

# Biochemical Changes in Maxillofacial Infection

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## ABSTRACT

Maxillary operation includes treating cases of congenital distortion, if the upper jaw has a large depression or protrusion, cross blockage, too much or too few teeth and lack of growth in the middle of the face (mid-facial hypoplasia), in order to continue performing the vital functions easily and smoothly with improvement of appearance. To find out whether laboratory or clinical variables on patients admitted with odontogenic impurities have a relation with a severe unassailable medical condition and extended hospice visit, laboratory investigations will increase the judgment. Hence, the assistance of ordinary blood assessments for elective surgical strategies in sufferers which are clinically healthful is established extensively. Moreover, this study contributes to increasing experience and education, by focusing on retrospective pathological records of cases and biochemical changes to find out the complications that expected to occur from maxillofacial infections, such as a member's disability from dental or non-dental infection. A retrospective patient-oriented research that incorporated all patients that were treated in the study of odontogenic origin in the department of Maxillofacial and oral Surgery at Ghazi Hariri Hospital for Specialized Surgery. The medical records were evaluated where 27 patient's data for biochemical changes, type of specific treatment, and complications was used. Medical conditions having an association with potential immunosuppression, electrolyte imbalance and the status of diabetes mellitus are some of the important factors that should be given intensive care. The results of this retrospective analysis show that hemostasis of blood glucose and electrolytes balance having an advantage of being a sensitive important step for controlling the patient stability postoperative. White blood cells are essential markers used for the determination of an infection's severity and the competence of treatment given to manage fascial space infections of the odontogenic origin. They also help in the protection of patients from various side effects caused by excessive usage of antibiotic. Therefore, White Blood Cells should be used as monitoring tools for the management of patients with fascial space infections of the odontogenic origin.

**Keywords:** Maxillary operation, biochemical changes, electrolyte imbalance, diabetic status mellitus.

## 1. INTRODUCTION

Maxillary surgery includes treating cases of congenital distortion, if the upper jaw has a large depression or protrusion, cross blockage, too much or too few teeth and lack of growth in the middle of the face (mid-facial hypoplasia), in order to continue performing the vital functions easily and smoothly with improvement of appearance [1] Importantly, maxillofacial surgery cases are not only cosmetic, but they treat serious cases that may cause death, such as obstruction of the airway, acute infections and fatal complications such as blood clots in a vein or rupture of the carotid artery, so surgical intervention has become imperative with the necessary

[2] Remarkably, before performing maxillofacial operations, it is necessary to analyze the biochemical parameter for the patients safety and following up on their health status, such as examining the efficiency of the kidneys by measuring urea and creatinine, and controlling the blood sugar level in cases of elevation in some patients[3], as well as knowing the complete blood picture, the number of white blood cells and differential count [4], following up the results of immune response after the operation to correct the body's response[5] and it is important to monitor the heart and lung fun.

## 2. METHODS

This study investigated the effect of maxillofacial stimulation and biomechanical changes of human postoperative. Study began with a retrospective patient-oriented study that comprised of all patients that were treated in the study of odontogenic origin in the Oral and Maxillofacial Surgery unit at Ghazi Hariri Hospital for Specialized Surgery. The data was collected between 27/1/2021 and 31/5/2021. A total of 27 were enrolled classified according to the following: gender, age, date of first evaluation, medical history, teeth, oral health, etiology, signs and symptoms affecting the face, approved treatments, date discharged, and treatment complications. For patients who required surgical treatment, it was carried out in the following procedure: the causative agent was removed, perforation and suction of the area that was affected, cellulitis and / or abscess was incised and drained, and cleaning of dead tissue. Consequently, records of all biochemical changes found were made and the regimen of treatment protocol was followed which includes prescription of ceftriaxone (0.5mg) in association with metronidazole, which is injected intravenously every 6 to 8 hours respectively.

## 3. STATISTICS EXPRESSIVE

Statistics were computed for every study variable to calculate means ( $\bar{x}$ ) and standard deviations (SD) for every variable that was evaluated. The significant difference in values between the collected data was evaluated by T-Test and repeated measures ANOVA was used. The Pearson's test was used in the investigation of the association between the outcome variables and 0.05 or less were regarded as significant. The general calculation and statistical analysis were conducted by SPSS 23.

