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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

بسم الله الرحمن الرحيم

ASSESSMENT OF THE ROLE OF SERUM TUMOR NECROSIS FACTOR ALPHA IN ACUTE HAEMATOGENOUS OSTEOMYELITIS OF LONG BONES

Thesis

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INTRODUCTION

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Osteomyelitis, or bone infection, is a common clinical problem throughout the world, causing major economic loss and personal morbidity.[1]

Osteomyelitis is an inflammation of bone caused by an infecting organism. It may remain localized, or it may spread through the bone to involve the marrow, cortex, periosteum, and soft tissue surrounding the bone.[2] Sixty years ago about 20% of patients with osteomyelitis died, and those who survived had significant morbidity. With the advent of antibiotics, chemotherapy and the development of more sophisticated treatment techniques, the risk of death has become negligible and the complication rate about 5%.[2,3]

Even with this improved prognosis, however, an established infection remains one of the most challenging problems to the orthopaedic surgeon.[2]

Classifications of osteomyelitis have been based on (1) the duration and type of symptoms, (2) the mechanism of infection, and (3) the type of host response to the infection.[2]

Based on the duration and type of symptoms, osteomyelitis may be acute, subacute, or chronic. Classified according to mechanism, osteomyelitis may be exogenous or haematogenous. The exogenous form is an infection caused by trauma e.g. open fractures, surgery on the bone (iatrogenic), or a contiguous area of infection but this is an uncommon mean of development of bone infection.[4] The haematogenous form may result from known or unknown bacteremia. Finally, osteomyelitis can be classified according to the host response as pyogenic or non pyogenic (granulomatous, classically seen in tuberculosis).

Acute haematogenous osteomyelitis (AHO) is the most common type of osteomyelitis in children.[4] The nature of the disease has been better understood by discoveries in the field of microbiology and radiology.[5]

The majority of cases occur in children especially who live under poor nutritional and bad sanitary conditions.[6] AHO is the blood born form of osteomyelitis where the organism invades the blood stream from respiratory tract infection, a minor skin abrasion, a boil, a septic tooth or, in the newborn, from an infected umbilical cord.[7,8] The most commonly isolated organism in this condition in all age groups remains Staphylococcus aureus. Many authors found this organism to be responsible for nearly 90% of all such infections in children,[5,8,9] while others underlined that it was responsible for fifty to seventy percent of these infections.[10] The second most common organisms are hemolytic streptococci. Both group A and group B streptococci have been implicated in acute hematogenous osteomylitis, the latter particularly within the first two months of life.[11,12,13] In children under 4 years of age the gram negative Haemophilus influenzae is a fairly common pathogen. Other gram negative organisms (e.g. Escherichia coli, Pseudomonus aeruginosa, Proteus mirabilis and the anaerobic Bacteroides fragilis) occasionally cause acute bone

infection. Curiously, patients with sickle-cell disease are prone to infection by Salmonella.[7]

The organism usually settels in the metaphysis. This predilection for the metaphysis has been attributed to the peculiar arrangement of the blood vessels in that area: The non-anastomosing terminal branches of the nutrient artery twist back in hairpin loops before entering the large network of sinusoidal veins; the relative vascular stasis favours bacterial colonization.[7,14] In young infants, in whom there is still a free anastomosis between metaphyseal and epiphyseal blood vessels, infection can just as easily lodge in the epiphysis.[7] Wilensky claims that the site of affection depends on which vessel is occluded by a septic embolus. If the main nutrient artery is blocked, whole shaft affection results. If the upper or lower branch is occluded, the corresponding half of the shaft is affected. Occlusion of one of the terminal arterioles results in a metaphyseal lesion, while occlusion of a periosteal vessel leads to subperiosteal abcess or cortical erosion.[15]

It was also found that there is deficient phagocytic function of the neutrophils in patients with AHO.[8]

As the organism settles in the metaphysis, the initial focus of osteomyelitis starts. The fate of this initial lesion depends on the dose and virulence of the infecting organisms as opposed by the resistance of the patient as well as any energetic treatment undertaken, viz:

a) Either the resistance of the patient takes the upper hand, the infecting organisms are completely eradicated by a violent body reaction, and the whole process is abandoned leaving no trace behind: this is the aborted lesion.

b) There may be a good balance between the invading organisms and the resistance of the patients, localisation of the lesion rapidly occurs and a subacute pathological process "Brodie's abscess" is the result.