



## Audit on The Type of Antibiotics Used for Post-Operative Surgical Management of Oral Squamous Cell Carcinoma Patients

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### ABSTRACT

Development of potentially severe complications secondary to head and neck cancer surgeries is commonly noted. Role of prophylactic antibiotics in head and neck surgeries has been proven with sound literature evidence. Certain studies have reported that the rate of wound infections when antibiotics were not used was as high as 87% whereas 10% of studies reported decreased surgical site infection (SSI) following antibiotics. This study aims to find out the various antibiotics and their combinations used for post operative management of Oral Squamous cell carcinoma patients at private dental college in Chennai. The aim of the current study was to audit on the type of antibiotics used in postoperative management of Oral squamous cell carcinoma in a private dental institution in Chennai. Data was procured from case records of patients undergoing surgical management for oral squamous cell carcinoma. The information obtained was tabulated in Ms-Excel and analysed using SPSS. 62.5% of the cases had cefotaxime and metronidazole prescribed postoperatively while other combination used in 37.5% of the cases were gentamicin, sulbactam, clindamycin and ofloxacin. Cefotaxime and metronidazole were predominantly used in the management of postoperative oral squamous cell carcinoma cases and 25% of the postoperative infections were associated with Cefotaxime and metronidazole combinations.

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### KEYWORDS

Antibiotics, Oral squamous cell carcinoma, Post-operative infections.

### INTRODUCTION

Development of potentially severe complications secondary to head and neck cancer surgeries is commonly noted, among which wound infections are noted at a rate of 87%. [1–3]

These wound infections can cause deterioration of the healing, leading to breakdown and formation of

healthy tissue causing mucocutaneous fistula subsequently increasing hospital stay and rarely leading to death.[4–8]

Significant surgical site infections can cause a delay in initiation of postoperative chemotherapy increasing the risk of recurrence. Prophylactic antibiotics can increase the cost of treatment, risks

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of the adverse effects, create resistance to antibiotics [9] and decrease the surgical site infection.[10–13]

Few factors associated with increased wound infection rates include preoperative radiotherapy, excision of flap, duration of surgery and duration of hospital stay. Literature research shows that despite antibiotic prophylaxis the risk of infection was as high as 41.8%.[14–19]. Though many factors contribute to postoperative infections theoretically, only a few factors are responsible for infections in the clinical scenario. [16,17,19–22]

Recent literature has analysed and supported the fact that, usage of prophylactic antibiotics has decreased the post operative surgical site infection rates while it was increased to 87% when antibiotic prophylaxis was not followed. [23,24]. Previously our team had conducted numerous clinical trials and in vitro studies [25–44] over the past 5 years. Now we are focusing on retrospective studies. This study aims to find out the various antibiotics and their combinations used for post operative management of Oral Squamous cell carcinoma patients at private dental college in Chennai.

## MATERIALS AND METHODS

This study was performed with the retrospective data of patients undergoing surgical therapy for oral squamous cell carcinoma over the period of 10 months between June 2019- March 2020. Convenient sampling was done to reduce the sampling bias. 87000 case sheets were analysed among which 47 patients who underwent surgical management for oral squamous cell carcinoma were identified. Among these 47 patients, only 13 patients satisfying the inclusion criteria. Incomplete data without photographs and procedural notes was excluded from the study.

The verification of the information was done in the presence of two reviewers to reduce the observer's bias. The data was verified with the help of photographs and procedural notes documented. The data obtained was tabulated in MS-Excel with various parameters which includes age, gender, antibiotic regimen used and the presence of postoperative infections. The data was analysed using IBM SPSS software (version 20) and the results were tabulated and interpreted. Pearson's chi square analysis was performed.

## RESULTS AND DISCUSSION

Post operative infections were observed in 25% of the cases (Figure 1). Among the antibiotics regimen prescribed, cefotaxime and metronidazole was prescribed to 62.5% of the population while other regimens such as tazobactam, gentamicin was used among 12.5% of the cases, ofloxacin, metronidazole was prescribed for 12.5% of the population, cefoperazone, sulbactam was prescribed to 12.5%

of the cases (Figure 2). Among the patients prescribed with cefotaxime and metronidazole, 25% of the patients had postoperative infections. No postoperative infections were observed in patients administered with other antibiotic regimens such as ofloxacin and metronidazole, tazobactam and gentamicin, cefoperazone and sulbactam. The association of antibiotics with post op infections was statistically not significant (Figure 3).

According to our current study, cefotaxime and metronidazole has been the most predominantly used antibiotic regimen post operatively for surgical management oral squamous cell carcinoma. 25% of the cases had postoperative infections among the total number of cases. The post operative infections were observed only in patients who were prescribed Cefotaxime and metronidazole combination. The other antibiotic regimens such as combinations of ofloxacin and metronidazole, tazobactam & gentamicin and cefoperazone & sulbactam were not associated with infections.