## 4. RESULTS

This was a randomized retrospective study that was carried out on 27 patients that were visiting the department of maxillary surgery at Ghazi Hariri unit of dental clinic with finding of odontogenic diseases. The patients were between age 17 and age 40. The males were 55 % while females were 45 % as illustrated in Figure (1). Comparison between pre and postoperative changes in biochemical results from the 27 patients enrolled in the current study revealed that their blood glucose was highly significant ( $P=0.0001$ ) in postoperative than preoperative also sodium and potassium showed a significant relationship while there is no statistically significant difference among the remaining groups ( $p\text{-value} > 0.05$ ) as illustrated in table (1) Statistical analysis was done by Pearson correlation and the results revealed that the relationship between glucose and sodium is statistically significant, with a confidence level of 0.029, and the relationship is inverse by -42%. This means that

whenever glucose increases, the sodium decreases by 42% for the affected patients. The relationship between sodium and potassium is statistically significant with a confidence level of 0.01 and the relationship is direct by 48%, meaning that whenever sodium increases, potassium increases by 48% for the affected patient as shown in table (2). The hematological difference between pre and postoperative were performed, the result of current study revealed that the red blood cells, hemoglobin level and Lymphocyte's% show insignificant difference ( $p>0.05$ ) in mean between pre and postoperative. While the mean difference between white blood cells (WBCs) count and neutrophil were significantly higher ( $p<0.05$ ) between pre and postoperative as illustrated in table (3).

## 5. DISCUSSION

In this research, the male gender was more affected whereby the patients were 55 % males and 45 % females. This may be due to the fact that they usually neglect light infections and only seek treatment when a condition worsens. The comparison between pre and postoperative changes in biochemical results from 27 patients enrolled in the study revealed that the blood glucose was highly significant ( $P=0.0001$ ) in postoperative than preoperative also sodium and potassium showed a significant relationship while there is no statistically significant difference among the remaining groups ( $p\text{-value} > 0.05$ ). It is taken into consideration that surgical strain is a forceful section and leads to stress that stimulate glycogenolysis i.e., glucose from glycogen and lipolysis formation of ketones from fats triggered with the aid of overwhelming catecholamine [14]. Consequently, a previous study has suggested that an influence of surgical stress on normal rabbits reduce insulin inside the cell stimulated lipolysis behind agenda ketone bodies formation with a majority of these happens additionally gluconeogenesis synthesis of glucose from protein enhance ketonemia, and hyperglycemia postoperative that straight away agrees with the results of current study [15]. During the first three days of injury the excretion of sodium is observed to be decreasing progressively because of incomplete renal conservation [16]. However, if there is prolonged stress then the sodium levels in urine decrease such that only about 10mEq is excreted on a daily basis [17]. The sodium output level after one is injured cannot be increased through sodium administration, and the attempts to increase sodium in the body to levels higher than the body can excrete will lead to the accumulation of these ions in the extracellular fluid in postoperative there is an extended fragment of tissue breakdown mobilization of intracellular protein with a few ions selectively and -drawn from the matrix of the cell, one of these ions is potassium triggering excreted in blood stream [18]. The quicker excretion is normally short-lived and also in a situation of a longer tissue fragment breakdown, like in bone injuries and in burns

collective with food regimen program induced fluid and electrolyte imbalance which occur after one is injured is supposed and if more renal losses are restricted as a way as practical and changed quantitatively and also qualitatively. In the control of designer surgical occurrences one of the maximum vital measures that decreases more renal losses is the barring of limitless water consumption while having a nasogastric tube. If loose consumption is accepted, then keeping the record of fluid stability is no longer convenient however, additionally the gut output is significantly enhanced [19]. Hematological result of this research revealed that red blood corpuscles, hemoglobin level and Lymphocyte's% show insignificant difference ( $p>0.05$ ) in mean between pre and postoperative. While the mean difference between white blood cells (WBCs) count and neutrophil were significantly higher ( $p<0.05$ ) between pre and postoperative similar to the finding of (Parlar et al 2017) [20]. The physiologic state induced by general infection after surgical operation which reflects a cellular defense mechanism against oxidative damage and elevation in glutathione peroxidase (GPX) and superoxide dismutase (SOD) concentration leads to release the immune response and increase phagocytosis defense like increases in the WBC [21].

