Summary

Antibiotics are chemicals produced by or derived from microorganisms that kill or inhibit the growth of bacteria . There are different classifications of antibiotics such as; according to their chemical structure (e.g., β-lactams, Macrolides, Fluoroquinolones, etc), according to their effect on the microbe (bactericidal or bacteriostatic) or according to their antimicrobial activity ('narrow-spectrum', 'extended-spectrum' or 'broad-spectrum')

The antimicrobial activity of the antibiotics is either by cell wall synthesis inhibition, increasing cell membrane permeability, protein synthesis inhibition, interference with nucleic acid synthesis or by interference with bacterial metabolism.

Selection of the most appropriate antimicrobial agent, and assessment of activity of the antibiotic is crucial to the successful outcome of antimicrobial therapy. However, some critically ill patients require empiric therapy that is, immediate administration of drug(s) prior to bacterial identification and susceptibility testing.

The widespread use of antibiotics both inside and outside medicine plays a significant role in the emergence of resistant bacteria. There are several mechanisims for bacterial resistance such as genetic alteration or altered expression of proteins in drug resistant organisms.

Antibiotics are associated with many side effects . Some side effects are class related but most reactions are specific to the agent in that individual.

Lower respiratory tract infections place a considerable strain on the health budget and are generally more serious than upper respiratory infections. There are a number of acute and chronic infections that can affect the lower respiratory tract. Antibiotics are often thought to be the first line treatment in lower respiratory tract infections however these are not indicated in viral infections.

Treatment of acute bronchitis with antibiotics is common but controversial as their use has only moderate benefit weighted against potential side effects, increased resistance, and cost of treatment in a self-limiting condition. In AECB the role of bacterial infections is still controversial. So, the efficacy of antimicrobial therapy is even more uncertain.

The efficacy of an antibiotic to treat lower respiratory tract infections can depend on the levels reached by the drug and the retention times in the different pulmonary sites of infection. For an efficient treatment of LRTIs, physicians must try to obtain antibiotic levels equal or superior to the MIC for the pathogen in infected tissues or secretions.

CAP can be treated either with directed therapy or using empirical therapy. The former involves use of a narrow spectrum antibiotic directed against a known pathogen whereas the latter essentially is an educated guess involving broader spectrum agents directed against a variety of pathogens, the latter is always the one used. For mild to moderate CAP shorter courses of antibiotics (5-7 days) seem to be sufficient. Severe CAP needs prolonged treatment and may be hosbitalised.

The empirical therapy is often used in treatment of HAP and VAP. Patients with non severe hospital-acquired pneumonia (mild to moderate) may be reasonably treated with broad-spectrum agents that covers the 'core organisms'. In patients with severe HAP, intravenous antimicrobial treatment should usually be extended to cover Ps. aeruginosa and Acinetobacter spp.

Treatment for TB uses antibiotics to kill the bacteria. Effective TB treatment is difficult, due to the unusual structure and chemical composition of the mycobacterial cell wall, which makes many antibiotics ineffective and hinders the entry of drugs. TB requires much longer periods of treatment with more than one drug.

Conclusions

Antimicrobial treatment exhibits a specific selection pressure. The change of microbial patterns and rates of microbial resistance must be recognised at the local level in order to modify general antimicrobial treatment polices.

LRTIs are a major health care and economical problem. They are usually treated by antimicrobial agents. Actually, once a diagnosis of LRTIs has been made, empirical antibiotic therapy may be justified. The selection of antimicrobial treatment should be based on a careful clinical assessment of severity, the expected general microbial and resistance pattern and the assessment of the presence of individual risk factors for infection with resistant pathogens.

Traditional agents such as β-lactams remain most frequently used, although they have compromised by bacterial resistance in the common pathogens.

Antimicrobials show considerable variation in their ability to penetrate pulmonary tissues. Nonetheless, lung penetration is considered, in part, to be predictive of efficacy in the treatment of LRTIs. So, drugs with higher intrapulmonary concentrations would have greater efficacy.

Recommendations

1- Antibiotics must be prescribed only for bacterial infections, because its use in non bacterial infections is useless and may leads to increase the bacterial resistance to the antibiotics.

2- Choice of the appropriate antibiotics to treat LRTIs, as early as possible, is crucial for favourable outcome.

3- Antibiotic therapy should be continued for sufficient time to achieve effective results and avoid the emergence of antibiotic resistance.