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Postoperative Surgical Site Infections in Oral Surgery Wards: Our Experience

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Abstract

Introduction: There are numerous surgical procedures performed in oral surgery wards and various postoperative complications may be encountered varying with type of procedure. The most common postoperative complication is surgical site infection.

Methods: 215 Patients medical records were analyzed retrospectively from June 2016 to March 2022 in the Department of Oral and Maxillofacial Surgery. Different factors were assessed and correlated statistically with surgical site infection.

Results & Conclusion: Factors like overall length of hospital stay, duration of surgery, blood sugar levels and antibiotic prophylaxis were statistically significant factors.

Keywords: Oral Surgery Wards, Surgical Site Infections, Risk Factors.

Introduction

Surgical Site Infection (SSI) is the most surveyed and frequent type of Hospital-Acquired Infections (HAI) in low-and middle-income countries which affects one third of patients who have undergone a surgical procedure [1]. The global estimates of SSI have varied from 0.5% to 15%, studies in India have consistently shown higher rates ranging from 23% to 38% [2]. The statistical analysis of Oral and maxillofacial surgery still remains ambiguous till date. The oral cavity is a habitat of variable number of microorganisms. The surgical procedures pertaining to oral and maxillofacial region varies from other sites of the body. Almost all oral surgical procedures are semi contaminated as it involves manipulation of soft and hard tissues, penetration of antibiotics and migration of bacteria. It shows significant variations depending upon surgical site and pathology

involved [3]. The aim of this study was to assess various factors associated with SSI at oral surgery ward of our institute.

Materials and Methods

This is a retrospective study which involves medical records of the 215 operated patients from June 2016 to March 2022 in the Department of Oral and Maxillofacial Surgery, AMC Dental College and Hospital. After collection of the data, uncommon records were excluded from the study only selective criteria common to both infected (SSI)and non-infected (non-SSI) patients were included. Inclusion criteria of the present study were: age and gender of the patients, preoperative oral hygiene status, systemic disease, blood investigations like Haemoglobin, Fasting blood sugar levels, CRP, preoperative hospital stay, preoperative prophylactic antibiotics, duration of surgery and total length of hospital stay. All major and minor surgical cases of patients admitted at our ward like trauma, orthognathic surgery, benign pathology, reconstruction and resection surgeries, minor procedure like multiple extractions were included. Both groups of patients infected with and not infected with surgical site infection respectively were analysed based on the above-mentioned factors. Patients who had pre-op infection were excluded. The surgical procedures were performed by team of consultants and residents. All surgical sites were prepared with 10% betadine solution before surgery. I.V antibiotic prophylaxis were given 30 minutes prior to surgery, 1 g Cefotaxime and 500 mg metronidazole till 5 days postoperatively, unless contraindicated. The diagnosis of a SSI was done on the basis of presence of pain, swelling, purulence, fistula or dehiscence following the criteria of the Centre for Disease Control and Prevention. [4 & 5]. Patients who developed SSI were assessed on the basis of type of surgery, location of the infection, signs and symptoms of the patient, rate of infection recurrence, removal of hardware (foreign body), nutritional status of the patient, antibiotic regimen and culture and sensitivity report. Wounds were assessed periodically till 30 days postoperatively. Patients who had developed an SSI were initially started with empirical or targeted antibiotic therapy depending on available culture and sensitivity reports. Close follow up of all the patients was done until the infection resolved.

Statistical analysis was performed using SPSS software version 20.0, by applying chi square test and Mann Whitney U tests. Variables were divided into categorical and quantitative. The continuous variables were calculated as median and interquartile range. Values were considered statistically significant if p value < 0.05.

Results

Out of the 215 patients, 30 patients reported with SSI. This study investigated the relationship between all variables and SSI. There was male predominance (73.33%) and the mean average age was 36.1 years. Intraoral sites were more infected (76.6%) than extraoral sites (23.33%), and mandible was chiefly affected area. All operated procedures with their percentage wise distribution as per infection is shown in graph 1. Age and gender were not associated with increased prevalence of SSI (p value<0.05%). There was no correlation between the type of antibiotic and SSI. Although antibiotics prophylaxis showed a statistically significant association ($p<0.01$).

