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Review Article

Antibiotics in Oral Surgery: Yes or No?

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ABSTRACT

An antibiotic is always used as an adjuvant to surgery. Sterile and atraumatic operated methods, sterile and clean instrumentation and good surgical judgement forms the basis of any surgical procedure and cannot be altered by any kind of drug use at all. We have tried to justify the use of antibiotics in Oral and Maxillofacial surgery by analyzing data and studies from multiple authors. Signs of local infection at operation site make it mandatory to use antibiotics. However, these are rather therapeutic drug usage rather than prophylactic drug usage. Risk of 1 to 6 % extending up to 45% has been found by various authors in third molar surgeries. Several risk factors put the patient at a higher risk than others when considering whether or not prophylactic antibiotics must be used. Bacteria commonly found in the oral cavity and cervicofacial skin area are Staphylococcus, Streptococcus, enteric and anaerobic bacteria. In dental practice usually the drugs administered are orally given and post operatively in most cases. However, it has been stated that the best route or treatment modality for antibiotic prophylaxis is via the intravenous route, which is not possible in each and every case. Also, according to the principles of Peterson, the antibiotic coverage should be given before surgery prophylactically instead of post operatively.

INTRODUCTION

An antibiotic is always used as an adjuvant to surgery. Sterile and a traumatic operated methods, sterile and clean instrumentation and good surgical judgment forms the basis of any surgical procedure and cannot be altered by any kind of drug use at all. The above mentioned are mere strategies' to prevent any sort of infection in surgical fields. However, very commonly believed is the use of antibiotic prophylaxis to prevent surgical site infection. Tooth extraction maybe considered as a clean contaminated surgery and occasionally a dirty contaminated procedure. However, if the patient is free of any infectious disease, the use of antibiotics prophylactically is neither justified nor sensible. [1-2]

The following factors that are enlisted, maybe the cause of infection postoperatively:

1. Duration of surgery
2. Type of surgery.
3. A.S.A status of the patient such as diabetes, cardiomyopathies, nephropathies, immune-suppresors (radiotherapy, chemotherapy etc.)
4. Any previous infections.
5. Age of the patient: patients at extremes of age are more prone to infections than other age groups.

We have tried to justify the use of antibiotics in Oral and Maxillofacial surgery by analyzing data and studies from multiple authors.

Indications for prophylactic antibiotic use:
When does the need for antibiotic prophylaxis arise in oral surgical or dental procedure?
1. Active infection in the surgical field. However this is rather a therapeutic rather than prophylactic procedure.

2. Cases where the intraoperative risks are low but the post operative infection risks are high e.g. Odontogenic infections spreading to deeper spaces. [3]

When should antibiotic prophylaxis be given to prevent local infections?
Signs of local infection at operation site make it mandatory to use antibiotics. However, these are rather therapeutic drug usage rather than prophylactic drug usage.

Peterson [8] has defined the principles that every antibiotic prophylaxis should follow in areas where the field is what appears to be infection free. The infection risk of any surgery should be greater than 10% in order to qualify for antibiotic usage. However, there is no set criteria to determine this percentage via methodology or large scale studies hasn't been found yet.

Risk of 1 to 6 % extending up to 45% has been found by various authors in third molar surgeries.
Secondly, cases where the clinical risks are low, but post-operative complications could generate post-operative infections e.g.: Odontogenic infections that can spread to anatomical spaces or Pre-operative pericoronitis in cases of third molar surgeries [9-11].

REVIEW OF LITERATURE:

Several Authors supporting the use of prophylactic antibiotics in dental and oral surgery procedures.

1. Poeschl et al. [4] conducted a study of over 523 mandibular molars that were surgically removed and came to a conclusion that the global rate of infection was 3.9% when patients were not given antibiotics as compared to patients who were administer with pre operative antibiotics which was either Amoxicillin or Clindamycin.
2. Happonen et al. [5] found that post-surgical infection rates could not be controlled, neither by penicillin's nor by Tinidazole in post-surgical third molar cases.
3. Sekar and colleagues [7] compared the effectiveness of different doses of metronidazole in preventing post operative infections in tooth extractions and third molar cases. They found that were was no benefits or reasons to justify the pre or post procedure antibiotics to reduce risk of surgical wound infections.

4. Adel Al Asfur et al. [6] conducted surgical procedures over 130 imacted lower third molar cases under strict aseptic techniques. No antibiotics prescribed neither administered before or after surgery. 5.5% of cases showed post operative infections rate. Thus, the rates observed affirm that antibiotics should be prescribed in surgical cases unless indicated otherwise.

However, on the contrary there are a few authors who support this protocol of prophylactic antibiotic coverage as well:
1. Mitchell et al. [11] states that low infection rates are seen in patients who were administered Tinidazole v/s placebo , however they concluded that antibiotic prophylaxis should be restricted to deep osseous defects.
2. Sands et al. [12] advocated the use of prophylactic antibiotics in case of total osseous impactions.
3. Arteagoitia [13] and colleagues state that a combination of Amoxicillin 500 mgs plus clavulanic acid 125mgs was effective in reducing post operative infections rate when the risk factor are actively present.

