

ORIGINAL ARTICLE

Medicine Science 2023;12(2):412-6

Preoperative evaluation characteristics of bimaxillary surgery patients: A retrospective study in which prominent findings were evaluated with the literature review

 Seher Orbay Yasli,  Dilek Gunay Canpolat,  Fatma Dogruel,  Ahmet Emin Demirbas

Erciyes University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Kayseri, Türkiye

Received 28 November 2022; Accepted 05 April 2023

Available online 07.04.2023 with doi: 10.5455/medscience.2022.11.248

Copyright@Author(s) - Available online at www.medicinescience.org

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial-NonDerivatives 4.0 International License.



Abstract

In this study, we aimed to share our experience in preoperative anaesthesia evaluation for patients undergoing bimaxillary surgery in our hospital and review the relevant literature. We retrospectively evaluated 139 patients with ASA (American Society of Anesthesiology) physical status 1 and 2 who underwent bimaxillary surgery. Data were collected on demographic characteristics, ASA physical status, mallampati scores, systemic diseases, allergy history, consultation request status, consulted departments, smoking, alcohol or drug use, and previous exposure to general anaesthesia. The preoperative evaluation of bimaxillary surgery patients revealed several notable findings, including a relatively high rate of cardiovascular problems (48% rate among those with additional systemic disease), the need for otolaryngology (ENT) consultation being the most frequent (44% rate among all consultations), and a relatively high rate of active smoking (23.7%). Our findings suggest that the bimaxillary surgery patient group should be carefully evaluated, particularly regarding cardiovascular disease and difficult airway management.

Keywords: Bimaxillary surgery, orthognathic surgery, preoperative period

Introduction

Orthognathic surgery procedures are a group of operations that are performed on patients with severe facial architecture abnormalities or bite asymmetry problems. The procedures may include mandibular or maxillary osteotomy, maxillary impaction, maxillary or mandibular advancement, and mandibular setback, either individually or in combination [1]. Correcting certain dental-skeletofacial deformities requires simultaneous surgical interventions on both the maxilla and the mandible, known as bimaxillary surgery. This procedure is more time-consuming under general anaesthesia than other orthognathic surgeries and may result in additional blood loss [2].

Preoperative medical assessments should contain comprehensive evaluations to provide risk stratification and appropriate modification for medical or surgical risk. These assessments and risk stratification are applications that guide the planning of perioperative anaesthesia management for each patient. A preoperative examination applies in bimaxillary surgery, as in all areas of surgery. Evaluation includes a complete history and physical examination, possible laboratory tests, imaging, specialist consultations, and diagnostic/therapeutic interventions [3].

Common features can be seen in the patient population of some surgeries. For example, bariatric surgery patients are morbidly

CITATION

Yasli SO, Canpolat DG, Dogruel F, Demirbas AE. Preoperative evaluation characteristics of bimaxillary surgery patients: A retrospective study in which prominent findings were evaluated with the literature review. Med Science. 2023;12(2):412-6.



Corresponding Author: Seher Orbay Yasli, Erciyes University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Kayseri, Türkiye
Email: sehersin81@hotmail.com

obese, and additional related problems are common in this patient group [4]. When the literature is examined, what is commonly known about the preoperative evaluation features of bimaxillary surgery patients is that the patient population consists of young patients and that difficult intubation may occur due to maxillofacial asymmetry problems. The authors hypothesised that bimaxillary surgery patients could have other common features in terms of preoperative evaluation characteristics and thought that this feature could draw attention to the point that anesthesiologists should pay attention to, which could require a detailed examination in terms of the preoperative examination. In this study, we aimed to reveal the preoperative examination characteristics of bimaxillary surgery patients and review the points to be considered accompanied by the literature.

Material and Methods

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Erciyes University Scientific local Ethical Committee in Turkey (Decision Number: 2022/ 781).

