872 Do Oral Conditions Influence the Incidence of Bloodstream Infection after Hematopoietic Stem Cell Transplantation? A retrospective Study

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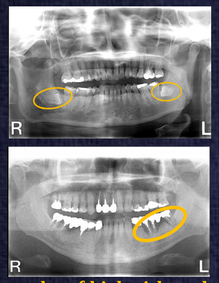
Backgrounds and Objects

Backgrounds

1. Hematopoietic stem cell transplantation (HSCT) is currently one of the most frequently used procedures for the treatment of malignant and non-malignant blood diseases.
2. 75-100% of patients who undergo HSCT develop oral mucositis (OM).
3. Oral cavity is an important port of entry for systemic infection during HSCT.
4. Many dentists have attempted to reduce the risk of infection during HSCT.
5. There are many cases in which infectious teeth cannot be extracted before HSCT because of general condition.



Examples of high-risk oral conditions

Objects

The objective of this study is to evaluate the incidence of blood stream infection (BSI) among patients with teeth that would have been extracted undergoing HSCT.

Patients and Methods

Patients

We retrospectively evaluated patients who underwent HSCT at Toranomon Hospital from January 2017 to December 2019.

Inclusion criteria

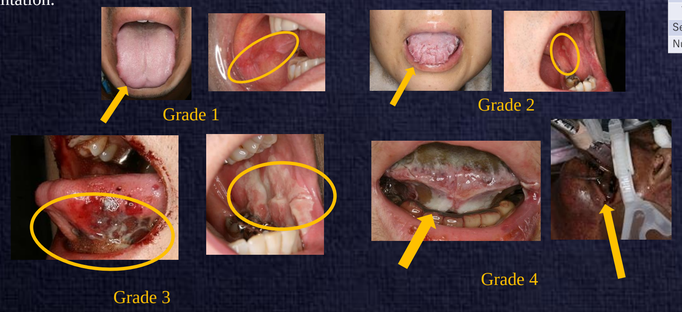
* Patients who underwent oral examination and panoramic radiography before HSCT.

Exclusion criteria

* Patients who underwent autologous peripheral blood stem transplantation.
* Patients who did not undergo dental screening.
* Patients who had their teeth extracted before HSCT.

Oral examination and oral care

1. Assessment of teeth through panoramic radiography.
2. Professional mechanical tooth cleaning
3. Preparation of mouthpieces to prevent oral mucositis
4. Evaluation of OM according to Common Terminology Criteria for Adverse Events (CTCAE)v.3.0 after HSCT



CTCAE v.3.0

Data collections

1. Age, sex, disease, pre-transplant conditioning intensity, donor source, graft-versus-host-disease (GVHD), transplant risk, number of infecition sources within the oral cavity, and grade of OM within 28 days after engraftment
2. Comparison of BSI between 2 groups those with high-risk oral conditions and without them
3. Description of Anaerobic gram-positive cocci, α-streptococcus, γ-streptococcus, Bacteroides, gram-positive cocci, *Rohia mucilanginosa*, *Streptococcus mitis*, and *Streptococcus parasanguinis* as pathogens originating from the oral cavity

Statistical Analysis

1. Chi-square and Mann-Whitney U tests were performed to compare the incidence of BSI.
2. Multivariate regression analyses were performed to investigate the risk of BSI.
3. Statistical analyses were performed using SPSS software (IBM).

Ethics

1. This study was approved by the Medical Ethics Committee of Toranomon Hospital (approval number: 1724).
2. This retrospective analysis was performed in accordance with the Declaration of Helsinki guidelines.

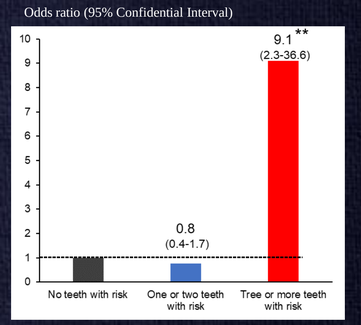
Results

1. A total of 279 patients underwent HSCT between January 2017 and December 2019.
2. We excluded 88 (77 who underwent autologous peripheral blood stem transplantation, 7 who did not undergo dental screening and 4 had their teeth extracted before HSCT).

