Dental Management of Patients Scheduled for Human Stem Cell Transplantation

NYU | DENTISTRY
Oral Health Center for People with Disabilities

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Introduction

In addition to a diverse population of individuals with disabilities presenting for comprehensive dental care, The Oral Health Center for People with Disabilities at NYU Dentistry routinely serves the needs of patients who are candidates for Human Stem Cell Transplantation (HSCT). Patients are referred from oncology teams for the purpose of receiving “dental clearance” which ensures that the patient is in optimal oral health or the anticipated transplantation. HSCT is indicated for leukemia, lymphoma, multiple myeloma, and select solid tumors such as germ cell tumors, neuroblastoma, Ewing sarcoma, and medulloblastoma. It may also be indicated for non-malignant conditions such as severe aplastic anemia, inherited bone marrow failure syndromes, sickle cell disease, transfusion dependent thalassemia, inherited immune deficiency syndromes, and certain metabolic conditions. The principle of HSCT is to replace an individual’s unhealthy bone marrow cells and immune system with an infusion of healthy stem cells following chemotherapy, radiation therapy, or both.

According to updated data on Blood Cancers for the Leukemia and Lymphoma Society, an estimated 186,400 individuals were expected to be diagnosed with leukemia, lymphoma, or myeloma in 2021. A total of 22, 827 hematopoietic stem cell transplants were performed and reported to The Center for International Blood and Bone Marrow Transplant Research (CIBMTR) in 2021. The importance of optimal oral health and the elimination of any compromising conditions prior to therapy cannot be underestimated as there may be implications during the treatment itself and/or during the post treatment period, especially with radiation treatment and potential adjunctive therapies.

Dental Considerations

Due to the potential severity and longevity of immunosuppression prior to, during, and following HSCT, pre-HSCT dental assessment and provision of dental treatment may prevent oral complications during and following the transplant. The underlying condition and the treatment regimen can affect the degree and length of immunosuppression and impact the patient’s ability to receive dental care. Although the literature presents contrasting views as to the extensiveness of dental intervention required for patient clearance, there is the potential for oral complications during the HSCT process and evaluation along with pertinent intervention can reduce the risk of their occurrence. The objective is to prioritize the patient’s needs which focus on the short term and stabilize the patient’s oral status and minimize potential complications during the HSCT process. The timing of the pre-HSCT in relation to the transplant is an important consideration as to permit sufficient healing time for invasive procedures should they be identified and performed. At least two weeks should be allotted post- operatively to permit soft tissue healing prior to HSCT. Communication with the oncology team is imperative as it facilitates timely, efficient, and medically appropriate dental intervention.

Medical Considerations

The dental management of patients who are planned to undergo stem cell transplantation necessitates a comprehensive understanding of the level of myelosuppression and the risks of bleeding. Regular and effective communication and collaboration between the dental team and the patient's medical team are essential for ensuring the delivery of safe and appropriate dental care . An Absolute Neutrophil Count (ANC) would inform the provider of the level of neutropenia and immunosuppression. If the ANC value is lower than 500, antibiotic prophylaxis should be considered for surgical procedures. A Platelet count would inform the provider risk of prolonged bleeding. A platelet count of less than 20,000 would require a platelet transfusion for surgical procedures. A Complete Blood Count with Differential could also be utilizes to determine the patient's hematologic status.

Case Study

Patient Introduction:
A 58-year-old Asian male presented to NYU Dentistry’s Oral Health Center for People with Disabilities seeking dental clearance prior to hematopoietic stem cell transplant (HSCT) as the patient had been diagnosed with a lymph node carcinoma.

Medical and Dental Findings:
The patient’s medical history included hypertension, hypercholesterolemia, systemic lupus erythematosus, and hepatitis B. His medications included amlodipine, lisinopril, metoprolol tartrate, pravastatin, pantoprazole, entecavir, oyster shell, calcium, and vitamin D3 along with 0.12% chlorhexidine gluconate. No known drug allergies were reported. The patient’s vitals were, BP 163/86 and HR 81. Most recent platelet count was 277 and ANC 3.8.