All patients undergoing bimaxillary surgery between 01 July 2020 and 31 August 2021 were evaluated retrospectively by retrieving their medical records. One hundred thirty-nine patients aged 18-65 were included in the study. The information obtained from the preoperative evaluation documents was recorded. Demographic characteristics, ASA physical status, Mallampati scores, systemic diseases, allergy history, consultation request status, and if requested to which department they were consulted, smoking, alcohol or drug use and previous exposure to general anaesthesia were recorded for all included patients.

Statistical Analysis

Data normality for continuous variables was evaluated using a histogram, q-q plots, and the Shapiro-Wilk test. The Levene test was performed to examine variance homogeneity for variables with normal distribution. Data values were shown as mean±standard deviation, median (minimum-maximum), or frequency (percentages) values. Analyses were conducted using TURCOSA (Turcosa Analytic Ltd. Co., Turkey, www.turcosa.com.tr). A p-value of less than 0.05% was considered statistically significant.

Results

A total of 139 patients' medical files were included in the study. Of the included patients, 75 (53.95%) were female, 64 (46.04%) were male, with a mean age of 22 (age range: 18-42 age). Ninety (64.7%) patients were included in the ASA 1 group, and 49 (35.2%) were in the ASA 2 group.

Of the 139 patients, 23 (16.54%) had an additional systemic disease (Figure 1). These were Diabetes Mellitus in 2 patients, asthma-chronic obstructive pulmonary disease in 5 patients, cardiovascular disease in 11 patients, hypothyroidism in 3 patients, neurological disease in 1 patient, and a nephrological problem in 1 patient (Figure 2).

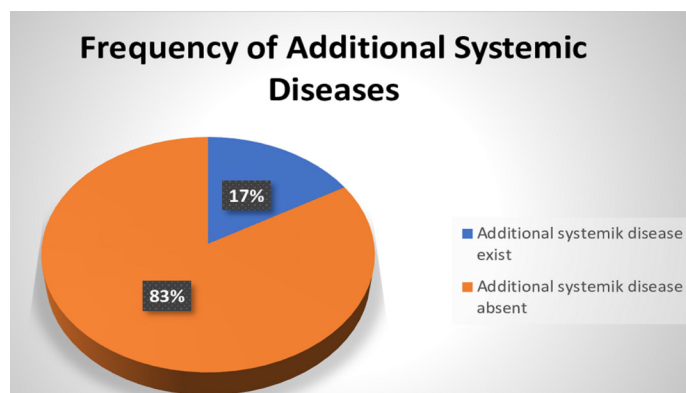


Figure 1. Shows the ratio of patients with systemic disease in bimaxillary surgery patients

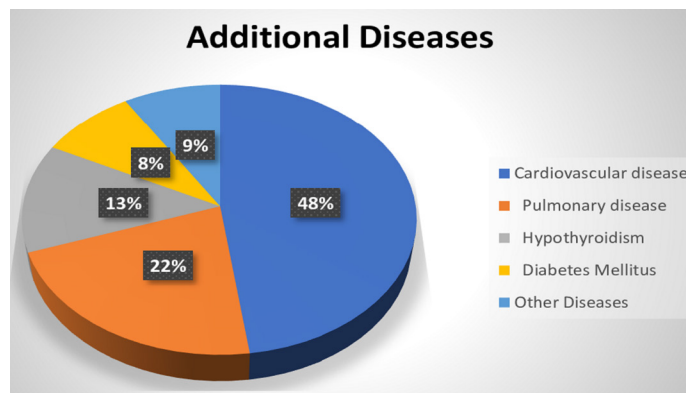


Figure 2. Shows the ratios of seen systemic diseases in bimaxillary surgery patients

When the other details of the preoperative evaluation characteristics of bimaxillary surgery patients were examined, it was determined that 33 (23.7%) of these patients were active smokers, and only two patients (1.2%) were using alcohol at least three days a week. It was determined that 17 (12.23%) of these patients had a history of allergy to any drug or food. Fifty-five patients were exposed to general anaesthesia before and did not encounter complications during general anaesthesia induction, maintenance, and awakening from general anaesthesia (Table 1).

