WHY? WHICH? AND HOW?

Pages with reference to book, From 81 To 82

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The term “antibiotics” now refers to a substance produced by a micro-organism or to a similar substance produced wholly or partially by chemical synthesis that, in low concentrations, inhibits the growth of other micro-organism. Antibiotics can be life saving drugs. However care is necessary in their use in order to avoid the twin dangers of toxic side effects and emergence of bacterial resistance. Since the introduction of antibiotics in 1929[1], clinicians for some time were dazzled by their success in the therapy of previously fatal infections but soon treatment failures prompted the need for susceptibility testing and development of new antibiotics with the result that over one thousand antibiotics are available over the counter and scores of new antibiotics would be marketed over the next year, this has complicated patient management, there is no antibiotics which would cure all illnesses. It would be wiser to understand about antibiotics before writing them down for treatment. Uptil 1935 no drugs were available for the treatment of systemic infections other than syphilis. Clinicians could do no more than treat symptoms. Since the introduction of antibiotics in 1945 for general use[2] the situation rapidly transformed and the morbidity and mortality dramatically reduced. It is hardly possible to over estimate the importance of antibiotics[3]. However this is far from meaning that today the correct answer to an infection is to give antibiotic or antibiotics. Choosing the right drug or drugs is by no means simple. Furthermore selecting the right drug is only part of the right management of the patient. The doctor who treats pneumonia merely by giving a suitable antibiotic and forgets the principles of general medical and nursing care and the importance of giving oxygen for hypoxia, may lose his patient even though he cures the infection. Similarly, the surgeon who ignores the rules of aseptic surgery and relies on antibiotics to prevent or cure wound sepsis is on the way to disaster. Antibiotics must be seen in proper perspective. To use them is to intervene in the struggle between the hosts defences and the invading organisms. If the weapons are rightly chosen and rightly used, such intervention is likely to be decisive, but at no time can we afford to neglect the defender’s morale or supplies or to allow the invaders to restore their numbers. Neither should we forget that antibiotics are foreign substances so far as the patient’s body is concerned and are potentially harmful[4]. No antibiotic is 100% safe, although they vary in the frequency and severity of their adverse effects which is directly proportional to their cost, and almost all of them have on occasions killed patients. Most of the troubles for which antibiotics are responsible fall into three groups[5].

1. The drugs are necessarily toxic to living cells; but their clinical usefulness depends on selective toxicity. The betalactams are in general free from direct host toxicity. Early Cephalosporins are nephrotoxic and the aminoglycocides are ototoxic.
2. Patients may become hypersensitive to almost any antibiotics specially to Penicillins otherwise the least harmful of antibiotics.
3. The clinician who prescribes an antibiotic is aiming it at a known or suspected pathogen but the drug itself is by no means so selective, man’s normal bacterial population is of great value to him, and any major interference with it can have unpleasant and sometimes serious consequences and the availability of powerful antibiotics has made such interference possible and indeed easy to achieve. Freed from the restraining influence of their more numerous but antibiotic-sensitive neighbours, more resistant organisms that are normally present only in small numbers (e.g candida albicans, pseudomonas aeruginosa and some of the enterobacteria) or are unable to establish infection in the face of body’s normal flora may be able to proliferate vigorously and may become opportunist pathogens; this is

common with qunilones. Furthermore antibiotic resistant variants of the pathogen may become a major threat. As far back as 1956 Jawetz suggested that not more than 10% of the vast output of antibiotics was employed on proper clinical indications, and in our set up the figure may not be more than one percent. To provide his patients with optimal antibiotic the doctor needs to answer a number of questions, which can be grouped under three headings Why? Which? and How? The most important being Why? unless there is a valid reason - scientific, not just social or emotional for giving an antibiotic, the patient would probably be better off without it, the valid reasons for initiating therapy are (1) Treatment of a known or suspected bacterial infection that is unlikely to undergo rapid and satisfactory spontaneous resolution and that can be expected on available evidence to respond to the drug given. (2) Prevention of bacterial infection. There are a few definite indications such as patients who have had rheumatic fever need to be protected, patients with congenitally abnormal disease or prosthetic heart valves run the risk of developing bacterial endocarditis. (3) Operations involving intestine, particularly the appendix colon and rectum, almost inevitably result in some contamination of the peritoneal cavity and incised tissues with mixed intestinal flora. Which drug or drugs, to answer this it is important to know the pathogen and its sensitvity. Sometimes the clinical condition is characteristic of activities of a particular pathogen and therapy could be initiated, but it is important that all specimens necessary for the isolation of the causative organisms should be collected before treatment is started. If this is not done, treatment may obscure the diagnosis without being adequate to effect a cure. It is preferable to give a drug which has a narrow spectrum so that it acts on the pathogen and disturbs the normal flora to a minimum and if the patient is not immunocomprised cidal or static drug could be given. In immune compromised patients, cidal drugs should always be preferred if there are more than one pathogen involved more than one drug may be necessary in such an event. It must be borne in mind that the effect of two drugs is synergestic, i.e. the combined effect of the two drugs is greater than can be explained by simple addition and is not antagonistic i.e. the combined effect is less than the effect of most powerful drug in the combination. As a general rule synergestic effect is observed in a mixture of two bactericidal drugs e.g. fi lactam + Aminoglycoside while antagonism is seen among a combination consisting of a bactericidal and bacteriostatic drug, i.e. fi lactam + tetracycline. Also it must be considered whether the antibiotic is compatible with other medication. How? The drug should be given in a form appropriate to the situation; it must be able to reach the site of the infection and have no physiological barrier. Oral drugs must survive the action of gastric secretions, should not provoke significant gastro- intestinal upset and must be absorbed into the blood, [Unless the site of the action is to be bowl lumen] and passes through liver without being inactivated. The therapy must be on the principle of give enough, for long enough and then stop. In the interest of limiting the development of resistance it would be worth while if the physician reads the prescription after writing it down and ask himself the question Why? Which? and How? and defy Voltaire (1699-1778) who said ‘The Effective Physician is the man who successfully amuses his patients while nature effects a cure”.

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