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DENTAL MANAGEMENT OF PATIENTS BEFORE AND AFTER RENAL TRANSPLANTATION – A RETROSPECTIVE STUDY

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Aim: This study aimed to identify essential peri-transplant dental treatments and retrospectively assess their implementation in organ transplant patients. Additionally, it sought to provide valuable insights for dentists evaluating and managing the dental care of renal transplant recipients.
Materials and Methods: The medical records of the Department of Dentistry at Christian Medical College & Hospital were evaluated to identify kidney transplant recipients who attended clinics from January 1, 2019, to December 31, 2021. A total of 158 patients were identified, and their medical charts were reviewed. The following data were tabulated: underlying systemic disease, oral hygiene status, necessary dental treatments, dental treatments actually performed pre- and post-transplantation and follow-up of renal transplant recipients.
Results: Around (150/158; 94.9%) of the kidney transplant recipients had poor oral hygiene. In kidney recipients, the rates of scaling, operative treatment, tooth extraction and root canal treatment actually performed pre-transplant, when deemed to be required, were 98.00 %, 96.25 %, 98.04 % and 100.00 % respectively. The overall performance rate for all the procedures was low in post-transplant compared with pre-transplant. The actual completion rates of necessary procedures after transplant were 70% for scaling, 42.86% for operative procedures, none of the patient's required root canal treatment, 66.67% for tooth extraction, and 40% for prosthetic treatment.
Conclusion: It is recommended that patients scheduled for organ transplants should be referred to a dental clinic as early as possible. This allows for the identification and removal of any potential sources of oral infection. Post-transplant, patients should be reminded of the necessity for regular dental check-ups and ongoing dental care to improve their prognosis.

INTRODUCTION

Renal transplantation is the treatment of choice for many patients with end stage renal disease. Many patients find transplantation attractive because of its life style advantages. Furthermore, recent data indicate that as the survival rates of transplanted kidneys continue to rise, transplantation also provides a notable longevity benefit compared to dialysis.(1,2)

Thanks to advancements in immunosuppressant medications, organ transplant recipients have experienced a significant improvement in survival rates.(3,4) However, their compromised immune systems make them highly susceptible to infections, necessitating proactive preventive measures.(5) A comprehensive approach to infection prevention is crucial, including thorough dental evaluation and treatment both pre- and post-transplant. Untreated oral infections can lead to severe complications, such as life-threatening abscesses and sepsis.(6) Consequently, dental care is a critical consideration for organ transplant recipients that should not be neglected.

Organ transplant recipients require phased dental care, comprising pre-transplantation and post-transplantation phases. The pre-transplantation phase focuses on eliminating potential oral infection sources to prevent systemic infections post-transplant. This includes addressing periodontal disease and dental caries, which can compromise transplantation success.

The dental evaluation should prioritize identifying and eliminating potential infection sources. Ignoring these issues can lead to pre-surgery infection complications, resulting in procedure cancellation. This, in turn, poses risks associated with delaying transplantation, resolving the infection, and finding another suitable donor organ.(7) Transfer of any pre-existing infection to a patient immediately after transplantation can have severe consequences, particularly since the patient is highly immunosuppressed. Following transplantation, patients undergo an intense immunosuppression regimen for several weeks to prevent acute graft rejection. However, because of this regimen patient is more susceptibility to infection, sepsis, which increases the morbidity, and mortality and risk of graft rejection.(8)

Post-transplantation dental care primarily involves managing dental caries and providing prosthetic treatment, as proper oral function facilitates nutrition and accelerates recovery.(9) Although numerous studies emphasize the critical role of dental care in transplantation, few have examined the actual delivery of dental services to these patients.

This study aimed to identify essential peri-transplant dental treatments and retrospectively assess their implementation in organ transplant patients. Additionally, it sought to provide valuable insights for dentists evaluating and managing the dental care of renal transplant recipients.

MATERIALS AND METHODS

Ethics

The study protocol was approved by the Institutional Review Board at Christian medical college and hospital and the study was conducted in accordance with institutional guidelines.