As a result of the preoperative evaluation, it was seen that 55 (39.56%) of 139 patients needed consultation. Since some patients required more than one consultation, 63 consultations were carried out. Of these, 28 (44%) were carried out in ENT because of suspected nasal passage stenosis, 12 (19%) were carried out in the internal medicine department because of elevated liver enzymes, elevated blood glucose levels, hypothyroidism, anaemia, or polycythemia, 11 (17%) were carried out in cardiology department because of arrhythmia seen in the electrocardiography or when the patient answered yes to the question "Do you have chest pain or palpitations when you are calm and do not make an effort?", 6 (10%) were carried out in the department of pulmonology because of asthma, chronic obstructive pulmonary disease, or intermittent dyspnea complaints even when no effort is made, and 6 (10%) were carried out in other departments like neurology, dermatology, and nephrology departments (Figure 3).

Table 1. Demographics of the patients and preoperative examination-related variables

Sex, n (%)	
Female	75 (53.9)
Male	64 (46.1)
Age, (year)	
mean±sd	22.06±4.58
min-max	42.0-18.0
BMI, (kg/m²)	
mean±sd	23.28±3.17
min-max	17.3-33.8
ASA, n (%)	
1	90 (64.7)
2	49 (35.2)
Tobacco use, n (%)	
using	33 (23.7)
not using	106 (76.2)
Alcohol use, n (%)	
using	2 (1.43)
not using	137 (98.56)
Additional systemic disease, n (%)	
Exist	23 (16.24)
Cardiovascular disease	11 (47.8)
Pulmonary disease	5(21.73)
Hypothyroidism	3(13.04)
Diabetes Mellitus	2(8.69)
Others	2(8.69)
Absent	116 (83.45)
Previous exposure to general anesthesia, n (%)	
Yes	55 (39.56)
No	84 (60.43)
Consultation need, n (%)	
Yes	55 (39.56)
Otolaryngology	28 (44)
Internal medicine	12 (19)
Cardiology	11 (17)
Pulmonology	6 (10%)
Other departments	6 (10%)
No	84 (60.43)

Note: Data are expressed as mean±standard deviation and/or n (%). BMI: Body Mass Index, ASA: American Society of Anesthesiologists score

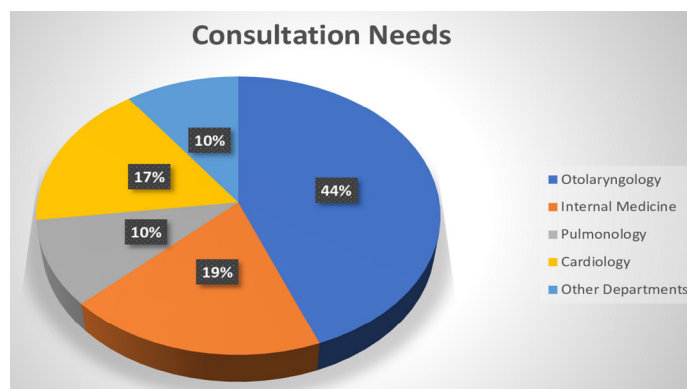


Figure 3. Shows the ratios of requested consultations in bimaxillary surgery patients

Discussion

Bimaxillary operations are a field of orthognathic surgery aiming to correct occlusal and aesthetic disorders by intervening in both the maxilla and mandible. The type of surgery dates back 1970s [5].

When we look at the previous studies, it was found that the number of bimaxillary surgical patients taken in a year was 126, 72, and 38, respectively [6-8]. All bimaxillary surgical patients in our centre were included in the current study for one year. It was observed that 139 bimaxillary surgeries were performed. Compared with the studies in the literature, this number is relatively high.

Bimaxillary surgery patients generally comprise a young

population with minimal comorbidity; thus, most are of the American Society of Anesthesiologists (ASA) Classification 1 [9]. It was observed that the current study we conducted consisted mainly of ASA 1 patients. In the literature, the mean age of orthognathic surgery patients is 25-30 [10]. In a retrospective study, Chow et al. [7] found the mean age of orthognathic surgery patients to be 24.1 years. The mean age of the patients included in our study was 22.06 ± 4.58 years.

