ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 09 | September - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EVALUATION OF POSTOPERATIVE COMPLICATIONS AFTER GENERAL ANESTHESIA IN ORAL AND MAXILLOFACIAL SURGERIES- A PROSPECTIVE DESCRIPTIVE STUDY.

Maxillofacial Surgery

Tejas Motiwale	Department Of Oral And Maxillofacial Surgery, Sri Aurobindo College Of Dentistry, Indore, Madhya Pradesh, India
Mishi Jain*	Department Of Oral And Maxillofacial Surgery, Sri Aurobindo College Of Dentistry, Indore, Madhya Pradesh, India *Corresponding Author
Geeti Vajdi Mitra	Department Of Oral And Maxillofacial Surgery, Sri Aurobindo College Of Dentistry, Indore, Madhya Pradesh, India
Rahul Chhajlani	Department Of Oral And Maxillofacial Surgery, Sri Aurobindo College Of Dentistry, Director, Smile Train Project, Avanti Hospital, Ujjain Director, Dr. Chhajlani's Maxillofacial, Cleft And Implant Clinic, Indore, Madhya Pradesh, India
Vaibhav Bhatt	Department Of Oral And Maxillofacial Surgery, Sri Aurobindo College Of Dentistry, Indore, Madhya Pradesh, India

ABSTRACT

Background- General anesthesia has been a major aid in the field of surgery, as invasive and painful procedures can be performed with little to no distress and pain to the patient. Although, numerous benefits have been stated in literature for general anesthesia, it comes with a set of complications. These adverse effects vary from major life threatening complications to various minor side effects. Aim of this study was to evaluate post-operative complications in patients undergoing oral and maxillofacial surgery under general anesthesia and its relationship with co-morbidities and other risk factors. **Method:** A prospective descriptive study was conducted from March 2021 to March 2024 including 220 patients undergoing oral and maxillofacial surgery under general anesthesia. Data of demographics, presence of co-morbidities, adverse habits and ASA status of the patients were recorded pre-operatively. Post-operative complications were recorded on the day of surgery, after 24 hours, 72 hours and 7 days post-operatively. **Results:** Sore throat and dysphagia were the most common complications encountered. Female gender and longer duration of surgery had relatively higher incidence of complications. (P=0.627, P= 0.189 respectively). Presence of co-morbidities was strongly correlated to post-operative complications (P=0.00001). **Conclusion:** There is a relatively higher incidence of minor post-operative complications, especially in patients with existing co-morbidities and adverse habits. All the complications undergo gradual remission in most of the patients by the end of the week with little to no intervention.

KEYWORDS

Co-morbidities; General Anesthesia; Oral and Maxillofacial Surgery; Post-operative Complications.

INTRODUCTION

Approximately, 75 million patients undergoing surgery, receive anesthesia worldwide each year. Anesthetic complications in post-operative period are very common and are the main cause of increased post-operative hospital stay [1].

The conditions leading to reduced mouth opening such as oral submucous fibrosis, malignancies, temporo-mandibular joint disorders; "The Shared Airway" between surgeon and anesthetist owes to difficulty in securing the airway in patients undergoing oral and maxillofacial surgery. In order to secure airway in patients requiring intra-operative Inter-maxillary Fixation without obstructing the surgical field, nasotracheal intubation is typically utilized. As an alternative, submental, retro-molar/retro-tuberosity and fiberoptic-guided intubation can be done [2, 3].

General anesthesia related morbidity varies from minor side effects to serious complications that may have long-term repercussions. Nausea, vomiting, dysphagia, sore throat, myalgia, fever, headache, shivering, sleep disturbances are among the common minor post-operative complications experienced by the patients [4, 5].

Patients with medical conditions involving cardiovascular system, kidney or lungs; patients on anticoagulant therapy; patients with allergies to anesthetic drugs; adverse habits and poor nutrition, can all contribute to worsen these complications [1].

This study aims to evaluate post-operative complications in patients undergoing oral and maxillofacial surgery under general anesthesia and its association with gender, duration of surgery and existing co-morbidities on the day of the surgery, on first, third, and seventh post-operative days.

METHODS

The prospective and descriptive study was conducted from March 2021 to March 2024 in Department of OMFS in Sri Aurobindo College Of Dentistry, Indore, India for patients undergoing oral and maxillofacial surgery under general anesthesia (GA). Permission for the study was taken from ethical committee (SAIMS/IEC/36/22) of Sri Aurobindo Institute of Medical Sciences, Indore, India. Written informed consent was taken from all patients included in study. A total of 220 patients were included in the study.

