

Dental implant failure in immunosuppressed renal transplant patient: A case report

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Abstract

Background: In the literature, the dental implant survival rate has been reported one hundred percent in immunosuppressed patients after a solid organ transplant (SOT). There is no previously published dental implant failure that has been reported on immunosuppressed renal transplant, which is the most common SOT therapy.

Case Report: The case presented is that of a 66-years old male edentulous patient suffering from lack of functional prosthesis and who received a renal transplant two years ago. No complications such as infection, radiolucency, or pus were detected after two dental implants were placed in the mandible and after three months recovery period. The right mandibular dental implant failure occurred due to compression of the dental implant and healing head during the delivery of the patient's removable prosthesis. Following implant socket healing after two months, the 4.8 mm diameter implant was placed immediately after. Osseointegration was completed uneventfully, and the patient was successfully rehabilitated with a two implant-retained mandibular overdenture prosthesis. The implant restoration was performing well with stable Peri-implant bone levels have shown minimal marginal bone loss at a 2-year follow-up.

Conclusion: Treatment of combined immunosuppressive medication used in renal transplant patients after dental implant rehabilitation, as well as accompanying chronic diseases, should be performed considering the possibility of failure in dental implant applications. In this case report, the causes of implant failure were reported patients who received dental implant treatment after renal transplantation from a cadaver.

Keywords: Dental implant, alveolar bone loss, clinical trial, renal transplantation, bone healing

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Introduction

Renal transplantation for end-stage renal failure (ESRD) is a preferable procedure since it is a low-cost treatment that improves the quality of life compared to dialysis treatment that improves patient survival. (1). Patients who undergo organ transplantation are usually subjected to long-term immunosuppressive

therapy consisting of steroids with anti-inflammatory properties and cyclosporin-A (2). Owing to advances in immunosuppressive therapy, there is a rapidly increasing survival time after transplantation (3). The increase in survival time and quality of life increases the demand for quality dental treatment in these patients (4).

According to a study of 45 renal patients undergoing dialysis, all patients were shown to have

periodontal disease, and also 64% of patients had multiple caries or filled teeth and missing teeth; therefore, a large number of tooth loss can occur in patients to eliminate focal infection centers before organ transplantation (5). Recently, dental implant treatment has been one of the most common applications used to rehabilitate patients with missing teeth or edentulous jaws, and it has been reported that 10-year follow-up dental implant success is quite high in systemically healthy (6,7).

Dental implant treatment of solid organ transplantation (SOT) patients is controversial due to the adverse effects of the immunosuppressant drugs they use on wound healing and bone structure; however, in experimental studies, have been reported that bone-implant contact is impaired, immunosuppressive agents reduce bone density and negatively affect osseointegration, while no complications in dental implant survival have reported in clinical practice (8-9). In a prospective controlled study of immunosuppressive patients with liver transplantation, it was reported that there was similar implant success with the control group and that immunosuppression was not a risk factor for implant failure or peri-implant diseases (8).

To our knowledge, no complications were reported as a result of dental implant treatment suffering immunosuppressive transplant patients in the literature. The complication of implant treatment in an immunosuppressive patient with renal transplant was presented in this case report.

Case Presentation

A 66-year-old edentulous male patient applied to our department. In the anamnesis taken from the patient, it was learned that the patient received renal transplantation from a cadaver two years ago and also had diabetes mellitus and hypertension. The present case report received ethical approval (Decision No: 2019/07-4).

Medical and dental examination

In the medical anamnesis, the patient had a successful renal transplant two years ago and used Prednisolone, Tacrolimus, Mycophenolate mofetil drugs for immunosuppression; however, the patient used Klopidoğrel, Furosemide, Carvedilol, Allopurinol, Lercanidipine for hypertension and DM. The patient reported that he did not have graft versus host disease since the transplantation was performed and that his condition was stable. The HbA1c value was 7.7% before surgery but 7.2% four months after implant placement, and the patient does not smoke. In the intraoral and radiographic examination was not observed, periodontal bone loss or infection (Fig. 1). Before the implant planning, cone beam computed tomography (CBCT) was taken, and surgical planning was completed. CBCT image is shown in Figure 1b.