Bimaxillary surgery procedure requires general anaesthesia, usually a few hours, and nasotracheal intubation is essential. Difficult laryngoscopy can be expected in patients with severely retrognathic mandibles and may require flexible fiberoptic tracheal intubation [9]. Therefore, the airway evaluation part of the preoperative examination in orthognathic surgery patients requires more detailed evaluations. As a result of our study, which we conducted with the data we obtained from the preoperative examination documents that we retrospectively scanned, we saw that most of the consultations requested were the ENT consultation we wanted for the patients we considered at risk for nasal intubation.

In the current study, 16.24% of the patients had an additional disease. The most common comorbidity was cardiovascular disease, followed by asthma-chronic obstructive pulmonary disease. When studies with bimaxillary surgery patients were examined, it was seen that data on comorbidities in this patient population were included in a small number of studies. In the study conducted by Rhee et al. [11], in which these data were included, it was found that the most common comorbidity among bimaxillary surgery patients was psychological diseases. In the current study, the most common comorbidity was a cardiovascular disease associated with arrhythmia. The main reason for this was the relatively high number of active smokers. In our current study, smoking was found to be 23.7%. This rate was 16.8% in the study by Kantar et al. [8] and 10.1% in another study conducted by Song et al. [6].

In our study, which included 139 patients, consultation was requested from 55 patients. Although there is a young patient population, this number is considered relatively high. When the consultations are examined in detail, it is remarkable that the ENT consultation is requested the most. This situation could be considered typical for bimaxillary surgery patients, usually accompanied by dentofacial anomalies. Determining the appropriate nasal cavity before nasal intubation as part of the preoperative evaluation is critical to minimizing potential complications. Nasal endoscopy, and rhinological evaluations, separately or together, were recommended for this purpose in the literature [12-16]. In our department, nasal intubation is performed from the side recommended by the ENT department for the patients for whom ENT consultation is requested. Therefore, our approach in these patients is generally that the necessity of nasal endoscopy has been eliminated. In this context, intubation is provided by the most appropriate part of the patients who are thought to have nasal passage stenosis preoperatively.

Our approach in patients with suspected stenosis in the nasal passage ensured no complications from nasal intubation were encountered.

Other consultations requested were listed in order of frequency as departments of internal medicine, cardiology, and pulmonology in the present study.

In the literature, very few studies were found in which the common characteristics of certain surgical patient groups were investigated. A review in the literature purposed to review the related evidence for the expected higher prevalence of alcohol or substance abuse disorder in the bariatric surgery patient group and serve as a reference to multidisciplinary teams. The evidence reviewed suggested that it correlates with a modest but consistent increase in the prevalence of abuse of alcohol and other substances in this group. They concluded that medical teams who treat bariatric patients must be informed about this eventuality for its timely prevention, diagnosis, and treatment [17]. Sebastiani et al. [18] reported in their study that more pain and depression are seen in the patient population undergoing orthognathic surgery due to dentofacial anomaly.

The limitation of this study was the inability to present cardiovascular disease, which was presented as the most common additional problem, in detail. However, this data could not be reached in the retrospective study.

Based on the results of the present study, it was revealed that an essential part of the preoperative examination of bimaxillary surgery patients included rhinological evaluation, the first step of airway evaluation. When making this evaluation, considering the necessity of nasal intubation, it should be noted that the nasal passage should be carefully evaluated. It should be kept in mind that ENT help may be obtained in evaluating the nasal passage, or a careful nasal endoscopy may be required before the operation. According to the current study, it should be kept in mind that the incidence of cardiovascular disease may be high in this population, although they are young. Active smoking was likely to be associated with this condition. Further studies are needed on the preoperative evaluation characteristics of bimaxillary surgery patients.

Conclusion

In conclusion, according to the present study findings, active smoking and other related problems should be considered in bimaxillary surgery patients. This patient group should be carefully evaluated, especially concerning arrhythmia. Moreover, another critical conclusion reached in the current study was that the nasal passage should also be assessed in detail in this patient group, for which it is already known that all patients should be carefully evaluated in terms of difficult airway management. We believe that, a thorough preoperative evaluation, including a detailed history and physical examination, laboratory tests, imaging, and specialist consultations, is essential for ensuring patient safety and optimizing surgical outcomes.