Patients aged between 16-80 years, whose airway was secured by endo-tracheal intubation were included in the study. Patients categorized under American Society of Anesthesiologists status (ASA) status 5 and 6 and patients unable to provide comprehensive description, information and voluntary consent were excluded from the study. Patient's age, gender, co-morbidities, adverse habits, laboratory and radiographic parameters were recorded pre-operatively. Anesthetic risk was assessed using ASA status after thorough examination (Table 1). Duration of surgery and any significant untoward events were recorded intra-operatively. Vitals of the patients were recorded every 2 hourly in post-operative period on the day of surgery and 4 hourly till 7th post-operative day. Subjective complications were recorded using Heidelberg peri-anesthetic questionnaire [6].

The data collected was analyzed using SPSS software, v.22. The correlation between gender, ASA status of the patient, duration of surgery and the incidence of post-operative complications was calculated using Pearson's correlation test. The comparison of quantitative variables was done using One way ANOVA test. The relationship was considered significant when the P-value was below 0.05.

Table 1: American Society of Anesthesiologist Status

ASA STATUS	DESCRIPTION
ASA 1	A normal healthy patient.
ASA 2	A patient with mild systemic disease.
ASA 3	A patient with a severe systemic disease that is not life-threatening.
ASA 4	A patient with a severe systemic disease.
ASA 5	A moribund patient who is not expected to survive without the operation.
ASA 6	A brain-dead patient whose organs are being removed with the intention of transplanting them into another patient.

Table 2: Heidelberg Peri-anesthetic Questionnaire

	QUESTIONNAIRE
1.	Waking up from anesthesia was comfortable?
2.	After waking up from anesthesia, pain was experienced in the area of surgery?
3.	Nausea or vomiting was a problem following anesthesia?
4.	Hoarseness or sore throat was a problem following anesthesia?
5.	Pain and weakness of muscles was a problem following anesthesia?
6.	Thirst was a problem following anesthesia?
7.	Inability to urinate was a problem following anesthesia?
8.	Feeling cold or shivering were a problem following anesthesia?
9.	It was hard to breathe following anesthesia?
10.	Fatigue or inability to concentrate was a problem following anesthesia?

RESULTS

The study included 220 patients aged between 16-80 years, out of which 200 (90.9%) were males and 20 were females (9.1%). 75 patients (35.5%) were categorized under ASA status I, 81 (36.8%) under ASA status II and 60 patients (27.3%) were categorized under ASA status III. Only 1 patient (0.5%) was under ASA status IV. Time taken for surgery under general anesthesia was less than 1 hour in 21 patients (9.5%), 1-2 hours in 91 patients (41.4%), 2-3 hours in 77 patients (35.0%) and more than 3 hours in 31 patients (14.1%) (Table 3).

In the post-operative period, complications were experienced in 178 patients (80.9%). Sore throat and dysphagia were the most common complaint, which occurred in 113 patients (51.36%). 84 patients (38.18%) had fever which was the second most common complication followed by post-operative nausea and vomiting (PONV) in 70 patients (31.81%). Other complications included headache, pain, swelling, irritability, sleeplessness, myalgia, hypertension, hypotension, micturition difficulty, cardiovascular and respiratory complications (Table 4).

161 (80.5%) males and 17 (85%) females experienced post-operative complications. Although, higher percentage of female patients had complications when compared to males, it was statistically non-significant, P value 0.627. 50 patients (64.1%) under ASA I status, 70 patients (87.6%) under ASA II status, 57 patients (95%) of ASA III status and 1 patient (100%) of ASA IV status experienced post-operative complications which was significantly correlated, P= 0.00001 (Table 3).

17 patients (80.9%) who underwent surgery for less than 1 hour, 71 patients (78.02%) of 1-2 hour duration, 61 patients (79.22%) of 2-3 hours duration and 29 patients (93.54%) of more than 3 hours experienced post-operative complications. The incidence of complications increased with increase in duration of surgery, but was not statistically significant, P= 0.189 (Table 3).

172 patients (78.2%) had post-operative complications after general anesthesia on the day of surgery which declined to 10 patients (4.5%) by 7th post-operative day, P value =0.001 (Fig. 1).