[45,46] reported that 16% of the patients following oral squamous cell carcinoma develop surgical site infections and other postoperative infections which is in accordance with our current study. Ricard Simo and Gray French[47] reviewed literature and concluded that the use of antibiotics helps reduce surgical site infections and postoperative infections. Several antibiotic regimens such as ampicillin and sulbactam, clindamycin and gentamicin, amoxicillin and clavulanic acid had been used to reduce post operative infection.

Most frequently isolated organism from the surgical site infections following surgical management for oral squamous cell carcinoma was *Pseudomonas aeruginosa*. Swabs, cultures from these sites identified other microbes such as non-fermenting gram-negative bacteria, *Staphylococcus aureus* although most pus cultures were polymicrobial in nature [48]. VV Poorten stated that most frequently isolated species were *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Streptococcus* spp, *Escherichia*, *Enterobacteriaceae*, *P. aeruginosa*, *Klebsiella pneumoniae*, *Haemophilus influenzae*, and *Proteus mirabilis*. Occasionally, anaerobic bacteria like *Bacteroides* species and *Candida* species[49] were isolated. According to Gobic et al, the most frequently isolated bacterial species was *Enterobacteriaceae* followed by *Staphylococcus*, *Pseudomonas aeruginosa*, *Corynebacterium* and *Acinetobacter baumannii*. [50].

Sridhar et al reported[48] cefoperazone, sulbactam along with metronidazole was more commonly used and associated with 12.6% of the post surgical infection rates and this result is in accordance with our current study as the same class of antibiotics (3rd generation cephalosporins) were used. De

melo GM reported[51] that Cephalothin and clindamycin was the most commonly used regime in the United Kingdom following head and neck surgeries. Poorten et al reported that Cephalothin, ampicillin-sulbactam was the most efficient antibiotic combination used to reduce post op infection rates after squamous cell carcinoma management while clindamycin was the least effective in reducing the infections[49]. The results of our study does not favour the previous study, as the previous studies had used 1st generation cephalosporins (Cephalothin) but at our unit 3rd generation cephalosporins (Cefotaxime) were used. This diversity in the prophylactic regimens followed is due to the variations in antibiotic policies followed by each country.

M.P.VeVe et al[45] concluded his study stating that short duration, broad spectrum antibiotics like metronidazole, sulbactam and ceftriaxone are commonly used antibiotics postoperatively which favours the results of our current study. Wendy Munck[52] suggested that the first generation cephalosporins such as cephalothin and cefazolin could be used along with metronidazole and gentamicin while the use of cefotaxime must be contradicted as it can increase the chances of bacterial resistance to it, which is in opposition to our current study.

The limitations of our current study includes operator bias, limited availability of samples, geographically isolated population and short term analysis. Further assessment is required to understand the pattern of microbiology of the infections and correlate with the type of antibiotic used.

## CONCLUSION

Within the limitations of this study, it is concluded that cefotaxime and metronidazole regimen was the most commonly used antibiotic regimen at our unit. 25% of the operated cases developed postoperative infections, among which all the cases were associated with cefotaxime and metronidazole regimen.

## AUTHOR CONTRIBUTIONS

Jembulingam Sabarathinam performed the analysis, interpretation and wrote the manuscript. Dr.Kathiravan Selvarasu contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Madhulaxmi M helped in coordinating the research and was one of the reviewers. All the authors have discussed the results and contributed to the final manuscript.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

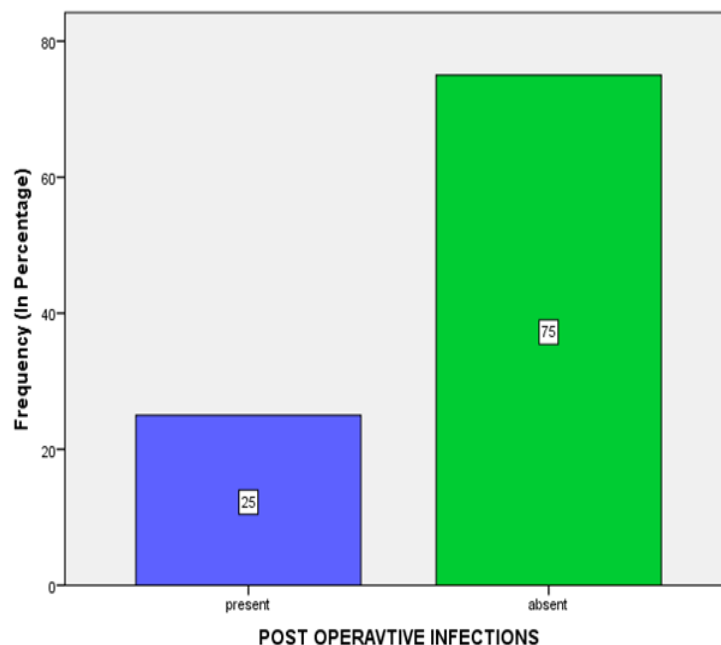
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**Figure 1: Bar graph depicts the status of postoperative infections following surgical management of oral squamous cell carcinoma. X axis shows status of postoperative infection and Y axis shows the number of patients with or without postoperative infections. One-fourth of the study population experienced postoperative infections following antibiotics (Blue -25%) while majority of the study population did not experience infections postoperatively following antibiotic therapy (Green-75%)**