Conflict of interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical approval

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Erciyes University Scientific local Ethical Committee in Turkey (Decision Number: 2022/781).

References

- Goulart ME, Biegelmeyer TC, Moreira-Souza L, et al. What is the accuracy of the surgical guide in the planning of orthognathic surgeries? A systematic review. *Med Oral Patol Oral Cirugia Bucal*. 2022;27:125-34.
- Umstadt HE, Weippert-Kretschmer M, Austermann KH, Kretschmer V. Transfusionsbedarf bei dysgnathieoperationen. keine generelle indikation für die präoperative eigenblutspende [Need for transfusions in orthognathic surgery. No general indication for preoperative autologous blood donation]. *Mund Kiefer Gesichtschir*. 2000;4:228-33.
- Feely MA, Collins CS, Daniels PR, et al. Preoperative testing before noncardiac surgery: guidelines and recommendations. *Am Fam Physician*. 2013;87:414-8.
- Schlottmann F, Nayyar A, Herbella FAM, Patti MG. Preoperative evaluation in bariatric surgery. *J Laparoendosc Adv Surg Tech A*. 2018;28:925-9.
- Borba AM, Borges AH, Cé PS, et al. Mandible-first sequence in bimaxillary orthognathic surgery: a systematic review. *Int J Oral Maxillofac Surg*. 2016;45:472-5.
- Song IS, Choi J, Baik UB, et al. Recovery pattern following bimaxillary orthognathic surgery: differences between sexes. *J Cranio-Maxillo-fac Surg Off Publ Eur Assoc Cranio-Maxillo-fac Surg*. 2019;47:138-42.
- Chow LK, Singh B, Chiu WK, Samman N. Prevalence of postoperative complications after orthognathic surgery: A 15-year review. *J Oral Maxillofac Surg*. 2007;65:984-92.
- Kantar RS, Cammarata MJ, Rifkin WJ, et al. Bimaxillary orthognathic surgery is associated with an increased risk of early complications. *J Craniofac Surg*. 2019;30:352-7.
- Rodrigo C. Anesthetic considerations for orthognathic surgery with evaluation of difficult intubation and technique for hypotensive anesthesia. *Anesth Prog*. 2000;47:151-6.
- Lee CC, Wang TT, Caruso DP, et al. Orthognathic surgery in older patients: is age associated with perioperative complications? *J Oral Maxillofac Surg*. 2022;80:996-1006.
- Rhee SH, An JS, Seo KS, Karm MH. Predictors of red blood cell transfusion in bimaxillary orthognathic surgery: A retrospective study. *Int J Med Sci*. 2021;18:1432-41.
- Williamson R. Nasal intubation and epistaxis. *Anaesthesia*. 2002;57:1033-4.
- Bell CN, Macintyre DR, Ross JW, et al. Pharyngoplasty: a hazard for nasotracheal intubation. *Br J Oral Maxillofac Surg*. 1986;24:212-6.
- Shohara K, Goto T, Kuwahara G, et al. Validity of rhinometry in measuring nasal patency for nasotracheal intubation. *J Anesth*. 2017;31:1-4.
- Sabour S, Dastjerdi EV. Reliability of assessment of nasal flow rate for nostril selection during nasotracheal intubation: common mistakes in reliability analysis. *J Clin Anesth*. 2013;25:162.
- Lim HS, Kim D, Lee J, et al. Reliability of assessment of nasal flow rate for nostril selection during nasotracheal intubation. *J Clin Anesth*. 2012;24:270-4.
- Cerón-Solano G, Zepeda RC, Romero Lozano JG, et al. Bariatric surgery and alcohol and substance abuse disorder: a systematic review. *Cir Esp (Engl Ed)*. 2021;99:635-47.
- Sebastiani AM, Gerber JT, Bergamaschi IP, et al. Individuals requiring orthognathic surgery have more depression and pain than controls. *Braz Oral Res*. 2021;35:091.