Amongst the quantitative variables, the average complications were found to be associated with long duration of hospital stay, duration of surgery and fasting blood sugar levels($p<0.01$) as seen in Table 1 and 2. No

association was found between the type of surgery and incidence of surgical site infection.

Discussion

Till date there exist very few scattered data on postoperative surgical site complications so far to our knowledge. Surgical site infections are defined as infections that occur up to 30 days after surgery at the operative site [6]. The oral surgical procedures are classified as either clean or clean contaminated. The average rate of postoperative complications varies depending on the type of procedure, with rate of 1% for clean procedures and less than 10 % for clean contaminated surgery [7].

In the present study, the percentage of SSI was 13.9% and it correlates with a previous study which showed that the estimated chances of wound infection in head and neck surgery ranges from 0-30% [8]. In our study, despite prolong postoperative antibiotic regime, we could find no benefit in terms of preventing surgical site infection. Similar results have been obtained in studies conducted by Vila et al, in their meta-analysis, where no benefit was obtained from 5 days antibiotic prophylaxis regime as compared to one day [3 & 8]. There is no consensus in literature available regarding duration of postoperative antibiotic prophylaxis in head and neck surgery [3,9,10].

Demographics like patients age and gender have been identified as possible risk factors for SSI, though in our study no such correlation has been established. The duration of surgery in patients with SSI vs non-SSI was statistically significant($p<0.05$). From this we can judge that prolonged duration of surgery was significantly linked with higher postoperative complications. This depends upon various other factors like the severity of surgical procedure and surgeon's skill. The length of hospital stay was also highly statistically significant ($p<0.001$). Patients stay longer due to economic constraints and to avoid long distance travel. Thus, achieving a proper disinfection and sterilization practices is essential [11].

In patients undergoing routine general surgical procedures raised perioperative serum blood glucose levels increase the risk of postoperative infection, independent of diabetic status [12]. Stress induced hyperglycaemia following substantial trauma have been noted in orthopaedic literature [12]. To bring to the notice, most of our cases who developed SSI were patients who had traumatic injuries. However, in study conducted by Sheighesi et. al. the role of poor glycemic control still remains unclear on postoperative complications [13]. The results of our study showed significant relevance ($p<0.001$) of blood sugar levels with postoperative infection. Therefore, we maintained a regular chart of blood sugar levels till the time of hospital stay of the patient. The ratio of patients having diabetes was comparatively higher than noninfected group of patients. There were 5 out of 30 patients who were diabetic and also had developed surgical site infections. Diabetic patients have always been at high risk of wound infection and slow healing.

Additional factors such as patients belonging to poor socioeconomic background who are undernourished increases their susceptibility to infection. Also, Trauma and oncological operated patients already rely on taking their food via feeding tubes or are on liquid diet due to inter maxillary fixation or resective surgeries. To combat the infection, we followed the protocol of proper flushing thrice a day with antiseptic solution like hydrogen peroxide diluted with normal saline and betadine and protein rich diet alteration. Appropriate

antibiotics regimen was followed as per the surgeon's advice and culture sensitivity report. Most common bacteria which we found were staphylococcus aureus and pseudomonas. (Graph 2). There were multiple strains of bacteria identified but are not enlisted separately. There were few cases where more than one bacterial strain was identified. As Pseudomonas strain is rapidly mutating and multi drug resistance is observed which makes selection of antibiotics very stringent and further prolongs time for recovery.

There are few limitations of our study, as the present study being a retrospective one, so chances of bias with the data might be possible. More prospective and long-term studies are required to analyse various categories of surgeries with postoperative infection. Long term follow up is necessary to know the course and management of the infection process.

Conclusion

The identifiable factors from our study were long duration of surgery, increased fasting blood glucose levels and longer hospital stay that increased the prevalence of surgical site infections & drug resistance. More detailed, case specific and multicentric analysis is further required to find out specific factors resulting in complications.