Audit on The Type of Antibiotics Used for Post-Operative Surgical Management of Oral Squamous Cell Carcinoma Patients

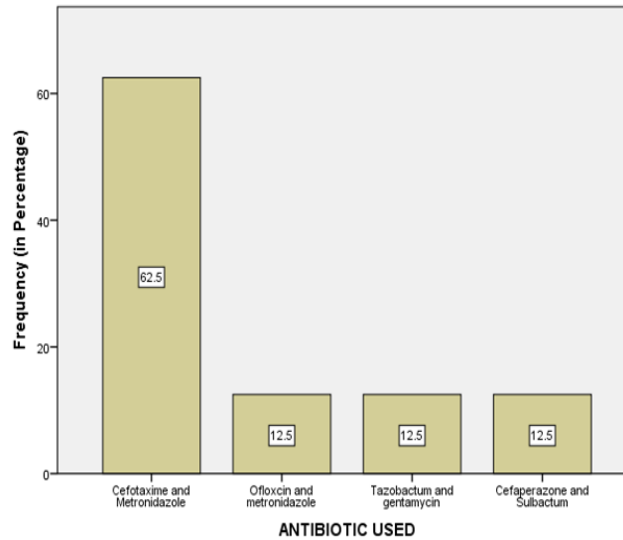


Figure 2: Bar graph depicts the type of antibiotics used following surgical management of oral squamous cell carcinoma. X axis shows the type of antibiotic used and Y axis shows the number of patients receiving the same. Among the antibiotics regimen prescribed, cefotaxime and metronidazole was prescribed to the majority of the study population (62.5%).

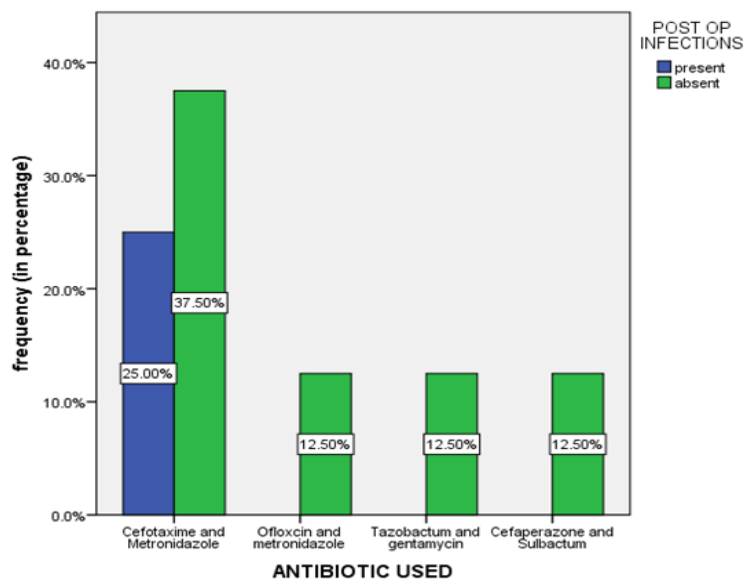


Figure 3: Bar graph depicts the association between the type of antibiotics used and the presence or absence of postoperative infections following surgical management of oral squamous cell carcinoma; X axis shows the type of antibiotic used with the presence or absence of infection and Y axis shows the number of patients in each category. When Cefotaxime and metronidazole was used, post operative infections were present in 25% (Blue) and absent in 37.50% (green) of the cases. When Ofloxacin and metronidazole, post operative infections were present in 0% (Blue) and absent in 12.50% (green) of the cases. When Tazobactam and Gentamicin was used, post operative infections were present in 0% (Blue) and absent in 12.50% (green) of the cases. When Sulbactam and cefoperazone was used, post operative infections were present in 0% (Blue) and absent in 12.50% (green) of the cases. Chi square test was done and association was found to be statistically not significant ; Pearson's value:1.600, DF:1, p value: 0.659(>0.05). In our current study, postoperative infections were associated with only Cefotaxime and Metronidazole regimen (25%) but there is found to be no significant association between the type of antibiotics used and the presence or absence of post op infections.