

Editorial

Antibiotic Crisis - A Time Bomb?

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Nearly seventy years ago, when Alexander Fleming and Professor Florey discovered a moldy growth on their culture plates to be a powerful antibiotic, penicillin, a new era began in medicine. The predictions then were, as usual, that the end of man's fight against germs on this planet is drawing closer. Like all other predictions in linear science, this one has also been belied. Doctors have been predicting the unpredictable all these years^[1]. That in itself is not bad! But we are now facing a new and formidable threat in that many of the germs that were initially sensitive to antibiotics have now become resistant and threaten to annihilate man from this planet. One example would suffice. One common germ, *the streptococcus*, was the most sensitive germ to be killed by penicillin. While 95% of these germs could be easily killed by penicillin to begin with, today 95% of the same are resistant to penicillin.

The history of this universe is very closely connected to human births and deaths, but illnesses do change history much more dramatically compared to the former two. The black death due to plague in Europe in the sixteenth century and the white death (so called because it killed most people with extreme anemia and mostly young adolescents in particular) of tuberculosis (TB), have been the greatest tragedies of mankind. Tuberculosis still eludes a cure despite our euphoria after the advent of antibiotics against the germ *Mycobacterium tuberculosis*.

In fact, it has become much more rampant and dangerous now that AIDS abets and assists the former to ravage human life. Tuberculosis has assumed a different form these days because of the changing circumstances^[2]. Historical milestones of tuberculosis include the hunchbacks of Egyptian mummies, the phthisis (wasting) of the Greeks, and the English consumption of the lay public. Most diseases respected wealth and status to a certain extent, but plague and TB did play truant even with the rich and the famous from time to time.

The gravity of the situation is such that the Royal College of Physicians of London organized a meet to discuss the 'Clinical Implications of Anti-microbial Resistance' on the 28th February 2001. It has been estimated that around 15,000 people die in that small country every year from infections against which no antibiotic is effective. Such of those germs that are resistant to most antibiotics are called the 'super bugs' and, as of now, we have no defense against them. One of the biggest hospitals in that country, Portsmouth Hospitals NHS Trust was forced to shut down most of its operating theatres last summer because of the super bugs. At the Queen Alexandra Hospital, the orthopedic surgeons could not perform any operation around that time. Another leading authority in the field, Professor Hugh Pennington of Aberdeen University, feels that the next big problem would be that of drug resistant tuberculosis. They had an outbreak of TB in Scotland recently, traced to a traveling family. He also feels that the Russian prisons have many inmates who have drug resistant TB without proper treatment. Since TB does not respect geographic borders this time bomb might explode anytime anywhere!

The usual thinking in the West was that this kind of uncontrolled infectious disease scenario could exist only in the poor countries like India and sub-Saharan Africa. They are now in for a great shock. In a well researched book, 'Betrayal of Trust: The Collapse of Global Public Health'^[3], Laurie Garrett, from the USA, shows how the threat is not confined to the poor countries but, is greater in the West, basically because doctors there over-prescribe antibiotics so that bacterial infections are becoming increasingly resistant to the most widely used antibiotics. She writes that "doctors who over-prescribe antibiotics undermine the health care system by encouraging germs to become resistant." She is dead right there.

The blame must also come on the consumers, the patients, as many of the latter, who think that they are well informed, demand antibiotics for the

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common trivial infections, most of which are viral to begin with. This adds to the problem. Doctors who follow ethics and refuse to give antibiotics are not usually popular. The fear of losing the patients makes many doctors to oblige patients with over-prescribing. Educating the public about the serious dangers of taking antibiotics for minor infections against medical advice should go a long way in reducing this menace.

Studies in the US have shown that it is the rich kids that suffer more from ear infections and other common childhood infections. Since antibiotics are very expensive, the poor parents do not bother to give them to their children for minor illnesses. This helps the poor child to fight the infection with the help of its own immune system and, in the bargain, the child develops immunity against major infections. This has another very dangerous ramification to it. Antibiotics given to minor viral illnesses of childhood make the immune system change its response to infection in such a way that the cytokine response to infections, based on their genes, changes from TH1 to TH2^[4]. The latter is the most important trigger for asthma in later life. The slum dwellers' kids, when they have enough to eat, have very robust health and have a very low incidence of asthma and many other common illnesses. Whenever they do not thrive, it is only because they do not get enough nutrition in their diet.

The other dangers of antibiotics are in commercial fields like farming and the dairy industry. Broiler sheds use a lot of antibiotics to not only treat the infections in chicks but, also in the fond hope of preventing infections in them. The amount of antibiotics used in cattle and broiler sheds far outweighs all that is used in hospitals and operation theatres! Today it only takes six weeks to get a bird on the dining table from the egg stage, about half the time normally required. The farmers, therefore, make double money and the birds come cheaper. But it means that we get a huge dose of antibiotics each time we bite a chicken lollypop! This does not take into account the added hazards of excessive hormones fed to fatten the birds. In short, we are only eating a slow poison^[5].