Patients

The medical records of the Department of Dentistry at Christian Medical College & Hospital were evaluated to identify kidney transplant recipients who attended clinics from January 1, 2019, to December 31, 2021. A total of 158 patients (113 males, 45 females) scheduled to receive a kidney transplant were identified, and their medical charts were reviewed. The following data were tabulated: sex, underlying systemic disease, oral hygiene status, necessary dental treatment (including scaling, operative treatment, root canal treatment, tooth extraction, and prosthetic treatment), actual dental treatment advised and performed, pre and post renal transplant.

RESULTS

The 158 patients identified included 113 males and 45 females. The causes of kidney transplantation included end-stage renal disease (154/158; 97.4%) and failure of a previous kidney transplant (4/158; 2.5%). Around (150/158; 94.9%) of the kidney transplant recipients had poor oral hygiene (Table 1). The dental treatments deemed necessary pre-transplant and the dental treatments actually performed pre-transplant are shown in Table 2. The actual completion rates of necessary procedures before transplant were 98.00% for scaling, 96.25% for operative procedures 100% for root canal treatment, 98.04% for tooth extraction, and none of the patient's required prosthetic treatment.

The performance rates of scheduled dental treatments post-transplant are shown in Table 3. The overall performance rate for all the procedures was low in post-transplant compared with pre-transplant. The actual completion rates of necessary procedures after transplant were 70% for scaling, 42.86% for operative procedures, none of the patient's required root canal treatment, 66.67% for tooth extraction, and 40% for prosthetic treatment.

Only 17 out of 158 (10.76%) renal recipients underwent follow-up dental visits (Table 4).

Table 1 Medical history and oral hygiene status of renal transplant recipients

Medical History	Good Oral Hygiene (n)	Poor Hygiene (n)	Total (n)
End stage renal disease	7	147	154
Failure of a previous kidney transplant	1	3	4
Total	8	150	158

Table 2 Necessary dental treatments and dental treatments actually performed before transplantation

Type of Treatment	Necessary (n)	Performed (n)	Performance Rate (%)
Scaling	150	147	98.00 %
Operative treatment	80	77	96.25 %
Root canal treatment	2	2	100.00 %
Extraction	51	50	98.04 %
Prosthetic treatment	0	0	0.00 %
Total	283	276	97.53 %

Table 3 Necessary dental treatments and dental treatments actually performed after transplantation

Type of Treatment	Necessary (n)	Performed (n)	Performance Rate (%)
Scaling	10	7	70.00 %
Operative treatment	7	3	42.86 %
Root canal treatment	0	0	0.00 %
Extraction	3	2	66.67 %
Prosthetic treatment	5	2	40.00 %
Total	25	14	56.00 %

Table 4 Follow-up of renal transplant recipients

Total number of recipients	Followed up (n)	Not followed up (n)	Total (%)
158	17	141	10.76

DISCUSSION

As organ transplantation becomes increasingly common for replacing failing organs, the importance of pre-transplant dental evaluations and treatment will also rise. A pre-transplant dental examination is highly recommended to identify and eliminate potential infection sources that could compromise the surgery or lead to post-transplant complications. Furthermore, dental treatment for transplant candidates often requires significant modification due to their fragile health status.

Several studies has consistently demonstrated that proactive infection control plays a crucial role in determining the outcomes and prognoses of organ transplant recipients.(10,11) Post-transplant patients are susceptible to various infections, including periodontal diseases and other oral health issues. Untreated dental caries can progress to the dental pulp, causing severe pain, eating difficulties, and general malaise. If left unchecked, oral bacteria can spread from the pulp to the surrounding alveolar bone around the root apex, creating a persistent source of infection.(12) In severe cases, this can lead to alveolar bone resorption, formation of a buccal gingival fistula, or development of a vestibular space abscess.(13) The gingival sulcus and periodontal pocket are prone to microbial colonization. If left unmanaged, periodontal disease, especially chronic periodontitis, can result in tooth loss due to alveolar bone destruction and serve as a source of systemic infection.(14)

The Department of Dentistry at Christian Medical College & Hospital has collaborated with the Departments of Nephrology and Transplantation Surgery to establish a comprehensive pre-transplant clearance program. As part of this initiative, all renal transplant candidates are referred to the Department of Dentistry for evaluation and clearance. A thorough intraoral examination is conducted, and necessary dental procedures are performed to ensure optimal oral health. Upon completion of the required dental treatment, the Department of Dentistry issues a clearance certificate, only then the patient's will be taken up for the transplant surgery. The primary objective of this program is to eliminate potential oral infection sources prior to transplantation, thereby ensuring a safe and complication-free post-transplant period.

