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ROLE OF SYSTEMIC ANTIBIOTICS IN MINOR ORAL SURGICAL PROCEDURES: A PILOT STUDY

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ABSTRACT

Dental extractions and minor surgical procedures for causes other than infection are quite common in any dental practice. All these procedures involve breach in soft tissue and probably hard tissue integrity thereby providing microorganisms to harbor and spread through blood stream. Transient bacteremia is inevitable with surgical procedure of any kind and may lead to septicemia, bacterial endocarditis, toxic shock syndrome, etc. all being life threatening but rare conditions. Prophylactic and post operative antibiotic therapy has been used extensively to prevent surgical site infection and other systemic complications but at the expense of added financial burden, adverse drug effects and drug resistance. The rational to use systemic antibiotics in clean procedures to prevent few rare complications and in availability of broad spectrum local antimicrobial agents should be justified.

INTRODUCTION

Minor oral surgeries and exodontia are frequently performed at dental centers, many of them for non-infectious reasons. Any dental extraction or surgical procedure in the oral cavity is expected to produce bacteremia, mostly anaerobic in nature [1-3]. For decades, dental surgeons around the world have relied upon use of systemic antibiotics for prevention of post operative infection and other associated complications [4-6]. However, recently several studies have questioned this age long wisdom of prescribing antibiotics after minor surgical procedures [5, 7-9]. It has been advocated that the minor surgical procedures and dental extractions if performed under strict aseptic conditions do not produce considerable bacteremia [10].

This study attempts to assess the need of systemic antibiotics followed by aseptic minor intraoral surgical procedures and dental extractions in healthy individuals.

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MATERIALS AND METHODS

This prospective study was conducted at our maxillofacial aesthetic and dental centre, Jaipur, Rajasthan. The patients reported to our centre from 1st June 2013 to 17th June 2015 were considered for the study. All healthy ASA I patients without any systemic conditions affecting wound healing or risk of infection, seeking treatment for non-infectious causes and willing to involve in our clinical trial were included in this study. Dental or surgical procedures considered for the inclusion in the study were orthodontic extractions, uncomplicated extractions due to non infectious reasons, biopsy, frenectomies, alveoloplasty and soft tissue excision <1cm. Exclusion criteria for the study were ASA II or above, patients with poor oral hygiene, tobacco chewer or smoker, patient with systemic condition or infectious pathology and procedures other than mentioned above.

Written consent was obtained from all the patients included in this study. A strict aseptic protocol was followed in all the patients. The patients were instructed to gargle with antimicrobial mouthwash (chlorhexidine 0.2% w/v) 15 min prior to the procedure, immediately after the procedure and twice daily thereafter

for seven days. The surgical wound was closed primarily with 3-0 silk or 4-0 vicryl sutures wherever indicated. Standard post operative and oral hygiene instructions were given to all the patients.

The patients were divided into two groups. The patients were screened for inclusion in the study by the two authors and all the surgeries were performed by the single blinded surgeon while the instructions and prescriptions were given to the patient by another author based upon their respective group. The patients were allotted in the group in alternating fashion for randomization. Group A included patients who were prescribed post operative antibiotics (amoxicillin 500mg per oral thrice daily for seven days) and routine analgesic (Paracetamol 500mg thrice daily per oral for seven days). Group B patients were abstained from systemic antibiotic therapy. Post operative follow up were made on 3rd, 7th and 30th day after the procedure. The post operative assessment was made by the surgeon with the help of clinical examination and intra-oral periapical (IOPA) radiographs.

RESULTS

Total 118 patients fit in inclusion criteria and were included in the study. 59 patients were allotted in Group A while rest 59 in group B. The age range of group A patients was 9 years to 57 years with the mean age of 31.59. Thirty eight patients were male while twenty one were female. In group B, 32 were male while 27 were female (Fig. 1) within the age range of 8 years to 53 years with the mean age of 30.58.

The details of various procedures performed are enumerated in table 1. The incidence of post-operative complications relevant to the study is tabulated in table 2. On comparing both groups, no significant variations in the pain scores or incidence of swelling were observed. The incidence of dry socket was equal in group A and B respectively.

Significant rise in gastrointestinal complications were observed in group A patients. The local and systemic complications were found to be less in group B as compared to group A. No incidences of post operative fever or drug allergy were found in this study.

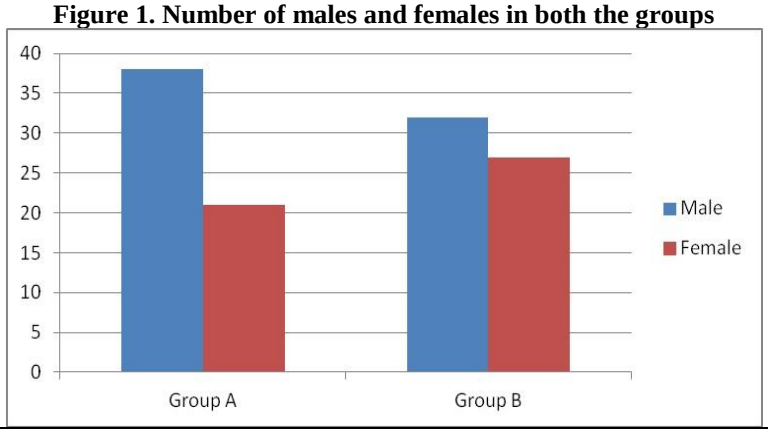
Table 1. Procedures included in the study

Procedure	Group A	Group B	Total
Extractions	35	42	77
Biopsy	7	4	11
Alveoloplasty	11	8	19
Frenectomy	4	5	9
Mini screw placement	2	0	2
Total	59	59	118