Table 3: Correlation of post operative complications with gender, ASA status and Duration of surgery

Variable	Total	Incidence Of Complication, *N* (%)	P- Value
Gender			0.627
Male	200 (90.9%)	161 (80.5%)	
Female	20 (9.1%)	17 (85%)	
ASA Status			0.00001*
ASA I	78 (35.5%)	50 (64.1%)	
ASA II	81 (36.8%)	70 (87.6%)	
ASA III	60 (27.3%)	57 (95%)	
ASA IV	1 (0.5%)	1 (100%)	
Duration of surgery			0.189
<1 hour	21 (9.5%)	17 (80.9%)	
1-2 hour	91 (41.4)	71 (78.02)	
2-3 hour	77 (35%)	61 (79.22%)	
>3 hours	31 (14.1%)	29 (93.54)	

*P- value less than 0.05

Table 4: Frequency of post operative complications according to ASA status of the patients.

COMPLICATION	ASA I	ASA II	ASA III	ASA IV	TOTAL	PERCENTAGE(%)
Sore throat and dysphagia	27	50	35	1	113	51.36
Fever	22	32	29	1	84	38.18
Nausea/ vomiting	29	22	19	0	70	31.81
Headache	15	19	14	1	49	22.27
Pain and swelling	17	17	16	0	50	22.72
Irritable/ sleeplessness	4	11	12	1	28	12.72
GIT problems	8	10	11	0	29	13.18
Myalgia	4	5	9	0	18	8.18
Hypotension	2	6	6	0	14	6.36
Hypertension	2	2	3	1	8	3.63
Micturation difficulty	0	4	1	0	5	2.27
Respiratory difficulty	1	0	0	0	1	0.45
CVS problems	0	1	0	0	1	0.45

ASA- American Society of Anesthesiologists; GIT- Gastrointestinal tract; CVS- Cardiovascular

DISCUSSION

The body responds towards injury by releasing cortisol, catecholamines, cytokines and glucagon causing an imbalance in the physiological functions. Also, delayed effects of anaesthetic agents and muscle relaxants undermine the body's natural ability to re-establish physiological balance and maintain health. This leads to post anaesthesia complications [7].

Myles PS et al [8] and Kiani H. et al [9] reported almost twice higher complication rate in females as compared to males. Similar results were reported by Lone et al [1]. In our study, result was similar to that reported in literature. But, due to very less number of females, data was insignificant.

Patients with existing co-morbidities or adverse habit history had overall 90.1% complication rate. Our findings were in accordance to that reported in literature, which ranges from 2% in ASA I status patients to 100% in ASA IV status patients. The relationship between co-morbidities and post operative complications can be explained as; these ailments pose higher risk of intra-operative morbidity, which is associated with increased risk of overall post-operative morbidity [10, 11].

There was no significant association between the duration of surgery and the incidence of complications in our research, despite the fact that patients who had surgery for more than three hours had the highest percentage of post-operative difficulties. Howland et al [12] and Scott C F[13] discussed that, with every hour increase in surgery time after 6 hours, there is an increase in post-operative complications by 2 times. Hardy et al [14] stated that, with each successive interval of operative time, there is concomitant rise in complications, with odds increase of 1.6 after 3 hours and nearly 5 after 6.8 hours. These studies, therefore, explain the non-significant result of our study, as around 89.5% patients underwent surgery for less than 3 hours.

Sore throat and dysphagia was the most common complication recorded. Various studies in literature have reported an incidence rate ranging from 30-81%. It is majorly caused by minor trauma to laryngeal mucosa during laryngoscopy, pressure exerted by endotracheal tube (ETT) and inflated cuff. Gentle manipulation of laryngeal tissues, selection of correct ETT size, gentle suctioning techniques, inhaled steroid, topical NSAIDs, or premedication with antibacterial lozenges can significantly reduce the risk of post-operative sore throat and dysphagia [15, 16].

Literature has reported 14-91% incidence of fever in post-operative period [17, 18]. In our study, 84 patients (38.18%) developed fever which resolved in all the patients by 3rd post-operative day, suggestive of its non-infectious etiology. Cytokines released in response to tissue damage and exposure to foreign materials stimulate hypothalamus to synthesize prostaglandin E2, which in turn, stimulate the release of cyclic Adenosine monophosphate (cAMP), a neurotransmitter, which results in fever in post operative period. The higher incidence of fever in Oral and Maxillofacial Surgery patients, could be due dehydration as a result to poor oral intake and patient non compliance [19, 20].