In the current study the oral hygiene status of organ transplant recipients was generally poor. Pinson et al. assessed Karnofsky Performance scores in patients before and after organ transplantation. This scoring system measures a patient's capacity to perform daily activities on a scale from 1 to 100, where 80–100 corresponds to the capacity to perform normal activity ('able'), 50–79 corresponds to requirement for assistance and an inability to work ('unable') and 0–49 corresponds to requirement for specialised care and hospitalisation ('disabled').(14,15) The performance scores of recipients before kidney transplantation were as follows: 13% were able, 57% were unable and 30% were disabled (mean score 53% ± 1%). Because oral hygiene habits are included in the daily activities measured using the Karnofsky score, the low performance status of renal transplant recipients (i.e., the majority feeling unable or disabled) could explain the comparatively poor oral hygiene status of these patients.

The early referral of prospective organ transplant recipients to the dentistry department facilitated timely completion of necessary pre-transplant dental treatments. Effective coordination between transplantation surgeons and dentists mitigated concerns about deterioration of a patient's condition after invasive dental treatments, such as periodontal surgery and tooth extraction, which could delay the transplantation surgery. When invasive procedures, such as tooth extractions, are necessary, the risk of life-threatening complications like abscesses and sepsis from oral infections should take precedence over concerns about procedure invasiveness, prompting immediate treatment. As a result, patients received required dental treatments, including both non-invasive procedures like scaling and filling, and invasive treatments like extractions. This study emphasizes the importance of referring patients for dental examinations and treatments on an outpatient basis well before organ transplantation to ensure effective pre-transplant dental care.

This study revealed that a significant number of renal transplant patients failed to attend follow-up appointments after their transplant. A possible explanation for this could be the comprehensive pre-transplant dental care they received. When all necessary dental treatments, including both invasive and non-invasive procedures, are completed before the transplant surgery, patients may not require immediate post-surgery dental visits. Nevertheless, it is essential to raise awareness among patients about the importance of post-transplant dental care, particularly prosthetic treatment, which can significantly improve their quality of life by enhancing their oral intake capacity.

Dental treatment after a transplant can begin once the patient's overall health has stabilized. For more invasive procedures involving bone surgery, it's typically recommended to wait 3-6 months after transplantation to ensure a smooth recovery.(16) Even when a patient recovers smoothly without any complications, invasive dental treatments still require careful consideration and administration.

Following an organ transplant, most patients must take immunosuppressive medications, which increase their susceptibility to infections, particularly after dental procedures.(17,18) To mitigate the risk of unknown infections, the use of prophylactic antibiotics is recommended, but only after consulting with both the patient's physician and surgeon. Historically, cyclosporine was the primary immunosuppressive agent used post-transplant, but it has largely been replaced by tacrolimus. Cyclosporine has been known to cause gingival hyperplasia,(19) leading to patient discomfort and difficulties with oral hygiene. In contrast, tacrolimus has no adverse effects on dental health.(20) The shift to tacrolimus has significantly reduced the incidence of gingival hyperplasia in transplant patients. Notably, none of the patients in this study were prescribed cyclosporine, and consequently, no cases of gingival enlargement were observed.

CONCLUSION

The field of organ transplantation is rapidly evolving, and as a result, transplant patients often experience a range of complications, including oral health issues. This necessitates ongoing efforts to refine treatment protocols and develop innovative strategies to effectively manage these complications and optimize patients' quality of life.

It's recommended that patients scheduled for organ transplants should be referred to a dental clinic as early as possible. This allows for the identification and removal of any potential sources of oral infection. Educating both physicians and patients about the importance of early dental screening and pre-transplant dental treatment is essential. Post-transplant, patients should be reminded of the necessity for regular dental check-ups and ongoing dental care to improve their prognosis. Achieving these goals requires a comprehensive oral care program, supported by full cooperation among patients, physicians, and dentists.

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