Table 2. Incidence of various complications observed in the groups

Complication	Group A (%)	Group B (%)	Total (%)
Dry socket	1 (16.67%)	1 (33.33%)	2 (22.22%)
Surgical site infection	1 (16.67%)	0 (0%)	1 (11.11%)
Wound dehiscence	1 (16.67%)	1 (33.33%)	2 (22.22%)
Fever	0 (0%)	0 (0%)	0 (0%)
Gastrointestinal	3 (50%)	1 (33.33%)	4 (44.44%)
Drug allergy	0 (0%)	0 (0%)	0 (0%)
Total	6 (100%)	3 (100%)	9 (100%)

Figure 1. Number of males and females in both the groups



DISCUSSION

Post operative infection is one of the most common complications of the dental extractions or surgical procedures which may occur in best hands and aseptic conditions [3]. Maintaining near aseptic conditions in oral cavity during and after any procedure is a daunting task mainly due to irregular hard and soft tissue surfaces, flow of saliva, communication with internal and external environment. Any breach in the hard or soft tissue will allow microorganisms to harbor at the surgical site and enter into the blood stream leading to transient bacteremia. Various local factors such as oral hygiene, preoperative infection, wound size, etc. and systemic conditions such as age, diabetes, thrombocytopenia, immunodeficiency, etc. have been suggested to aid in surgical site infection [11]. Surgical site infection may lead to delayed wound healing, pain, swelling, halitosis, bacteremia, fever and other complications; all being embarrassing to any dental surgeon.

Systemic antibiotics have been an essential part of prescriptions after any dental extractions or the oral surgery [4-6]. Preoperative antibiotic prophylaxis can significantly reduce risk of infection or bacteremia in susceptible individuals such as diabetics or patients at risk of bacterial endocarditis [12-14]. However few authors have raised doubts over use of antibiotic prophylaxis [15-17]. Similarly, post operative systemic antibiotic therapy can significantly reduce incidence of infection and other systemic complications following dental procedures [6] but they also add significant financial burden over the patient and other complications such as adverse drug reaction, gastrointestinal disturbances, drug resistance, etc. [5]. Several authors in the past have questioned the wisdom of using antibiotics in clean, non-infected procedures [5, 7-9, 18, 19].

The incidences of local and systemic complications in group A is 5.08% each while in group B, it is 3.39% and 1.7% respectively. No statistical difference was found in the incidence of dry socket after dental extractions in both the groups. One case of alveolar osteitis was found in each group, both being elderly which were successfully managed by intraoral wound irrigation with povidone iodine solution, hydrogen peroxide and eugenol dressing placement [20].

Surgical site infection along with wound dehiscence was found in a young child after lingual frenectomy from the group A. The age of the child, inability to clean the area, tongue movements and large wound can be contributing factor for the surgical site infection and wound dehiscence as in this case.

In this study the incidence of complications are more in antibiotic group as compared to non-antibiotic group. This should not be confused as we have considered both local and systemic complications. The localized complications were almost equal in both the groups while the systemic complications or the incidence of gastrointestinal complaints was three folds in group A patients as compared to group B which was statistically significant. Various antibiotics are known to cause gastrointestinal disturbances; nausea, vomiting and diarrhea being the commonest [21]. No long term complications were observed in any of our patients.

Various local drug delivery systems have been developed to avoid or in adjunct to systemic antibiotic therapy. Broad spectrum antimicrobial mouth rinses (povidone iodine, chlorhexidine, phenolic compounds, etc) have been found to be effective in postoperative period [22]. Tetracycline fibers have been extensively used in periodontal surgeries and can be used in extraction wounds [23]. Topical endoalveolar application of minocyclin [10 mg in bioresorbable poly (D, L-lactide-co-glycolide) lactide sustained-release microspheres], chlorhexidine gel and clindamycin have also shown to be effective in reducing post operative infection [24-26]. These local drug formulations can effectively deliver drug directly at the surgical site without any systemic adverse effects. Recent biomaterials such as calcium hydroxide have shown osteogenic potential and antimicrobial effect and therefore can be considered for use in post operative wounds [27]. Recently platelet rich plasma (PRP) has been successfully used to accelerate wound healing and prevent alveolar osteitis [28]. The anti-inflammatory and anti microbial activity of aloe vera can be harnessed in prevention of surgical site infection and early healing [29].

In developing countries where the treatment cost is an essential factor for the patient and the doctor as well, the use of systemic antibiotics should be assessed and reserved for the cases that are at risk of local infection and associated systemic complications. According to the National Center for Disease Control and Prevention approximately one-third of all outpatient antibiotic prescriptions are unnecessary [30]. The misuse of antibiotics has led to drug resistance which is a problem of great concern [5].

Our study delineates the fact that use of systemic antibiotics might not have any possible advantage in clean and uninfected surgical wound healing process. Further, systemic antibiotics can contribute to the systemic adverse drug effect and added cost in the treatment of the patient and thereby can be avoided or replaced by local drug system at the discretion of the consulting surgeon and other factors.

We have included variety of minor oral surgical procedures involving hard and soft tissues and patients from various age groups have been included which is the strength of the study. Small sample size, lack of patient blinding, lack of local site and blood culture investigations are the main drawback of the study. Multicentric trials or studies with large sample size are needed to further assess the merits and demerits of using systemic antibiotics in clean surgical procedures. The decision of using antibiotics after these surgeries should be made by the surgeon only after thorough local and systemic examination, type of the pathology and the post operative

wound. Aseptic protocols and local drug deliveries can substantially reduce the need for systemic antibiotics in many patients and can significantly reduce the cost of the treatment.

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