Surgical procedure and postoperative recommendations

Before the surgical operation, standard antibiotic prophylaxis was prescribed; local anesthesia was achieved using the bilateral vestibular infiltration technique. The incision was made on the alveolar crest, and a full-thickness flap was raised. Two bone-level dental implants (Bilimplant, İstanbul, Turkey), 4.1 mm in diameter and 10 mm in length, were surgically placed in mandibular canine areas. Standard procedures were followed during implant surgery, and regenerative procedures were not applied.

The patient was prescribed 1 gr antibiotic and mouthwash two times each day for a week following the operation. Sutures were removed on the postoperative 8th day. Postoperative soft tissue healing was completed uneventfully.

Postoperative early implant failure

No clinical and radiographic findings were detected regarding the osseointegration disorder of the implant during the second surgery and until after the delivery of the prosthesis. At the delivery stage of the prosthesis, four months after the implant surgery, the healing cap on the right mandibular dental implant could not be removed. The healing cap was tried to be removed from the implant connection with the ultrasonic device. Then, the healing cap was tried to be removed with reverse torque, but it moved from the dental implant with friction. Then non-osseointegrated dental implant was extracted, the implant socket was curetted, and the hemostatic sponge was placed and sutured in the wound area. After approximately two months of healing of the alveolar socket, a larger diameter dental implant (4.8 mm diameter and 10 mm length) was placed into the extracted region late immediately. Implant-supported mandibular overdenture with locator attachment was delivered to the patient in the 4th month following dental implant placement.

Clinical and radiographical results

Bilaterally balanced occlusion was achieved between the maxillary and mandibular prostheses delivered to the patient, and the occlusion classification was recorded in the Angle Class I molar and canine relationship (Fig. 2).

Periodontal indexes of implants supporting overdenture prostheses were measured and recorded by the periodontology with a periodontal probe, and measurements were shown in Table 1. In the radiographic evaluation, distal and mesial marginal bone loss (MBL) measurements were made with software using periapical radiographs taken by the parallel method. While MBL was not measured around the right implant and left implant, MBL was measured at 0.5 mm in the mesial and 0.85 mm in the distal region (Fig. 1).

