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## **Roles of antibiotics on infective endocarditis**

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## Abstract

Infective endocarditis occurs worldwide, and is defined by infection of a native or prosthetic heart valve. In recent years epidemiology and microbiology have changed, and staphylococci most often associated with health-care contact and invasive procedures. And we can use antibiotic prophylaxis (AP) for prevention of infective endocarditis.

## Introduction

Infective endocarditis (IE) mean “inflammation of inner layer of the heart”. The heart wall’s made up of three layers epicardium, myocardium, and endocardium Which’s the layer that get inflamed. IE is a serious contamination characterised via colony formation or invasion of the heart valves, or mural endocardium with the aid of microbe. This leads to the formation of vegetations, which are composed of thrombotic debris and organism, often related with destruction of the underlying cardiac tissues. The aorta, aneurysmal sacs, blood vessels, and prosthetic gadgets can additionally grow to be contaminated, and additionally it can be the source of infection. It turn out that most cases of IE are caused by microbial infection of endocardium such as bacteria and fungal. Bacteria such as Staph.aureus “most common”, Staph.epidermidis, Enterococcus faecalis, Streptococcus bovis, Coxiella burnetii.Fungi such as Candida species “most common”, Histoplasma capsulatum, and Aspergillus Another group of organism that are less commonly associated with IE which are Haemophilus, Aggregatibacter, Cardiobacterium, Eikenella, Kingella.[1]

also IE has been classify into acute and subacute, relying on the severity of signs and symptoms and the causative agent, which are decided in giant phase by using the virulence of the infecting microorganism, and whether or not underlying cardiac sickness is present. Acute IE is usually brought on by contamination on the regular heart valves by way of the especially virulent organism that causes necrotizing, ulcerative, and adverse lesions. These infections are generally handled with the aid of surgical operation, and that’s due to situation in treating them with antibiotics. Might also be Death within day to weeks ensues in some affected person with acute IE, the causative organisms of subacute IE are less virulent in contrast to the ones that reason acute IE. These organisms motive insidious infections of deformed valves, that are less damaging from acute IE. In such instances the ailment many pursue a protract direction of weeks to months, and treatment options are frequently produced with antibiotics.[2]People with infective endocarditis can be dealt with by gives vancomycin and gentamycin.[3]

## **Aim of the study**

This study will focus on infective endocarditis, and its most common cause, pathogenesis, and its treatment.

## **Materials and Methods**

These two hospital researches explain the number of cases that were presented in specific hospitals in specific years.

*Firstly*, medical records of all hospitalized patients diagnosed with IE at the all hospital of Heraklion, Crete, Greece. From 1995 to 2015, a total of 82 IE patients (median age 67 [range 21-86 years]) were included. [5]

Second, Medline was searched from January 1, 2003 to March 31, 2013 for all articles containing the term "infective endocarditis". All relevant studies reporting diagnostic results were included. A total of 105 studies were included, from 36 countries, with available data on a total of 33,214 cases. [6]

## **Results**

*Firstly*, *Staphylococcus aureus* was found to be the most common microorganism, being the most frequent in 54.3 % of studies, (and in 55.4 % of studies using Duke's criteria for diagnosis [N = 51]). Viridans group streptococci (VGS), coagulase-negative staphylococci (CoNS), *Enterococcus* spp and *Streptococcus bovis* were among the most common causes. *S. aureus* was the most common pathogen in almost all population subgroups. [5]

*Second*. Most common microorganism was *Staphylococcus aureus*, isolated in 24 cases (29%), followed by *Streptococcus* spp. in 15 (18%) and *Enterococcus* spp. in 12 (14.5%). A number of rare and difficult to treat microorganisms had been identified, such as *Gemella morbillorum* in four cases (4.5%), *Streptococcus lugdunensis* in two (2.5%) and *Streptococcus pneumoniae* in one (1%). One patient was serologically positive for *Coxiella burnetii* (1%).

## **Discussion**

First of all, we will discuss about pathogenesis of IE. Virulent organisms, such as *S. aureus*, can infect curiously ordinary valves, however the mechanism of such bacterial colonization is poorly understood. The pathogenesis of the infection of a broken valve, with the aid of less-virulent organisms has been related to hemodynamic factors. The formation of an at first sterile platelet fibrin thrombus, and the adherence houses of the microorganisms. A key function is unusual blood

flow across damaged valve. The pressure gradient formed across a narrow orifice “valve or congenital defect” produces turbulent flow at the periphery and a high-velocity jet stream at the center.[7]

This glide will denude endothelial surfaces of valves on the low-pressure side of the orifice. This leads to focal deposition of platelets and fibrin growing small sterile vegetation, that presents suitable websites for bacterial colonization and growth. Microorganisms that obtain get entry to to the circulation, as a result of a dental technique can be deposited within the vegetation. In this included environment, colony counts upon way of life might also attain 10<sup>10</sup> organisms per gram of tissue. Factors that promote bacterial adherence to the sterile vegetation are believed to be important in the pathogenesis of endocarditis. Cell-associated and circulating fibronectin both bind to surface molecules of the bacteria, facilitating adhesion of fibrin, collagen, and cells. Some microorganisms produce extracellular polysaccharides, which also function as adhesion factors.[7]

Treatment of IE by gives vancomycin and gentamycin. First of all, I’m going to talk about vancomycin. Vancomycin is glucopeptide antibiotic, and reduced intestinal absorption because it’s hydrophilic nature, and we typically give it IV form. Vancomycin only target on gram positive bacteria such as staphylococcus, streptococcus, and enterococcus. MOA of vancomycin is a bactericidal, so it inhibit cell wall synthesis, how do that? Vancomycin bind to D-Ala-D-Ala to prevent trans peptidase from acting on NAM and NAG, so well cross linking of the peptiglycan cell wall.[3]

Second of all gentamycin, gentamycin is a type of aminoglycoside, and always giving IV form. bacteria targets are gram negative aerobic bacilli such as E.coli, klebsiella , and proteus. MOA of gentamycin is rapidly bacteriocidal, by binding and inhibit bacterial 30s ribosomal subunit, so it inhibit and this leading to decrease protein synthesis.[3]

## **Conclusion**

In conclusion, the IE is a common disease that can happen after dental procedures and surgeries, and that’s because the bacteria had an access to the blood, the most common causative agent is S, aureus which cause acute IE. Its divided into 2 forms, acute and subacute based on severity of symptoms. Treatment of IE involve a combination of gentamycin and vancomycin, these drugs may be changed depending on the causative agent.

## Referances

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