Mastitis in cows is another danger. The incidence is around 10% of the cows in a dairy on a given day! The huge amount of antibiotics, like ciprofloxacin, injected into the udder (one udder dose costs \$ 250) makes the milk not potable for a week. But the farmers might use the milk earlier to reduce loss of money. So the milk that we drink from large pools in larger dairies might also contain unacceptable doses of antibiotics^[6].

The House of Lords in Britain was worried about the large-scale abuse of antibiotics in farming

and spoke of a "vicious circle repeatedly witnessed in which the value of each new antibiotic has been progressively eroded by resistance." Very dangerous indeed! In a shocking incidence recently at the Prince Edward Hospital in Wales a patient had an infection in his leg wherein the germs were resistant to all the antibiotics available. Doctors had to go back to Nature to get maggots to help cure that infection! ^[7]. Now they are routinely culturing maggots to treat resistant infections. In Nature, this is a very common way of controlling bacterial infections, evident even during the Second World War and earlier.

Minor wounds could be smeared with fresh, clean honey. Honey gives a coating to the wound to prevent germs getting in and the germs already there are prevented from multiplying, as honey stops the nutrition needed for growth and multiplication in the germ world. Therefore the existing germs die out and the new ones cannot get in.

The time bomb of tuberculosis is threatening to burst anytime now. The West is in the middle of the worst TB epidemic in the last twenty years. Tuberculosis never went away. It was only lying low because we depended on the powers of the anti-TB antibiotics too much and did away with the methods to enhance the capacity of the immune system as we used to do before the advent of antibiotics. Sanatoria, good food, complete rest, and a healthy environment were given up as useless. Surgery, which in the olden days, helped to get rid of the infected part of the lung, thereby reducing the risk of death and bleeding, took a back seat. Now we are threatened by the MDR, multiple drugs resistant germs, of this deadly disease, waiting to produce another epidemic of the white death. Thomas Dormandy in his treatise "The White Death"^[8] gives us the horror stories of the hoary past with even people like Napoleon Bonaparte having suffered its ravages.

TB is no respecter of status, position or even money power for that matter. Many were the victims such as leaders, poets (Keats was the leading one), writers, soldiers, beggars, children, adults, mothers and also the medical and nursing professionals. Many careers had to be either terminated or changed in mid-waters when TB struck. Things could be gloomier with the added burden of AIDS reducing the potency of the immune system of man. Vaccination against TB came and went without much fanfare. May be we need to look more carefully into this aspect of TB prevention.

This article should alert all good Samaritans about the time bomb ticking away threatening to explode any time now. While I am sure the situation is worse in India, I have no scientific data

for the whole country to give you the true picture. The earlier we wake up from our deep slumber, the better for our progeny. We have never been using antibiotics scientifically for well over half a century and the results could be disastrous to say the least.

Professor J R Bignall of the Institute of Chest Diseases (Brompton Hospital, London) was requested by Nehru's government in India in 1956 to study the TB situation in the country. He came, he saw and then he gave a very sane suggestion. The anti-TB drug situation at that time was very pathetic with very few drugs trickling into the country and being abused by even quacks. Dr Bignall wrote to the government suggesting that the 2,50,000 odd TB patients in the country at that point in time should be allowed to have the conventional treatment available then. The use of anti-TB antibiotics should be banned in the country for ten years! His scientific reasoning was that those that die of the disease would die anyway and take the germs with them to be burnt or buried, ending the germ's life cycle. Rest of the patients who survive, their immune system would kill the germs. In the following ten years, India would have been rid of TB germs. With hindsight, it looks like God's advice.

The same advice could have worked even for the West. Leaders of the time in India ridiculed this report in the Parliament and rejected it. The results are there for all of us to see. "Truth" said Aristotle, "could influence only half a score of people in a given time or age, whereas falsehood and mystery would drag millions by the nose". How true?

There is also the brighter side of antibiotics. Many have been saved from the jaws of death by antibiotics but, the number is dwindling daily. The famous story of the great British Prime Minister, Lord Winston Churchill, the son of a Nobleman, is very interesting. As a boy Winston was drowning in a marshy patch and was struggling for his life with no help in sight. A farmer in the neighborhood heard the cries of the desperate boy and went over

to help him. Thus saved, Winston thanked the farmer profusely. The following day Winston's father came by to compensate the poor farmer for his noble deed. The modest farmer refused any money and told the elder Churchill that he was only doing his duty. However, the elder Churchill insisted in helping the son of the farmer, same age as Winston, to get good education in Oxford, which, in the normal course, the farmer's son could not have afforded. Later in life when Sir Winston Churchill was seriously ill with pneumococcal pneumonia it was the same farmer's son, by then Nobel Laureate Alexander Fleming, who came with his penicillin to help pull Sir Winston from the jaws of death. Irony of fate indeed! But the story now is totally different. A recent report from the US shows how nosocomial infections alone kill more than 80,000 people in American hospitals in one year^[9].

This is the long and short of the story of the germ and man, the two friends, that depend on one another for better or for worse.

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