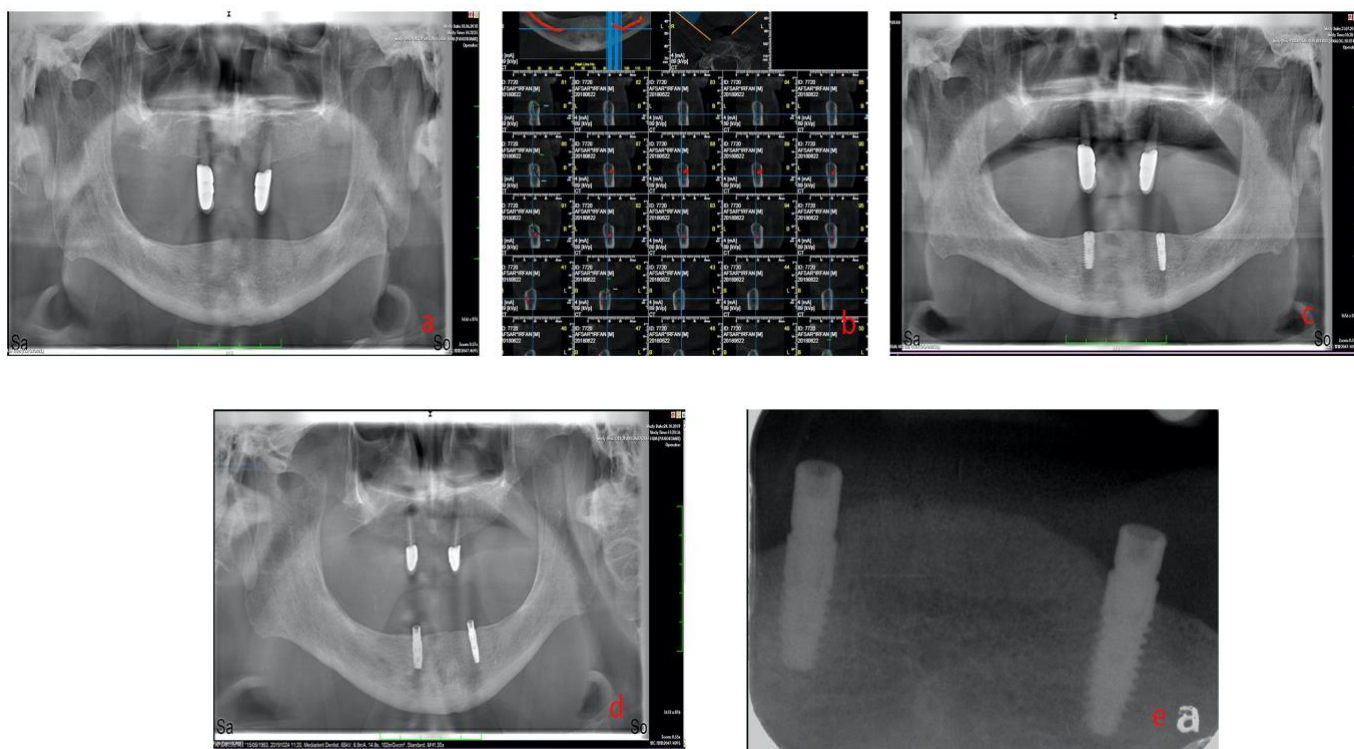


Figure 1. a) Preoperative radiographic image, b) Preoperative cone beam computed tomography cross-section images, c) Third-month image after dental implant placement, d) Radiographic image at the stage of delivery of the prosthesis to the patient after the second implant placement surgery, e) Periapical radiograph image after two years follow-up.



Figure 2. Intraoral images of the patient after two years of follow-up

Table 1. Clinical measurements at one-year follow-up

Parameter	Mean Values	
	Right Side	Left Side
PI	1	1
GI	1	1
PD (mm)	2	2
GR (mm)	0	0
KTW (mm)	2.34	3.34
BOP (%)	0	0
MBL mesial (mm)	0	0.5
MBL distal (mm)	0	0.85

Discussion

Recently, SOT was increasing, and dental implants to improve the oral health-related quality of life of these patients (8). A review has reported that the survival rate of dental implants placed in immunosuppressed patients after SOT patients were one hundred percent (10). However, in this case, the report, for the first time in the literature, has presented early implant failure complications due to osseointegration impairment.

ESRD patients who use immunosuppressive drugs have to use these drugs for life to prevent organ rejection by suppressing pro-inflammatory cytokines. Studies have reported that immunosuppressive drugs were an effect on wound healing and especially bone metabolism (11, 12).

ESRD patients can use different combinations of drugs such as prednisone, cyclosporin-a, mycophenolate mofetil, azathioprine, and tacrolimus. Tacrolimus is a calcineurin inhibitor and is a drug that inhibits T-cell production by suppressing pro-inflammatory cytokine production (12). Although tacrolimus has a similar mechanism with cyclosporin-A, studies have reported that side effects of tacrolimus, such as hypertension, hyperlipidemia, and hyperglycemia, are less common than cyclosporin-A (3). However, there are experimental and clinical trials that evaluate the effects of both drugs on bone healing (12). Although experimental studies are reporting that tacrolimus causes decreased bone-implant contact ratio and bone resorption (13, 14).

A 10-year case report of a patient who received implant-supported overdenture treatment after liver transplantation reported peri-implant marginal bone loss values in the right and left mandibular implants as approximately 3.28 and 3.42 mm (15). A study reported that MBL was 1.56 mm in patients receiving renal

transplant treatment, and MBL in the control group was 1.88 mm (10). In another study, when fixed partial prostheses placed in patients with liver transplantation were evaluated for eight years follow-up, it was reported that approximately 20% of patients had more than 2.4 mm MBL (8).

Conclusions

In a definition of implant losses, it was stated that there should be findings such as radiolucency, mobility in the implant, pain, and infection in intraoral radiography, however; none of these symptoms were recorded in this case report during the second surgery and during the prosthetic stages. The removal of the implant by force with reverse torque suggests that the implant socket was cured while curing the inside of the implant socket, the presence of a dry socket, and the implant was subjected to mechanical action at the prosthetic stage. However, it is thought that the DM patient using drugs that are to affect bone-implant contact may cause osseointegration disorder. Clinical and experimental studies are needed on dental implant treatments and complications applied to people with chronic diseases that accompany immunosuppression.

Ethical Approval: Ethics committee approval was received for this study from Kütahya Health Sciences University, Local Ethics Committee in accordance with the World Medical Association Declaration of Helsinki, with the approval number: 2019/07-4).

Patient Consent for Publication: Written informed consent was obtained from the patient.

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