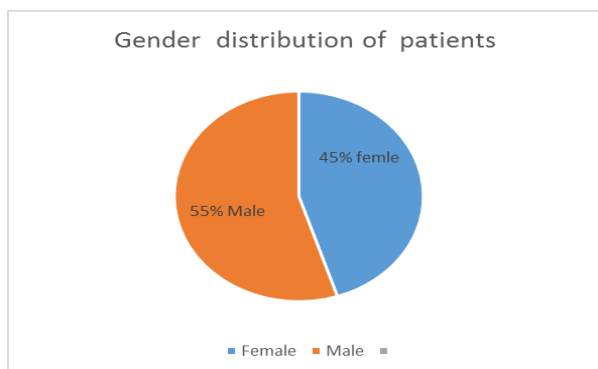


Figure 1 Gender distribution of patients among study

**Table 1.** The mean  $\pm$  SD of biochemical parameter pre and postoperative

Parameters	Preoperative	Postoperative	Statistics
	Mean $\pm$ SD	Mean $\pm$ SD	P-Value
B. Glucose (mg/dL)	81.5 $\pm$ 7.9	109.86 $\pm$ 7.6	Highly Sig *P=0.0001
B.Urea (mg/dL)	31.15 $\pm$ 8.048	26.063 $\pm$ 15.97	N.S P= 0.112
S. Creatinine (mg/dL)	0.85 $\pm$ 0.76	1.328 $\pm$ 1. 02	N.S P=0.515
Sodium (mEq/L)	139.6 $\pm$ 3.197	142.33 $\pm$ 1.9 2	Sig P=0.001
Potassium (mEq/L)	4.2 0 $\pm$ 0.4 4	3.4 5 $\pm$ 0.4 2	Slightly Sig P=0.01
Chloride (mMol/L)	101.3 $\pm$ 2.7	101.47 $\pm$ 2.5 3	N.S P=0. 1

**Table 2.** The correlation among biochemical parameters

Pearson Correlation						
Parameters	Glucose	urea	Creatinine	Sodium	K	Cl
Glucose	1	0.254	-0.180	-.421**	-0.248	-0.254
Sig(2-tailed)		0.201	0.369	0.000	0.212	0.201
Urea	0.254	1	0.029	-0.220	-0.167	0.366
Sig(2-tailed)	0.201		0.888	0.269	0.405	0.060
Creatinine	-0.180	0.029	1	0.034	-0.140	0.130
Sig(2-tailed)	0.369	0.888		0.866	0.486	0.519
Sodium	-0.248	-0.220	0.034	1	.487**	0.214
Sig(2-tailed)	0.248	0.269	0.866		0.010	0.283
Potassium	-0.248	-0.167	-0.140	.487**	1	0.038
Sig(2-tailed)	0.212	0.405	0.486	0.010		0.851
Chloride	-0.254	0.366	0.130	0.214	0.038	1
Sig(2-tailed)	0.201	0.060	0.519	0.283	0.851	

**Table 3.** Difference in Hematological result between pre and postoperative

	RBC Count $\times 10^6/\mu\text{L}$	Hb gm/dl	W.B.C Count $\times 10^3/\mu\text{L}$	Neutrophil% $\times 10^3/\mu\text{L}$	Lymph%
before	4.79 $\pm$ 0.42	12.6 $\pm$ 0.92	7.65 $\pm$ 1.78	78%	22%
After	4.108 $\pm$ 0.425	11.60 $\pm$ 1.5	15.95 $\pm$ 2.92*	87.6%*	12.4%
P-Value			*p<0.05	*p<0.05	

## 6. CONCLUSION

The results of this retrospective analysis showed that hemostasis of blood glucose and electrolytes balance having an advantage of being a sensitive important step for controlling the patient stability postoperative. White blood cells are essential markers used for the determination of an infection's severity and the competence of treatment given to manage fascial space infections of the odontogenic origin. They also help in the protection of patients from various side effects caused by excessive usage of antibiotic. Therefore, White Blood Cells should be used as monitoring tools for the management of patients with fascial space infections of the odontogenic origin.

## AUTHORS' CONTRIBUTIONS

All authors participated in order to reach important results that we are reviewing now the medical history should be used when it comes to assessing the control in diabetes that is achieved by the patient. a patient whose medical history indicates recurrent hypoglycemia and also has varying blood glucose levels (from the current measurements) therefore suggests that he or she will be more likely to develop a disorder from the treatment. it is therefore important for a doctor to prioritize diabetic patients and also ensure they take their medication normally. finally, the levels of electrolytes have more susceptibility to postoperative complications hence perfect operations have to be put off until nutrition of the patient has improved.

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excretion of nitrogen and electrolytes on one hand function in the conservation of water in the body including the intracellular and extracellular volume and contrastingly there is the establishment of conditions favoring the establishment of inflammation exudates thus initiating the repair process. it is therefore important for the surgeon to avoid administration of excess water or administration of sodium to the patient more than the body can excrete since this will cause an imbalance. additionally, it is unnecessary to administer potassium to a patient after an uncomplicated injury.

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