Surgical Antibiotic Prophylaxis Indications Timing Choice and Duration

Posted on January 27, 2020

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Introduction

Whenever a person goes through surgery, the most commonly acquired wound infection becomes a problem for him. Such infections are acquired from the hospital. After surgery, patients are then detained to get rid of it; it increases their pain as well as cost. To tackle this issue, antibiotic prophylaxis is used. Doctors make sure that the chances of getting infections are decreased to the minimum level. Another side of the picture is that the use of such medicines might make the microbe resistant to antibiotics. Therefore, doctors have to use antibiotics with great discretion to avoid any infection.

Surgical antibiotic prophylaxis can be explained as the method to avoid infection after the surgery or operation. Doctors have to take care of the infections even if they are not apparent. In such cases preemptive measures are taken to avoid any big infectious wound. Forty years ago, scientists tested the surgical antibiotic prophylaxis on pigs. The research at that time showed that the most effective period of Surgical antibiotic prophylaxis starts when bacteria invade the tissues. This period only lasts for three hours. After this discovery, many scientists have been experimenting on animals and humans to take care of this issue. Due to these researchers, principles of antibiotic prophylaxis are in place, which is being frequently practiced in surgery.

Today, 30% of 50 % of antibiotics are used to fight surgical antibiotic prophylaxis (Burke, 162). But, 30% to 90% is not being used appropriately. The doctors usually give the dose at the wrong time, or sometimes they increase the period. The questions about the exact duration and time are still in place, and also, there needs to be a clear guideline about when prophylaxis should be given to the patient.

First of all, doctors need to check if prophylaxis is necessary by examining the bacteria. Not all bacteria cause infection, so prophylaxis shall be done for those who are infectious. Then, select an antibiotic, taking care of the antibacterial spectrum. Another rule is to choose the cheaper antibiotic if there are two medicines with the same features. Injecting the dose at the correct time and then examining it for a few hours is the next step. However, doctors should not use prophylaxis to cover up any flaws in the surgery. After the entire process, a review of the prophylaxis is also required (Dettenkofer, 164).

Indications For Surgical Antibiotic Prophylaxis

The risk of any infection after the surgery depends on the type of surgery, and the type of prevention can be determined by the procedures used. There are three approaches. The first one is clean, the second one is clean-contaminated, and the third one is contaminated. For a clean surgery, for example, if the healthy skin is incised or for pharyngeal cavity operations, prophylaxis is not required, but if the surgery is about inserting the prosthetics, the indication is recommended. Similarly, in clean-contaminated surgery, for example, laryngectomy or uncomplicated appendectomy, an indication for prophylaxis is recommended. Lastly, for contaminated surgery in which there is soiling of the operation field, which involves the operations of bile and urine, an indication for prophylaxis is strongly recommended. (Vaisbrud, 610) Therefore, for contaminated and clean-contaminated, prophylaxis is highly recommended, and the doctors must take care of the wounds. On the other hand, for major surgeries like open heart surgery, patients are more prone to it, and the results of infection can be catastrophic.

Choice Of Antibiotic

Choosing the antibiotic is the next phase, which is tricky at times. There are many factors which determine the type of medicine to be used. First of all, the patient's history is read. History is the most important thing before giving any dose of antibiotic. If the patients have any allergies, take care of them. If the patient has a history of allergy to penicillin, there is a risk of cross-reaction. However, the antibiotic which is chosen must be effective against the bacteria. It should be of the potency to kill the microbes. Usually, the infections after the operations are caused by the bacterial flora of the patient. Keep in mind that not all bacteria are covered in prophylaxis. If the bacteria are less in number or if they are not dangerous, then antibiotics for those are not required. (DiPiro, 553).

The antibacterial spectrum is one of the major factors in deciding the antibiotic. Before choosing any medicine, usually a very small spectrum medicine is selected. The fact behind it is that after any acute sepsis, doctors may use any broad-spectrum antibiotic. Also, the very hard "third generation" medicines are avoided in prophylaxis, particularly cefotaxime and ceftriaxone. If the available options of the medicines are the same in all features and specifications, including toxicity and efficacy, then doctors should choose the cost-effective antibiotic because a significant portion of the budget is spent on surgical prophylactic antibiotics. In hospitals, usually, these medicines are used by doctors depending on the patients and their needs. If an anaerobic infection is probably then tinidazole, intravenous or rectal metronidazole are used (Horan, 73). Intravenous 'first generation' cephalosporins cephazolin or cephalothin and intravenous gentamicin are also common. If a methicillin-resistant staphylococcal infection is expected, then intravenous vancomycin is used.

On the other side, second generation medicines are also used. These are a bit expensive, but their efficacy is equivalent to the blend of metronidazole (Patchen, 422). As stated above, the history of

each patient varies. Therefore, the bacterial flora of each patient is also unique. Before any prophylaxis, doctors need to assess the vancomycin and its indication.

Route And Timing Of Antibiotic Administration

Patients might have allergies from various chemicals, therefore; first of all, their allergies are inquired. If the patient is allergic to beta-lactam, then before anesthesia, a dose is given to him. However, if the patient does not have any allergy, then no test dose is required. It is just to make sure that the patient does not suffer Prophylactic anesthesia. Preventive medicine is usually injected into the body through veins, and tissue concentration is ensured. Beta-lactams are the major components, and their half-life is short. Therefore, it is essential to take care of the time of injection of the medicine. Vancomycin needs an hour to be infused, so it is injected earlier, and it gets introduced before the induction (McGowan, 879).

Intravenous antibiotics are familiar, but somewhere, intramuscular antibiotics are also used. The methodology is straightforward and easy because these are given before any medication, and the tissue levels are at peak at the time when a surgical incision is done.

Similarly, rectal and oral doses are given earlier to ensure that the tissues are at peak in surgery. In bowel surgeries, Metronidazole suppositories are given to the patients almost 2-4 hours before the surgery is started. In the case of burns surgery, topical antibiotics are used, which are otherwise not recommended.

Duration Of Antibiotic Administration

If the duration of the operation is 4 hours or less than this, only one dose is given to counter the infections. In the case of exploitation in which the time duration is long, more doses are required to keep the tissue level at the peak. Also, if the half-life of the medicine is short, then multiple doses are required. If the tissues are concentrated even after the surgery, then it increases the toxicity and cost (McDonald, 388). Surgical drains are removed in the prophylaxis because it does not have any benefit.

Conclusion

To tackle the problem of infections after the operation, prophylaxis is one of the basic approaches. The timing and duration of the dose are important factors, and one cannot neglect these. Also, the choice of the medicine is a major determinant of success. Usually, a single dose is given in veins to counter the problems. However, if the half-life of the medicine is short or the time of surgery is long, then more than one dose is required. Intravenous antibiotics are more familiar, but somewhere, intramuscular antibiotics are also used. Another side of the picture is that the use of such medicines

might make the microbe resistant to antibiotics. Therefore, doctors have to use antibiotics with great discretion to avoid any infection. Another side of the picture is that the use of such medicines might make the microbe resistant to antibiotics. Therefore, doctors have to use antibiotics with great discretion to avoid any infection.

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