Dental Extractions in Patients Prior to Stem Cell Transplantation

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Abstract

The purpose of the study was to evaluate the incidence of complications of dental surgical procedures conducted in patients requiring hematopoietic stem cell transplantation (HSCT). This retrospective cohort study included 33 patients with hematologic diseases in need of dental extraction. The variables evaluated were age, gender, primary disease, platelet count, number of extracted teeth, leukocyte count, and hemoglobin and hematocrit levels. Seven patients showed platelet count below 100,000/μL. None of the patients presented any significant bleeding during or after the surgical procedures. Also, no infectious complications were observed. In conclusion, bleeding complications are rare in patients with hematological conditions requiring HSCT and dental extraction procedures are safe.

Key Words: Dental extraction, Hematopoietic stem cell transplantation, Oral surgery, Bleeding

Introduction

Management of thrombocytopenic patients in need of Hematopoietic Stem Cell Transplantation (HSCT) is a challenge for dentists as it involves meticulous preoperative planning, while taking into consideration the patient's medical condition, his/her systemic debilities, and the imminent risk of complications such as bleeding. HSCT is indicated as a therapeutic measure for hematological malignancies, bone marrow deficiencies or other congenital disorders of hematopoiesis [1,2]. Thrombocytopenia is a frequent complication in patients with hematological conditions that require HSCT [3]. Recent studies suggest that the current methods used by dentists to treat thrombocytopenic patients are safe and local procedures for hemostasis are sufficient to address any bleeding complications. However, the benefits of platelet transfusion still remain unclear [4,5]. The approach used in thrombocytopenic patients requiring HSCT is still dependent on the experience and judgment of the surgeon as there is limited literature available on the treatment of such cases. The aim of this study was to evaluate the incidence of intraoperative and postoperative complications of dental surgical procedures conducted in patients requiring HSCT.

Materials and Methods

Study design and sample

The present study was a retrospective analysis in 33patients with hematologic diseases referred for dental extraction to the School of Dentistry at the Universidade Federal de Minas Gerais between 2002 and 2013. All the patients eligible for this study underwent at least one tooth extraction, had complete blood count at the time of consultation, and were prepared for HSCT. Dental extractions were involved in the oral environment stabilization procedures prior to HSCT. In keeping with the institutional protocol, transfusion of platelets was performed in patients with counts less than 50,000/μL. Platelets were transfused on the same day and few hours prior to the surgical procedure. No prophylactic antibiotic or anti-inflammatory drugs were used in any of the patients. The study was conducted in accordance with the declaration of Helsinki and was approved by the University ethical committee.

Study variables

The following variables were included in the analysis: age, gender, primary disease, platelet count, number of extracted teeth, type of extraction, use of additional local hemostatic measures, leukocyte count, and hemoglobin and hematocrit levels. The primary outcome was postoperative bleeding that required intervention. Intraoperative complications were considered as excessive bleeding and difficult hemostasis using conventional techniques such as local compression and suture. The additional hemostatic measures consisted in the use of absorbable hemostat.

Results

The basic clinical information of the subjectsis given in *Table 1*. From the total of 33 patients, 7 showed platelet count below 100,000/μL (*Figure 1*). Patients' blood count prior to dental extraction is on *Table 2*.

None of the patients presented any significant bleeding during or after the surgical procedures. However, fibrillar absorbable sponges were required in two of the cases. Moreover, no infectious complications were observed, despite not using prophylactic antibiotics. Platelet transfusion was indicated in two cases. Eighty-one teeth were extracted comprising40 molars, 30 premolars, 4 canines, 5 incisors, and 2 deciduous molars. Eight out of the 40 molars were impacted.

Discussion

Myelosuppressive chemotherapies are frequently used in patients with hematologic malignancies, resulting in immunodeficiency and thrombocytopenia. Dental interventions

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Table 1. *Basic descriptive information of subjects included in the study.*

Study Variable	Descriptive data	Total
Male/Female	22/10	32
Age (years),	Mean ± SD (range)	39 ± 15.2 (67–12)
Patient Diagnoses	Chronic myeloid leukemia	8
	Acute myeloid leukemia	4
	Multiple myeloma	7
	Acute lymphocytic leukemia	4
	Fanconi anemia	1
	Aplastic anemia	2
	Hodgkin's lymphoma	2
	Myelofibrosis	1
	Immune thrombocytopenic purpura	1
	Myeloid sarcoma	1
	Unspecified leukemia	2
Local measures used, n (%)	Fibrillar absorbable sponge	2