PONV was a major complaint in 70 patients (31.81%) in our study, which is in accordance to studies done by Amirshahi M et al[21] and Goldfuss S et al[22]. The risk factors include female gender, history of motion sickness, longer duration of surgery, non-smoking status and using opioids and volatile anesthetics. PONV leads to dehydration, electrolyte imbalance, hypotension, wound dehiscence, bleeding from surgical site and increased chances of aspiration. Dexamethasone, ondansetron, total intravenous anesthesia, opioid free or reduced analgesia, minimizing pre-operative anxiety are proven to reduce the risk of PONV [21-23].

Relatively lower incidence of headache is recorded in our study (22.27%), than reported in literature. Hypoxia, hypercapnia, hypoglycemia leads to cerebral vasodilatation and hypovolaemia leads to traction of dural sinus. This causes an increased pressure on brain parenchyma leading to headache [24, 25].

Behavioural changes such as sleeplessness were recorded in 28 patients (12.72%). The changes in behavior could be attributed to various other co-existing complaints, lack of physical activity and hospital environment. In this study, such behavioral changes were more prevalent among patients with associated brain injury [1].

GIT problems like constipation were reported to occur in 29 patients. Dehydration, analgesics, reduced oral intake, lack of physical activity and use of narcotic drugs lead to constipation. Adding to these conditions, anesthetic drugs also, tend to reduce GIT motility. Hypotension was recorded in 14 patients (6.36%) due to a variety of factors such as reduced cardiac output myocardial contractility and hypovolemia. [1].

It has been concluded from this study that, there is a relatively higher incidence of minor post operative complications, especially in patients with existing co-morbidities and adverse habit history. However, their incidence can be reduced by identifying high risk patient pre-operatively and adequate patient management. Also, research for newer anaesthetic agents is required for optimal anaesthesia with minimal side effects.

Acknowledgement
No funding was received for this study.

Conflict of interest:
The authors declare that there are no conflicts of interest.

REFERENCES:

1. Lone, P., Wani, N., Ain, Q., Heer, A., Devi, R., & Mahajan, S. (2021). Common postoperative complications after general anesthesia in oral and maxillofacial surgery. National Journal of Maxillofacial Surgery, 12(2), 206. https://doi.org/10.4103/njms.njms_66_20
2. Chesshire, N. J., & Knight, D. J. W. (2001). The anaesthetic management of facial trauma and fractures. BJA CEPD Reviews, 1(4), 108–112. https://doi.org/10.1093/bjacepd/1.4.108
3. Jaisani, M. R., Pradhan, L., Bhattarai, B., & Sagtani, A. (2014). Intubation techniques: Preferences of maxillofacial trauma surgeons. Journal of Maxillofacial and Oral Surgery, 14(2), 501–505. https://doi.org/10.1007/s12663-014-0679-8
4. Kehlet, H., & Wilmore, D. W. (2002). Multimodal strategies to improve surgical outcome. American journal of surgery, 183(6), 630–641. https://doi.org/10.1016/s0002-9610(02)00866-8
5. Gan, T. J. (2006). Risk factors for postoperative nausea and vomiting. Anesthesia & Analgesia, 102(6), 1884–1898. https://doi.org/10.1213/01.ane.0000219597.16143.4d
6. Schiff, J. H., Fornaschon, A. S., Frankenhauser, S., Schiff, M., Snyder Ramos, S. A., Martin, E., Knapp, S., Bauer, M., Böttiger, B. W., & Motsch, J. (2008). The Heidelberg Peri.anaesthetic Questionnaire – development of a new refined psychometric questionnaire*. Anaesthesia, 63(10), 1096–1104. https://doi.org/10.1111/j.1365-2044.2008.05576.x
7. Saini, S., Singhal, S., & Prakash, S. (2021). Airway management in maxillofacial trauma. Journal of anaesthesiology, clinical pharmacology, 37(3), 319–327. https://doi.org/10.4103/joacp.JOACP_315_19
8. Myles, P. S., Hunt, J. O., & Moloney, J. T. (1997). Postoperative 'minor' complications. Comparison between men and women. Anaesthesia, 52(4), 300–306. https://doi.org/10.1111/j.1365-2044.1997.89-az0091.x
9. Kiani, H., Hoseinian, M., Sadat, Z., & Ajorpaz, N. M. (2021). Prevalence of Anesthesia Complications in Orthopedic Surgeries and its Related Factors. Journal of Client-centered Nursing Care, 7(2), 123–130. https://doi.org/10.32598/jccnc.7.2.295.3
10. Sohal, K. S., & Shubi, F. (2015). Early Post-Operative Complications in Surgeries Pertaining Oral and Maxillofacial Region in MNH, Tanzania. Surgical Science, 06(10), 470–477. https://doi.org/10.4236/ss.2015.610068
11. Hackett, N. J., De Oliveira, G. S., Jain, U. K., & Kim, J. Y. (2015). ASA class is a reliable independent predictor of medical complications and mortality following surgery. International Journal of Surgery, 18, 184–190. https://doi.org/10.1016/j.ijsu.2015.04.079
12. Ws, H., & O, S. (1972). Complications associated with prolonged operation and anesthesia. PubMed, 9(1), 1–7. https://pubmed.ncbi.nlm.nih.gov/4508287
13. Scott C. F., Jr (1982). Length of operation and morbidity: is there a relationships?. Plastic and reconstructive surgery, 69(6), 1017–1021. https://doi.org/10.1097/00006534-198206000-00024
14. Hardy, K. L., Davis, K. E., Constantine, R. S., Chen, M., Hein, R., Jewell, J. L., Dirisala, K., Lysikowski, J., Reed, G., & Kenkel, J. M. (2014). The Impact of Operative Time on Complications After Plastic Surgery: A Multivariate Regression Analysis of 1753 Cases. Aesthetic Surgery Journal, 34(4), 614–622. https://doi.org/10.1177/10 90820x 14528503
15. Lee, J. Y., Sim, W. S., Kim, E. S., Lee, S. M., Kim, D. K., Na, Y. R., Park, D., & Park, H. J. (2017). Incidence and risk factors of postoperative sore throat after endotracheal intubation in Korean patients. Journal of International Medical Research, 45(2), 744–752. https://doi.org/10.1177/0300060516687227
16. Jaensson, M., Olowsson, L. L., & Nilsson, U. (2010). Endotracheal tube size and sore throat following surgery: a randomized controlled study. Acta Anaesthesiologica Scandinavica, 54(2), 147–153. https://doi.org/10.1111/j.1399-6576.2009.02166.x
17. Cohen, J., Powderly, W. G., & Opal, S. M. (2016). Infectious Diseases E-Book. Elsevier Health Sciences.
18. Fanning, J., & Brewer, J. (2002). Delay of hospital discharge secondary to postoperative fever--is it necessary? PubMed, 102(12), 660–661. https://pubmed.ncbi.nlm.nih.gov/12501983
19. Christabel, A., Sharma, R., Manikandhan, R., Anantanarayanan, P., Elavazhagan, N., & Subash, P. (2015). Fever after maxillofacial surgery: a critical review. Journal of maxillofacial and oral surgery, 14(2), 154–161. https://doi.org/10.1007/s12663-013-0611-7
20. Huang, J., Wang, T., Wu, S., Liu, C., & Fan, J. (2021). Post craniotomy fever and its associated factors in patients with traumatic brain injury. Nursing in Critical Care, 27(4), 483–492. https://doi.org/10.1111/nicc.12640
21. Amirshahi, M., Behnamfar, N., Badakhsh, M., Rafiemanesh, H., Keikhaie, K. R., Sheyback, M., & Sari, M. (2020). Prevalence of postoperative nausea and vomiting: A systematic review and meta-analysis. Saudi journal of anaesthesia, 14(1), 48–56. https://doi.org/10.4103/sja.SJA_401_19
22. Goldfuss, S., Wittmann, S., Würschinger, F., Bitzinger, D., Seyfried, T., Holzamer, A., Fischer, M., Camboni, D., Sinner, B., & Zausig, Y. A. (2019). Anaesthesia-related complications and side-effects in TAVI: a retrospective study in Germany. BMJ Open, 9(4), e025825. https://doi.org/10.1136/bmjopen-2018-025825
23. Kovac A. L. (2000). Prevention and treatment of postoperative nausea and vomiting. Drugs, 59(2), 213–243. https://doi.org/10.2165/00003495-200059020-00005
24. Cosh P. H. (1988). Headache after general anaesthesia. Anaesthesia, 43(10), 889. https://doi.org/10.1111/j.1365-2044.1988.tb05610.x
25. Heitz, J. W. (2016). Post-Anesthesia care: Symptoms, Diagnosis, and Management. Cambridge University Press.