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Clinical characteristics and risk factors of oral infection in patients undergoing oral and maxillofacial surgery

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Abstract: Objective: To explore the clinical features and risk factors of oral infection in patients undergoing oral and maxillofacial surgery. Methods: 140 patients with oral infection who underwent oral and maxillofacial surgery from April 2019 to May 2023 were retrospectively collected as the study objects, and their clinical characteristics and risk factors were analyzed. Results: Staphylococcus aureus, Staphylococcus epidermidis and Pseudomonas aeruginosa were the highest in patients with oral infection in oral and maxillofacial surgery, accounting for 25.00%, 20.71% and 17.85%. Multivariate logistic analysis showed that age, long-term use of antibiotics, emergency invasive surgery, diabetes and perioperative failure to prevent oral infection were risk factors for oral and maxillofacial surgery patients. Conclusion: Staphylococcus aureus, Staphylococcus epidermidis and Pseudomonas aeruginosa are the main pathogens of oral infection in patients undergoing oral and maxillofacial surgery. Age, long-term use of antibiotics, emergency invasive surgery, diabetes and perioperative failure to prevent oral infection all increase the risk of oral infection in patients undergoing oral and maxillofacial surgery.

Keywords: Oral and Maxillofacial Surgery; Oral Infection; Clinical Features

Studies have shown that patients undergoing oral and maxillofacial surgery may suffer from oral infections due to various factors [1]. However, oral infection in patients undergoing oral and maxillofacial surgery will cause oral discomfort and adversely affect their daily diet and language communication ability [2]. In addition, this infection can further induce more serious systemic disease, which poses a threat to the overall health of patients. Therefore, in-depth understanding of the clinical characteristics and risk factors of oral infection in oral and maxillofacial surgery patients is of great value for accurate diagnosis of infection and assessment of the severity of the disease, and provides strong support for the formulation of scientific and effective prevention strategies.

Based on this, this study aims to further explore the clinical characteristics and risk factors of oral infection in patients with oral and maxillofacial surgery, in order to provide a solid theoretical basis for further reducing the risk of oral infection in patients.

1. Data and methods

1.1 General Information

A total of 140 patients with oral infection who underwent oral and maxillofacial surgery from April 2019 to May 2023 were retrospectively collected as the study objects, and their clinical characteristics and risk factors were analyzed. In this group, there were 80 males and 60 females, ranging in age from 25 to 60 years old, with an average age of (35.11±3.24) years old. There were 40 cases of oral malignant tumor resection, 33 cases of cyst resection, 28 cases of gingival resection and tooth extraction, 10 cases of cleft lip and palate correction, 5 cases of salivary gland operation, and 24 cases of debridement and suture. There was no significant difference in the general data among the groups ($P < 0.05$). Inclusion criteria: (1) patients meeting the indications for oral and maxillofacial surgery; (2) Good compliance with the experiment. Exclusion criteria: (1) Patients with parenchymatous organ injury; (2) Patients with immune diseases and coagulation dysfunction; (3) Patients who are allergic to the instruments used in this experiment; (4) Patients with mental illness or cognitive impairment who cannot communicate normally; (5) Patients who were judged by more than two senior doctors to be unable to perform this experiment.

1.2 Research Methods

Clinical data of patients were collected retrospectively and recorded. After strict operating procedures, oral test specimens of patients were collected, and all samples were accurately identified by bacteria identification instrument. In the whole process of bacterial culture and

identification, the relevant operating specifications were strictly observed, and the repeated strains in the same part of the same patient were eliminated. In order to comprehensively and objectively analyze the factors related to oral infection, a self-made survey and analysis table was used. The design of the questionnaire is scientific and reasonable, including many factors closely related to oral infection.

1.3 Observation indicators and evaluation criteria

(1) Clinical oral test results of patients with oral infection were observed, and the types of pathogenic bacteria were analyzed. Blue negative bacteria ≥105 CFU/mL is positive, gram-positive bacteria and fungi ≥104 CFU/mL is positive.