At the initial visit, a panoramic film and a complete intra-oral radiographic series was recorded and interpreted. Additionally, an extra-oral and intra-oral examination were completed. Clinical examination revealed that the patient had multiple partial dentures, #2-#4, #6-#9, #13-#15, #18-#21 with a cantilevered pontic on #18, and #28-#31. #17 and #32 were missing. Generalized gingivitis was present. Generally, periodontal probing was less than 5 mm. Although mandibular anterior periapical images displayed reduced bone levels, periodontal probing's were 3 mm or less. Radiographically, a root had been removed on #2, #3 had advanced periodontal disease, #14 had a retained root under the pontic, and #15 and #16 had advanced periodontal disease, #19 and #30 had advanced periodontal disease with furcation involvement, and #31 had advanced periodontal disease.

Comprehensive Treatment Plan:
A prophylaxis and extractions of #2, #3, #14, #15, #16, #19, #30, and #31,were recommended prior to the patient’s HSCT as they were periodontally compromised or posed a potential infection which could significantly compromise the transplantation process while the patient was immunosuppressed. While the patient did not contract the findings, he was reluctant to consent for the recommended treatment as the teeth in question had been recently restored with fixed options at a significant out of pocket expense for him**.**

Phase One Treatment Planning

Comprehensive Treatment Planning: Should be complete at least a month before HSCT allowing for a minimum 7- 14 days of healing from surgical procedures. Aggressive or conservative treatment plan will be determined by the dental and medical status.

Patient education/ Hygiene: Educate patient on maintaining nutrition throughout the medical treatment. Encourage oral hygiene habits 2-3 times a day.
If oral hygiene cannot be maintained, Alcohol free chlorhexidine rinse should be prescribed.

Restorative: Incipient caries should be treated with fluoride varnish. Advanced caries that may have pulpal involvement should be alleviated. Failing restorations should be stabilized.

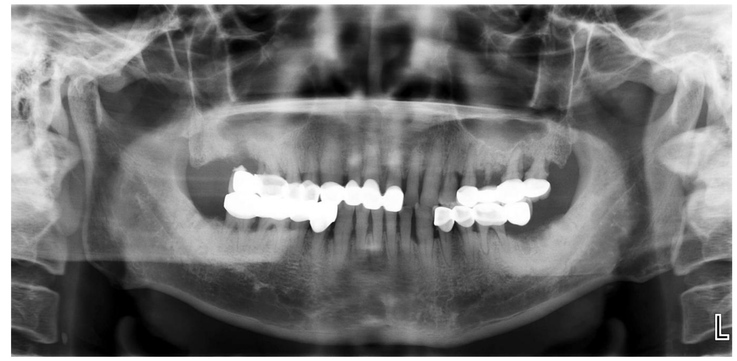
Endodontics: For symptomatic vital teeth, the definitive treatment is extraction. If the tooth is important to support future prosthesis, Root canal therapy can be considered. For asymptomatic non-vital teeth, Root canal treatment may be delayed until the patient hematologic status is stabilized.

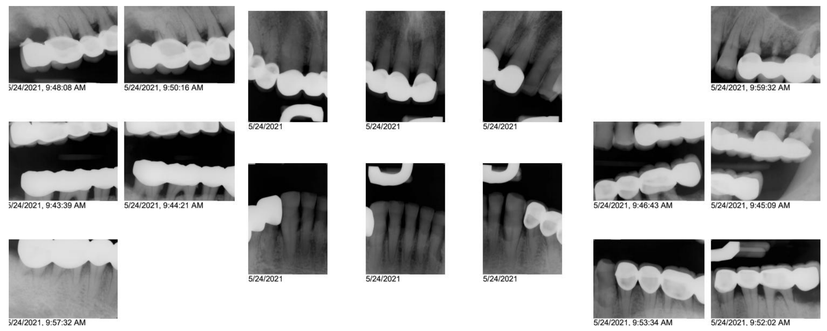
Periodontics: Patients with Hematologic and myelosuppressive malignancy will have decreased sign of periodontal disease. Reduction in oral microbial load contributes to controlling oral GVHD.

