 up to 9;
- ◆ Poorly controlled DM—HbA_{1c} above 9.

In our research we treated diabetics with well-controlled and moderately controlled disease. We decided that patients with poorly controlled DM were not appropriate for routine dental treatment. It was better for them to achieve moderately or well-controlled disease before invasive treatment.

In our research we performed invasive dental procedures on patients with type 2 DM. The patients were in the well-controlled and moderately controlled group with HbA_{1c} levels up to 9. Invasive procedures are associated incisions, wound opening, and wound healing. The processes of wound healing can be impaired by DM (9, 10). Nevertheless, these patients need dental treatment, and especially invasive dental treatment. According to patient status and the volume of surgical treatment antibiotics and NSAIDs were prescribed to the patients. During the research blood sugar levels were controlled before the treatment and wound healing was strictly controlled after the surgical treatment. We examined the patients during the early healing period for complications and also for late complications during the period of publication, which is a period of about 4 years. Results were collected in every case, regardless of the end result.

RESULTS

A series of 125 invasive procedures was performed on patients with DM. Patient were both males and females in the age group from 45 to 84 years. Distribution of patients by age and sex was uneven. We established impaired wound healing in 2 out of all 125 procedures, which led to failure and these procedures can be determined as unsuccessful. No specific reason was found in the patients with treatment failure. More than 98% of the procedures were successful.

Speaking of success rate in patients with specific underlying disease we have to compare it with the one in a group of healthy patients. The control group of patients in our study included 22 males and females, unevenly distributed. We performed 83 invasive procedures on them. The type of implants we used and the other materials were identical for both groups. The success rate of invasive dental procedures in patients without underlying diseases was

over 96.7%, which was similar to the studied DM group.

During the research we performed 59 surgical procedures of implant placement on diabetics. We used high class screw type implants. Screw type retention of the crown is preferred when possible. In 58 of the procedures, normal wound healing was reported and the implants were loaded with crowns or bridges. There was only one implant failure due to impaired wound healing. During the research none of the loaded 58 implants was linked to further problems and late implant failure. The high success rate is comparable to the rate in patients without underlying diseases. We followed the patients during the period of the research, which was about 4 years. Because of the pandemic situation we could not precisely measure the marginal bone loss in every patient, but we registered clinically no signs of peri-implant inflammation, soft tissue retraction, or mobility of the implants.

DISCUSSION

In our research we performed invasive dental procedures on patients with type 2 DM, with well-controlled and moderately controlled disease. We perform the procedures complying DM. After the treatment 98% from all procedures were successful. This high success rate is comparable with the success rate declared in other researches (11–14). They show similar success rate from 90% up to more than 95%, which correlates with our findings.

There are several keys to the successful invasive dental treatment—patients should be selected correctly according to the glycemic control, the treatment guidelines should be followed, and inflammation should be avoided. The inflammation in the oral cavity is directly connected to the possibility of plaque retention and the maintenance of oral hygiene. Plaque retention and improper oral hygiene can seriously boost the inflammation, which can lead to failure of the invasive treatment. Further investigation must be done in cases of unsuccessful invasive treatment in patients with DM in order to confirm whether the problem is caused by plaque retention only or by other reasons.

CONCLUSION

Invasive dental treatment, including dental implants and surgeries, can be done in patients with DM with good and moderate control of the disease. It is mandatory to follow the protocols and the contemporary guidelines even more strictly than in the group of healthy patients. Further investigations have to be done in the group with poor control of diabetes mellitus.

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