Table 1. Patient characteristics by oral condition group

	Patients without high-risk oral conditions(n=60)	Patients with high-risk oral conditions(n=131)	Total(n=191)
Age (median)	22-70 (51.5)	20-72 (50.0)	20-72 (48.0)
Sex (male, %)	24 (40.0)	89 (67.9)	113 (59.2)
Diagnosis (%)			
AML	35 (58.3)	63 (48.1)	98 (51.3)
ALL	7 (11.7)	20 (15.3)	27 (14.1)
MDS	3 (5.0)	19 (14.5)	22 (11.5)
Others	15 (25.0)	29 (22.1)	44 (23.0)
High-risk HSCT	41 (68.3)	78 (59.5)	119 (62.3)
Myeloablative regimens (%)	21 (35.0)	55 (42.0)	76 (66.7)
Sources of transplantation (%)			
BMT	2 (3.3)	12 (9.2)	14 (7.3)
PBSCT	7 (11.7)	10 (7.6)	17 (8.9)
CBT	51 (85.0)	109 (83.2)	160 (83.8)
GVHD prophylaxis (%)	60 (100.0)	131 (100.0)	191 (100.0)
MTX	5 (8.3)	20 (15.3)	25 (13.1)
TAC	56 (93.3)	124 (94.7)	180 (94.2)
Severe mucositis at day 8-14	29/54 (53.7)	49/124 (39.5)	78/178 (43.8)
Number of remaining teeth (median)	7-32 (26.6)	2-32 (27.0)	2-32 (28.0)

Figure The risk factors for BSI in multivariate analyses



**p<0.01
Adjusted for age, sex, HSCT, donor source, MTX, and oral mucositis

Table 2. Microorganisms detected in blood culture

Positive blood culture from oral cavity (n=13)	
Streptococcus mitis/oralis	8 (61.5%)
α-streptococcus	3 (23.1%)
Gram-positive cocci	2 (15.4%)

Positive blood culture from non-oral cavity (n=213)	
Staphylococcus epidermidis	57 (26.8%)
Enterococcus epidermidis	48 (22.5%)
Staphylococcus haemolyticus	13 (6.1%)
Escherichia coli	11 (5.2%)
Gram-positive rods	11 (5.2%)
Corynebacterium striatum	10 (4.7%)
Klebsiella pneumoniae	10 (4.7%)
Stenotrophomonas maltophilia	9 (4.2%)
Enterococcus faecalis	7 (3.3%)
Streptococcus agalactiae	5 (2.3%)
Staphylococcus hominis	4 (1.9%)
Pseudomonas aeruginosa	4 (1.9%)
Staphylococcus lugdunensis	3 (1.4%)
Staphylococcus species	3 (1.4%)
Others	18 (8.4%)

Abbreviations:
AML: acute myeloid leukemia, ALL: acute lymphoblastic leukemia, MDS: myelodysplastic syndrome, HSCT: hematopoietic stem cell transplantation, BMT: bone marrow transplantation, PBSCT: peripheral blood stem cell transplantation, CBT: cord blood transplantation, GVHD: graft-versus-host disease, MTX: methotrexate, TAC: tacrolimus

Discussions

1. High-risk of oral conditions did not affect the incidence of BSI in the group of about 200 patients' who underwent oral screening before HSCT.
2. Chronic oral inflammation does not affect the incidence of BSI after HSCT.
3. Limitations of this study:
   *Many patients receive HSCT for high-risk diseases.
   *Many patients underwent CBT.

Conclusions

We found out that we do not need to remove less than three infectious teeth of patients with high-risk for HSCT.

References

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The authors declare no conflicts of interst associated with this study.