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Benefits of Antibiotics In Post Extraction Surgery - A Review

Research Article

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Abstract

Certain patients do require antibiotic administration prior to any invasive oral procedure. This is because even a small amount of bacteria introduced into the blood stream may have catastrophic outcomes. These patients include, but are not limited to, those with prosthetic heart valves, history of infection in the heart or heart valves, and certain patients with implanted prosthetic joints or other body parts, those suffering from immunosuppressive illnesses, and those taking immunosuppressive drugs.There was no evidence to judge the effects of prophylactic antibiotics for extractions of severely decayed teeth, teeth in diseased gums, or extractions in patients who are sick or have low immunity to infection. However, it is likely that in situations where patients are at a higher risk of infection that prophylactic antibiotics may be beneficial, because infections in this group are likely to be more frequent and more difficult to treat another concern, which cannot be assessed by clinical trials, is that of widespread use of antibiotics by people who do not have an infection which is likely to contribute to the development of bacterial resistance.The conclusion of this review is that antibiotics given to healthy people to prevent infections, may cause more harm than benefit to both the individual patient and the population as a whole.

Keywords: Antibiotics; Infection; Inflammation; Complications; Impaction.

Introduction

Tooth extraction is probably the most commonly conducted surgical procedure. Teeth are normally extracted because of severe dental caries or periodontal infection, although they are also removed because they are poorly aligned or developed [1]. The aim of this review is to determine the effect of antibiotic prophylaxis on the development of infectious complications following tooth extractions.

Tooth extraction is a surgical treatment to remove teeth that are affected by decay or gum disease . The other common reason for tooth extraction, performed by oral surgeons, is to remove wisdom teeth that are poorly aligned/developed (also known as impacted wisdom teeth) or those causing pain or inflammation [2].

A study published in February 2015 by the Journal of Oral and Maxillofacial Surgery evaluated the perceptions patients hold regarding the value of taking antibiotics following tooth removal [3]. This study found that 2/3 of patients having tooth extraction expected to have antibiotics prescribed after the procedure. 70% of these patients expected that taking the antibiotic would help prevent infection [4].

The risk of infection after extracting wisdom teeth from healthy young people is about 10%; however, it may be up to 25% in patients who are already sick or have low immunity [5]. Infectious complications include swelling, pain, pus drainage, fever, and also

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dry socket (this is where the tooth socket is not filled by a blood clot, and there is severe pain and bad odour). Treatment of these infections is generally simple and involves patients receiving antibiotics and drainage of infection from the wound [6].

This review looks at whether antibiotics, given to dental patients as part of their treatment, prevent infection after tooth extraction. There were 18 studies considered, with a total of 2456 participants who received either antibiotics (of different kinds and dosages) or placebo, immediately before and/or just after tooth extraction. There were concerns about aspects of the design and reporting of all the studies. In all of the studies healthy people had extractions of impacted wisdom teeth done by oral surgeons [7].

There are a host of other reasons why a doctor may recommend taking an antibiotic in conjunction with surgery which are beyond the scope of this article. However, it is important to know that antibiotics are not always useful, could be harmful, and to understanding the reasoning behind the prescription is important.

Indication

Antibiotics are not an alternative to dental intervention; they are adjunct. Antibiotics are indicated when clinical signs of any inflammation or infections involvement are evident. The major use of antibiotic prophylaxis for dental procedures, are cases with excessive infection or pain in the oral cavity, has become a common practice among dentists [8, 9].

- **Antibiotics for odontogenic infections:**

Gram positive aerobes and intraoral anaerobes are sensitive to Penicillin which is the drug of choice in treating odontogenic infections, organisms found in alveolar abscess, periodontal abscess and necrotic pulps. Both aerobic and anaerobic microorganisms are susceptible to penicillin [10]. Penicillinase-resistant penicillin or an ampicillin-like derivative is prescribed for infections caused by penicillinase-producing staphylococci or those involving gram-negative bacteria. A combinations of penicillin and clavulanic acid can be preferred for infections caused by staphylococcus, streptococci and pneumococci. Patients allergic to penicillin are treated withclindamycin 300 mg (65%) which is the ideal drug of choice and followed by azithromycin(15%) and metronidazole-spiramycin(13%). Cephalosporin is indicated in endodontic practice as they exhibit good bone penetration [11, 12].

- **Antibiotics for non-odontogenic infections:**

The non-odontogenic infections require prolonged treatment. They include infections such as tuberculosis, syphilis, leprosy and non-specific infections of bone. New synthetic antibiotics such as fluoroquinolones are the drug of choice for management of non-odontogenic infections. Fluoroquinones are indicated for bone and joint infections, genitourinary tract infections, and respiratory tract infection [13]. Bone and anaerobic infections are managed by prescribing clindamycin (orally) or lincomycin (parenterally). Tuberculosis management requires a long duration of antibiotic service which includes ethambutol, isoniazid, rifampicin, pyrazinamide and streptomycin. Penicillin G benzatine is administered in the management of syphilis. Clofazimine, dapsone and rifampicin are used for treating leprosy [14, 15].