Risk Factors

Several risk factors put the patient at a higher risk than others when considering whether or not prophylactic antibiotics must be used. We enlist the factors below:

1. Recurrent pericoronitis
2. Immunocompromised patients.
3. Disrupted metabolic status of patients.
4. Placement of sutures or other foreign material such as Gel foam etc. in surgical sites which could lead to secondary infections.
5. Significant osteotomy degree.

Other factors that were mentioned by Monaco et al. [14] are as such:

1. Operator experience
2. Tobacco use , alcohol use
3. Preoperative infections , fever , pain.
4. Age older patients are at a higher risk compared to younger, healthy patient.

Classification of surgeries

Oral surgery procedures can be classified into two main categories:

A. Cases with absence of microorganisms:

1. Impacted teeth
2. Non infected odontogenic tumours , cysts
3. Pre prosthetic surgeries.
4. Preorthodontic surgeries.
5. Closed jaw fractures.
6. Flaps, grafts.

B. Cases with the presence of microorganisms:

1. Pericoronitis associated with third molar surgeries.
2. Open jaw fractures.
3. Contusions.
4. Retained root pieces of teeth.
5. Radionecrosis
6. Immunocompromised cases.

Which antibiotics and where must they be used?

Bacteria commonly found in the oral cavity and cervicofacial skin area are Staphylococcus, Streptococcus, enteric and anaerobic bacteria. The durgs of choice being penicillins with beta lactamase inhibitors such as Amoxicillin – Clavulanate and Ampicillin Sulbactum.

Second generation Cephalosporins such as:

1. Cefazolin
2. Cefoxitin
3. Ceftriaxone

Other drugs such as Chinolones , Clindamycin can also be administered.

A. Traumatology: Infection rates increase in case of open fractures of jaws, wide and large soft tissue injuries. The classically used antibiotics mentioned above are used in such cases .However, infections secondary to trauma such as abscess, osteomyletis etc. that require antibiotic treatment and not just prophylaxis. The treatment of closed fractures does not show any improvement with or without the use of antibiotic therapy, though many professionals use them prophylactically. In cases of mid and upper third fractures, third generation cephalosporins are used. In case of Orbital wall fractures no consensus on use of antibiotics has been proved. [16-18]

B. Oral Surgery: In Oral and Maxillofacial surgery, the patients reporting are usually healthy and disease free, thus making the post operative infection rates low. However, patients with active infection, pericoronitis , imunosuppresive drugs are on a higher risk of post operative infections. Impacted third molars requiring large amount of osteotomy shows better prognosis with prophylaxis antibiotics. However, cases with no evidence of local infection do not require prophylactic antibiotic therapy. [19-20]

C. Salivary gland diseases : No effectiveness of prophylactic antibiotics have been proven in Parotidectomy or submaxilectomy cases. [21]

D. Oncological surgeries: Use of pre operative antibiotics has shown reduction of post operative infections. The drugs of choice are:

1. Clindamycin + Cefazilin
2. Cephalosporins
3. Aminoglycosides
4. Chinolones
5. Penicillin derivatives + betalactamases.

In oncological cases, when saliva comes in contact with the operates site and wound, the risk of infection increases multiple folds. Other risk factors such as immunocompromised status of patients, radiotherapy, chemotherapy, flap ischemia, necrosis is amongst other reasons for post operative infections.

Gentamycin + clindamycin work against gram positive, negative as well as anaerobic organisms. [15]

CONCLUSION

In dental practice usually the drugs administered are orally given and post operatively in most cases. However, it has been stated that the best route or treatment modality for antibiotic prophylaxis is via the intravenous route, which is not possible in each and every case. Also, according to the principles of Peterson, the antibiotic coverage should be given before surgery prophylactically instead of post operatively.

Burke [22] stated that the best way to give or administer antibiotics is before the bacterial exposure of the surgical site.

Studies suggest that in cases of considerable damage cases, the duration of antibiotic prophylaxis should be as short as possible as long as it is effective. Also, it has been stated that in cases of oral administration for prophylactic use, one high dose is enough. [8, 23]

OUR VIEWS

A. Prophylactic antibiotics in Oral and Maxillofacial Surgery have not been clearly established currently. However, in cases where there is the presence of microorganisms or local infections, the use of antibiotic prophylaxis seems valid and well called for as well as needed. However, in cases of absence of microorganisms and local infections, the use of prophylactic antibiotics has not been justified as yet very clearly.

B. Amoxicillin and clavulanic acid combination covers the entire Bacterial spectrum in odontogenic infections. However, more studies are required to confirm this.

C. Antibiotic doses should not extend for more than 24 hours when high dosages are administered.

D. Preoperative antiseptics in oral cavity such as Chlorhexidine, betadine, Iodine should be used to reduce post-operative complications.

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