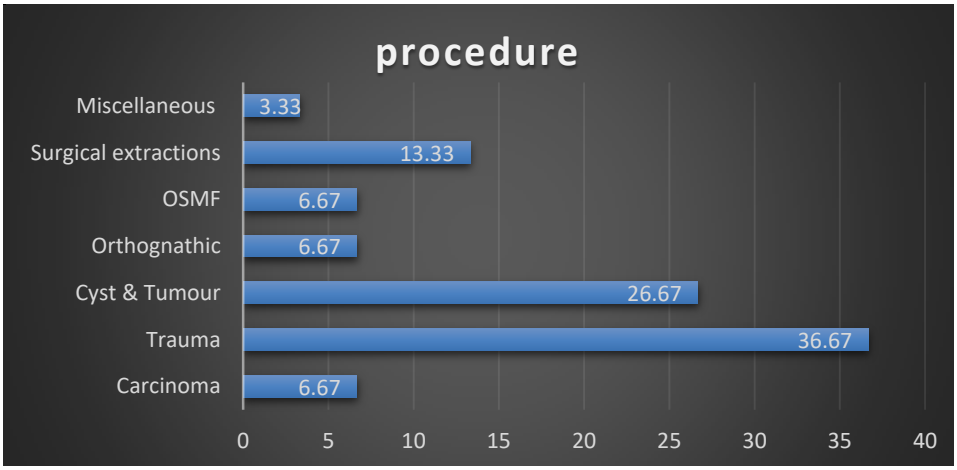
Table 1: Factor associated with SSI (Quantitative Variable)

Characterises	SSI (n=30)	Non-SSI (n=185)	P value
	Median (IQR)	Median (IQR)	
Age	37(18)	32(12)	>0.05
length and duration of hospital stay (days)	11(5)	5(2)	<0.001
Duration of surgery(hrs)	3.5(1)	3(0.5)	<0.001
Haemoglobin (gm%) preoperatively	10.80(2)	11.50(2.6)	>0.05
FBS (mg/dl)	114(76)	85(23)	<0.001
CRP preop	1(5)	1(11)	<0.05

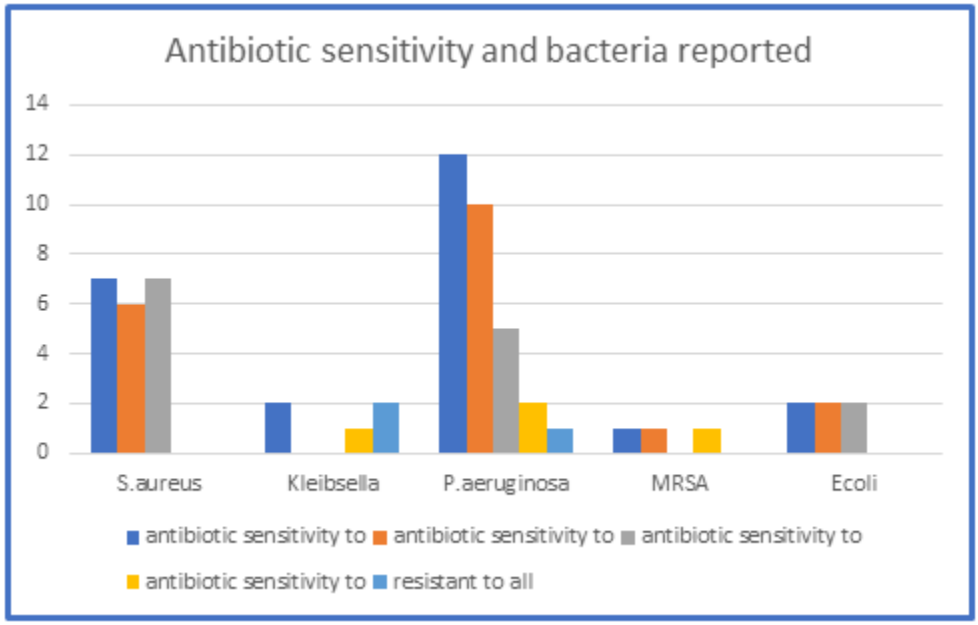
Table 2: Factor associated with SSI (Categorical Variable)

Characterises		SSI (n=30)	Non-SSI (n=185)	P value
		No.	No.	
Gender	Female	8	34	>0.05
	Male	31	151	
Antibiotics prophylaxis	Yes	14	44	<0.01
	No	16	141	

Graph 1: Percentage of surgical site infection in various procedures performed



Graph 2: Antibiotic sensitivity as per bacterial isolation



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