- **Antibiotic prophylaxis to treat local infectious:**

There are various surgical procedures and medical conditions that are routinely covered by systemic antimicrobials which include impacted third molars, orthognathic surgery, implant surgery, periapical surgery, benign tumorsurgery and immunocompromised patients. The service of antibiotics in endodontics should be indicated for patients with signs of local infection and fever [16]. Abu-Taa et al compared the benefits of pre- and post-operative antibiotics in patients undergoing periodontal surgery [17, 18]. Pertaining to the post operative antibiotics, remarkable reduction in the post operative discomfort was noticed. Paluzzi et al have emphasized the need of antibiotic prophylaxis for implant surgery. Immune compromised patients represent a special division for dental professionals as they are more prone to bacteremia, which may rapidly lead to septecemia [19]. Invasive dental procedure like dental extraction, deep periodontal scaling should be avoided whenever feasible [20]. The dental procedures performed for the immune compromised patients should be carried after interacting with the hematologic, oncologic and microbiologic consultants.

Discussion

Based on a recent Cochrane review which suggests that there is moderate evidence to support prophylactic use to reduce the risk of dry socket (alveolar osteitis) and post-operative infection of surgical sites [23]. This evidence does not however outweigh the risks associated with the use of antibiotics such as anaphylactic reactions and the development of resistant bacteria, and therefore antibiotics must not be prescribed routinely. The Cochrane review only refers to post-operative antibiotic therapy and there is no mention to the use of pre-operative antibiotic prophylaxis. Still in routine practice some oral surgeons use antibiotic prophylaxis as a method to reduce the incidence of post-operative infections [24, 25].

Post Operative Infections

Bactereamia

Bacteraemia is a condition in which bacteria are present in the blood and may cause disease, including systemic disease such as infective endocarditis [27]. Some dental treatments may cause bacteraemia, such as tooth extractions, subgingival scaling or even simple aggressive tooth brushing by patients [28].

Infective Endocarditis

If the bacteria involved in the bacteraemia reach the cardiac tissue, infective (or bacterial) endocarditis can develop, with fatal outcomes [29]. Infective endocarditis is an infection of the endothelial lining of the heart. Infective endocarditis is known to dentists as a post-operative infection and is very serious and life-threatening, especially to patients at high risk of developing the disease, due to a weakened heart. This may be through having congenital heart defect, rheumatic or acquired valvular heart disease and prosthetic heart valves [30]. The most common bacteria associated with infective endocarditis are streptococcus sanguinis.

Antibiotic Treatment (Prophylaxis)

Historically, the use of antibiotic prophylaxis to prevent post-operative infections, resulting from bacteraemia, and infective endocarditis was practiced by dentists, especially in patients at high risk (i.e. with heart problems) [31]. However, according to new recommendations from the National Institution for Health and Care Excellence (NICE), antibiotic prophylaxis should not be offered for all patients at risk of infective endocarditis. This is due to the ever-increasing antibiotic resistance and there is no or very little evidence to show whether antibiotic prophylaxis is effective or ineffective against post-operative infections [32]. Ethically, there is still a need to discuss with patients, the benefits and disadvantages of antibiotic prophylaxis before they make a decision on whether they will go through with it or not.

Pain Management

Many drug therapies are available for pain management after third molar extractions including NSAIDS (non-steroidal anti-inflammatory), APAP (acetaminophen) and opioid formulations. Although each has its own pain relieving efficacy, they also pose adverse effects. According to Dr. Paul A Moore and Dr. Elliot V. Hersh, Ibuprofen-APAP combinations have the greatest efficacy in pain relief and reducing inflammation along with the fewest adverse effects. Taking either of these agents alone or in combination may be contraindicated in those who have certain medical conditions [32]. Historically, dental extractions have been used to treat a variety of illnesses. Before the discovery of antibiotics, chronic tooth infections were often linked to a variety of health problems, and therefore removal of a diseased tooth was a common treatment for various medical conditions.Instruments used for dental extractions date back to several centuries. In the 14th century, Guy de Chauliac invented the dental pelican,which was used through the late 18th century. The pelican was replaced by the dental key which, in turn, was replaced by modern forceps in the 20th century. As dental extractions can vary tremendously in difficulty, depending on the patient and the tooth, a wide variety of instruments exist to address specific situations. Rarely, tooth extraction was used as a method of torture, e.g. to obtain forced confessions [32].

Antibiotics can be prescribed by dental professionals to reduce risks of certain post extraction complications. There is evidence that use of antibiotics before and/or after impacted wisdom tooth extraction reduces the risk of infections by 70% and lowers incidence of dry socket by one third. For every 12 people who are treated with an antibiotic following impacted wisdom tooth removal, one infection is prevented. Use of antibiotics does not seem to have a direct effect on manifestation of fever, swelling or trismus seven days post-extraction. In the 2013 Cochrane review, 18 randomized control double-blinded experiments were reviewed and after considering the biased risk associated with these studies, it was concluded that there is moderate overall evidence supporting the routine use of antibiotics in practice in order to reduce risk of infection following a third molar extraction.

Conclusion

There are still reasonable concerns remaining regarding the possible adverse effects of indiscriminate antibiotic use in post extraction patients. There are also concerns about development of antibiotic resistance which advices against the use of prophylactic antibiotics in practice. Although the clinical evidence is limited, pre operative intravenous antibiotics may help to reduce the incidence of post operative infections in patients undergoing surgical removal of teeth including third molars. However, the prescribing of antimicrobials includes risks such as anaphylaxis, development of resistant bacteria and unfavourable side effects such as gastrointestinal and neurological disturbances and must therefore be prescribed only when necessary.

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