(2) Risk factors of patients with oral infection were analyzed.

1.4 Statistical Analysis

SPSS 24.0 software was used for data processing, measurement data were presented in the form of ($x \pm s$), and T-test was used for comparative analysis among different groups. For counting data, percentage (%) was used as the expression, and the difference between groups was compared by 2 test. In this study, if $P < 0.05$, the difference was considered statistically significant.

2. Consequence

2.1 Clinical oral test results of patients with oral infection

Among patients with oral infection in oral and maxillofacial surgery, Staphylococcus epidermidis, Staphylococcus aureus and Pseudomonas aeruginosa were the main pathogens, accounting for 20.71%, 25.00% and 17.85%.

Table 1 Types of clinical oral pathogens in patients [n, %]

Pathogenic bacteria	n	scale (%)
E. coli	13	9.28%
Staphylococcus epidermidis	29	20.71%
Staphylococcus aureus	34	25.00%
Klebsiella pneumoniae	14	10.00%
Acinetobacter baumannii	10	7.14%
Pseudomonas aeruginosa	25	17.85%
Candida albicans	12	8.57%
other	3	2.14%

2.2 Risk factors in patients with oral infection

Multivariate logisti analysis showed that age, long-term use of antibiotics, emergency invasive surgery, diabetes, and perioperative failure to prevent oral infection were risk factors for oral and maxillofacial surgery patients.

Table 2 Results of multivariate logisti analysis in patients in group 2

index	Multivariate Logistic regression analysis		
	OR	95%CI	P 值
age	1.28	1.30-1.58	0.024
Long-term use of antibiotics	0.93	0.99-1.24	0.016
Emergency invasive surgery	1.14	0.75-1.77	0.017
Combined diabetes	1.32	1.21-2.05	0.009
It was not prevented during perioperative period	1.52	1.45-2.05	0.014

3. Conclusion

The clinical characteristics and risk factors of oral infection in patients with oral and maxillofacial surgery can be prevented and treated, which is of great significance for improving the quality of life of patients and reducing the burden of hospitalization. The results of this study showed that Staphylococcus epidermidis, Staphylococcus aureus and Pseudomonas aeruginosa were the main pathogens in patients

with oral infection in oral and maxillofacial surgery, accounting for 20.71%, 25.00% and 17.85%. Sun Shaohong's research results found that Staphylococcus aureus infection was 22.5% and Staphylococcus epidermidis infection was 12.5%, accounting for the highest proportion, which was consistent with the results of this study [3]. The reason may be that Staphylococcus aureus produces a variety of toxins such as leukocidin and hemolysin. The existence of these toxins may have a destructive effect on the body resistance of patients, thereby affecting their health status and increasing the probability of infection. In this study, age, long-term use of antibiotics, emergency invasive surgery, combined diabetes, and perioperative failure to prevent oral infection were the risk factors for oral and maxillofacial surgery patients. The physiological function of the elderly is decreased, the immunity is decreased, and the oral environment is changed, which is easy to form infection. Patients who use antibiotics for a long time develop resistance to the drugs and the treatment effectiveness of oral infections decreases. However, emergency invasive surgical treatment will reduce the role of resistance to bacterial invasion, reduce the resistance of skin mucosa, make the oral environment suitable for anaerobic bacteria and other pathogens, and increase the risk of oral infection. For patients with diabetes, their resistance is reduced, and the high blood sugar state provides a good environment for the growth of pathogenic bacteria. As a result, people with diabetes are at increased risk of developing oral infections. In addition, the absence of perioperative prevention can also increase the risk of oral infection.

In summary, Staphylococcus epidermidis, Staphylococcus aureus and pseudomonas aeruginosa are the main pathogens of oral infection in patients undergoing oral and maxillofacial surgery, and age, long-term use of antibiotics, emergency invasive surgery, diabetes, and perioperative failure to prevent oral infection all increase the risk of oral infection. Clinical intervention measures can be implemented according to the research results to effectively reduce the risk of oral infection and ensure the oral health of patients.

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