SD: standard deviation

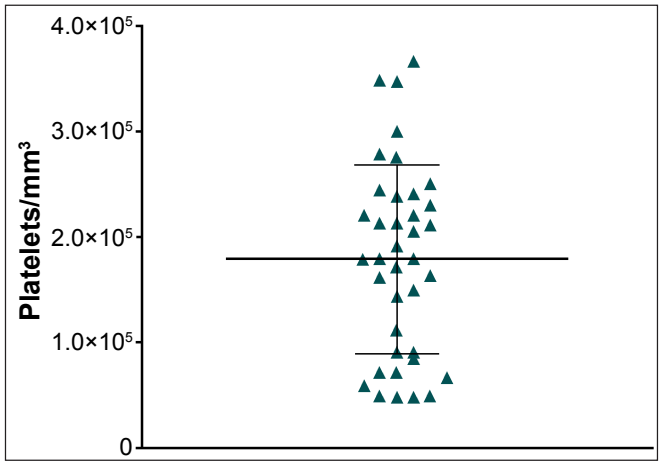

Figure 1*. Distribution, mean and standard deviation of platelet count before each clinical session for teeth extraction. Note that ten patients underwent more than one clinical session.*

play an important role in the control of dental infections during the phase of chemotherapy and HSCT [6]. Restorative, periodontal and surgical dental procedures are necessary prior to the conditioning regimen for HSCT, thus emphasizing the importance of interdisciplinary treatment for such patients [7,8].

Although normal platelet counts range from 150,000 to 400,000/μL, a platelet count of 100,000/μL is considered as the cut-off value by some authors for dental extractions [4,5]. However, lower values are acceptable in case of minor procedures [5]. Platelet transfusion is recommended preoperatively when the count is lower than 50,000/μL [4]. Invasive surgical procedures such as dental extractions should be performed when there are precise indications, keeping

Table 2. *Blood counting panel of patients submitted to dental extraction.*

Blood component	Mean	Standard deviation	Range
Hemoglobin (g/dL)	12.10	± 3.20	6.40 – 18.00
Hematocrit (%)	36.10	± 10.00	18.50 – 51.50
Erythrocytes (10^6/μL)	3.94	± 1.16	2.11 – 624.00
Mean corpuscular volume (fL)	90.74	± 6.02	78.80 – 108.04
Mean corpuscular hemoglobin (pg)	30.49	± 2.26	26.30 – 36.00
Mean corpuscular hemoglobin concentration (g/dL)	25.75	± 14.40	0.32 – 36.70
Leukocytes(10^3/μL)	4.82	± 3.00	620 – 14300
Neutrophil (10^3/μL)	2.62	± 2.15	0.01 – 8.12
Lymphocyte (10^3/μL)	1.60	± 0.94	0.09 – 3.86
Monocyte (10^3/μL)	0.49	± 0.34	0.06 – 1.66
Eosinophil (10^3/μL)	0.24	± 0.26	0.00 – 0.90
Basophil (10^3/μL)	0.043	± 0.05	0.00 – 0.14
Platelet count (10^3/μL)	178.70	± 88.7	48.00 – 366.00
International normalized ratio (INR)*	1,06	± 0,69	0.75 – 1.91

*Data available from ten patients.

in mind the systemic condition of the patient. Although prophylactic antibiotics have been recommended in patients with granulocyte count below 2,000/μL [9,10], this was not validated by evidence based studies. In our institution prophylactic antibiotics are used only in patients with counts less than 500/μL.

In the present study, none of the patients received prophylactic antibiotics and no postoperative infection was observed. Moreover, none of the subjects referred from the HSCT unit underwent bleeding complications after tooth extraction. Among the conditions listed in *Table 1*, aplastic anemia is the condition most frequently associated with thrombocytopenia. The low number of patients with aplastic anemia included in our study helps explain the fact that only 6 subjects presented with platelet counts below 100,000/μL. Therefore, the clinical profile of the patients attending our service may have also contributed to the absence of intraoperative or postoperative bleeding complications.

A traumatic surgical techniques and sutures that aid in primary mucosal closurehelp in controlling bleeding and inducing hemostasis and are essential in thrombocytopenic patients [5]. The use of fibrillar absorbable sponges inside the alveolus and plasmin inhibitors such as tranexamic acid and ε-aminocaproic acid are measures that help to preserve the clot and promote hemostasis [5,11]. Although we have not used any anti-fibrinolytic agents in the present cohort, fibrillar absorbable sponges were necessary in two of the cases. In conclusion, our data shows that bleeding complications are rare in patients with hematological conditions requiring HSCT and dental extraction procedures are safe.

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