Oral Surgery: Non-restorable, Teeth with a probing depths greater than 5 mm, Partially impacted teeth , teeth associated with purulence, periodontally involved teeth should be extracted.

Prosthodontics: Removable appliances should be removed and cleaned twice a day and not worn overnight. Poorly fitting prosthesis should only be used for dietary and esthetic purposes. Peri-implantitis should be managed with debridement and chlorhexidine rinse. Mobile implants should be removed.

Radiographs





Conclusions

This case reemphasizes the need for interprofessional collaboration between the oncology and dental teams to optimize patients for cancer therapy. It may also be in the best interests of patients to have an objective third party conduct the dental evaluation to ensure an unbiased diagnostic assessment and treatment recommendations as opposed to the patient’s primary care provider. Additionally, it illustrates the professional obligations to diagnose dental conditions and recommend indicated treatment while respecting patient’s autonomy in the event the patient will not consent to any proposed treatment. Lastly, the dental and oncology teams will need to discuss potential complications which could occur during therapy and compromise it effectiveness and manage the patient accordingly.

References

Advances in hematologic stem cell transplant: An update for oral health care providers Joel B. Epstein, DMD, MSD, FRCD,FCDS,FDS RCS; Judith E. Raber-Drulacher, DDS,PhD; Affi Wilkins, DDS; Maria-Gabriella Chavarria, DDS; Han Myint, , MD, FRCP Oral Surgery, Oral Medicine, Oral Pathology, and Endodontology, Vol 107, No. 3, March 2009

Impact of oral care prior to HSCT on the severity and clinical outcomes of oral mucositis da Silva Santos PS, Coracin FL, Barros JCA, Dulley FL, Nunes FD, Magalhaes, MG Clinical Transplantation, 2011: 25: 325-328

Oral Management in Pre-HSCT Patients: An Evaluation of Oral and Systemic Complications Renato Pol, Tiziana Ruggiero, Luisa Giaccone, Davide Camisassa, Andrea Spadafora, Giulia Rivetti,, Marta Bezzi; OBM Transplantation (2019), Volume 3, Issue 4, 1-11

Dental status and risk of odontogenic complication in patients undergoing hematopoietic stem cell transplant Hansen HJ, Estilo C, Owosho A, Solano AK, Randazzo J, Huryn J, Yom SK; Supportive Care in Cancer (2021) 29: 2231-2238

Oral Care for Hematopoietic Stem Cell Transplantation Patients: A Narrative Review Samim F, ten Bohmer KL, Koppelmans RGA, Raber-Durlache JE, Epstein JB; Oral Health Prev Dent (2019) 17:413-423

Oral Health in patients scheduled for hematopoietic stem cell transplantation in the Orastem study Skallsjo K, von Bultzingslowen I, Johansson JE, Ohman J, Raber- Durlacher JE, Huysmans MC D.N.J M, Laheij A M.G.A, van Leeuwen S J.M, Hovan AJ, Legert KG, Nguyen HM, Turk PJ, Rozema FR, Blijlevens M.A., Brennan MT; PLos ONE, (2023) 1-18

A general practitioner’s guide to hematopoietic stem-cell transplantation Bazinet A, Popradi G, Current Oncology, Vol 26, No 3, (2019)187-191

Dental assessment prior to stem cell transplant: treatment need and barriers to care Durey K, Patterson H, Gordon K; British Dental Journal,(2009)206: E19, 1-5

Oral health of adult patients undergoing hematopoietic cell transplantation. Pre-transplant assessment and care Boguslawska-Kapala A, Halaburda K, Rusyan E, Golabek H, Struzycka I; Ann Hematol (2017) 96:1135-1145