Diseases | Acute, Chronic, Communicable Diseases

Based on GROUP-IV Examination syllabus -prepared by G.SRIRAM

NOTE: Dear kalam achievers kindly read at lest 4 to 5 times you can easily understand..

Acute and Chronic Diseases

- Some diseases last for only very short periods of time, and these are called **acute diseases**. We all know from experience that the common cold lasts only a few days.
- Other ailments can last for a long time, even as much as a lifetime, and are called**chronic diseases**. An example is the infection causing **elephantiasis**, which is very common in some parts of India.

Communicable Diseases

- Microbial diseases that can spread from an infected person to a healthy person through air, water, food or physical contact are called **communicable diseases**.
- Examples of such diseases include **cholera, common cold, chicken pox** and**tuberculosis**.
- Example of a carrier is the **female Anopheles mosquito**, which carries the parasite of **malaria**. **Female Aedes mosquito** acts as carrier of **dengue virus**.
- Robert Köch (1876) discovered the **bacterium** (**Bacillus anthracis**) which causes**anthrax**
- How do infectious diseases spread? Many microbial agents can commonly move from an affected person to someone else in a variety of ways. In other words, they can be 'communicated', and so are also called **communicable diseases**.
- Such disease-causing microbes can spread through the air. Examples of such diseases spread through the air are the **common cold, pneumonia** and**tuberculosis**.
- Diseases can also be spread through water. This occurs if the excreta from someone suffering from an infectious gut disease, such as **cholera**, get mixed with the drinking water used by people living nearby.

- The sexual act is one of the closest physical contact two people can have with each other. Not surprisingly, there are microbial diseases such as **Syphilis or AIDS** that are transmitted by sexual contact from one partner to the other.
- Other than the sexual contact, the aids virus can also spread through **blood-to-blood contact** with infected people or from an infected mother to her baby during pregnancy or through **breast feeding**.
- We live in an environment that is full of many other creatures apart from us. It is inevitable that many diseases will be transmitted by other animals. These animals carry the infecting agents from a sick person to another potential host. These animals are thus the intermediaries and are called **vectors**. The commonest vectors we all know are mosquitoes.
- In many species of mosquitoes, the **females** need highly nutritious food in the form of blood in order to be able to lay mature eggs. Mosquitoes feed on many warm-blooded animals, including us. In this way, they can transfer diseases from person to person.

Organ-Specific And Tissue Specific Diseases

- Different species of microbes seem to have evolved to home in on different parts of the body. In part, this selection is connected to their point of entry.
- If they enter from the air via the nose, they are likely to go to the lungs. This is seen in the bacteria causing **tuberculosis**.
- If they enter through the mouth, they can stay in the gut lining like **typhoid**causing bacteria. Or they can go to the liver, like the viruses that cause **jaundice**.
- An infection like HIV, that comes into the body via the sexual organs, will spread to lymph nodes all over the body.
- **Malaria**-causing microbes, entering through a mosquito bite, will go to the liver, and then to the red blood cells.
- The virus causing **Japanese Encephalitis**, or **brain fever**, will similarly enter through a mosquito bite. But it goes on to infect the brain.

- The signs and symptoms of a disease will thus depend on the tissue or organ which the microbe targets. If the lungs are the targets, then symptoms will be cough and breathlessness. If the liver is targeted, there will be jaundice. If the brain is the target, we will observe headaches, vomiting, fits or unconsciousness.
- In addition to these tissue-specific effects of infectious disease, there will be other common effects too.
- Most of these common effects depend on the fact that the body's immune system is activated in response to infection.
- An active immune system recruits many cells to the affected tissue to kill off the disease-causing microbes. This recruitment process is called **inflammation**. As a part of this process, there are local effects such as swelling and pain, and general effects such as fever.
- In some cases, the tissue-specificity of the infection leads to very general-seeming effects. For example, in HIV infection, the virus goes to the immune system and damages its function. Thus, many of the effects of HIV-aids are because the body can no longer fight off the many minor infections that we face every day. Instead, every small cold can become **pneumonia**. Similarly, a minor gut infection can produce major diarrhoea with blood loss. Ultimately, it is these other infections that kill people suffering from HIV-aids.

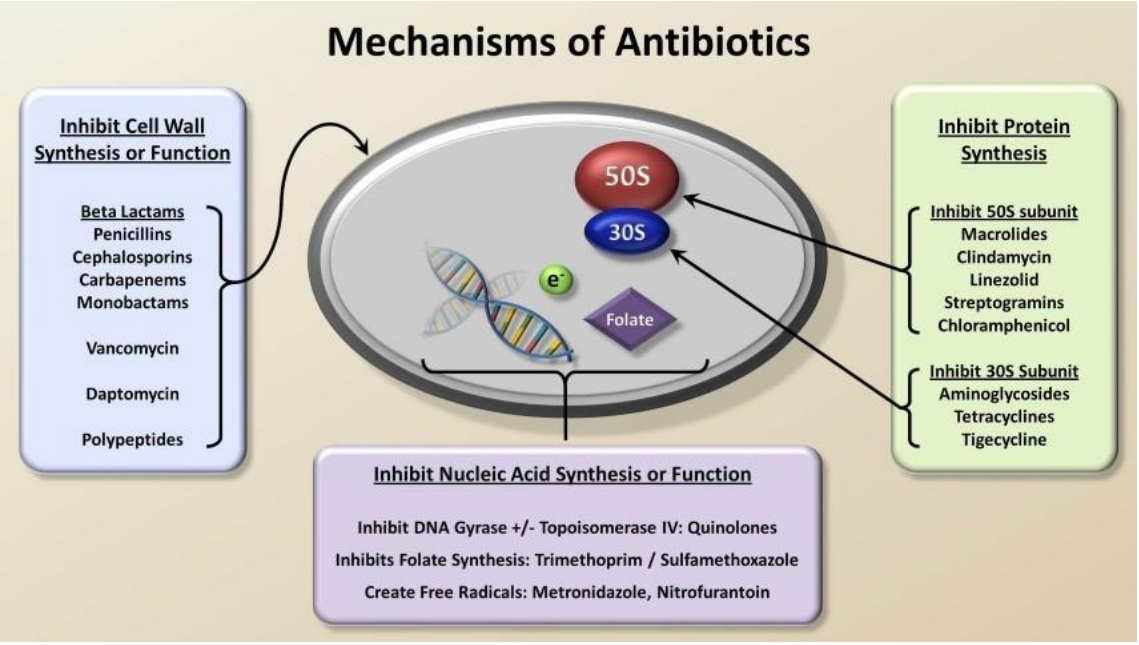
Principles of Treatment

- There are two ways to treat an infectious disease. One would be to reduce the effects of the disease and the other to kill the cause of the disease.
- For the first, we can provide treatment that will reduce the symptoms. The symptoms are usually because of inflammation. For example, we can take medicines that bring down fever, reduce pain or loose motions. We can take bed rest so that we can conserve our energy. This will enable us to have more of it available to focus on healing.
- But this kind of symptom-directed treatment by itself will not make the infecting microbe go away and the disease will not be cured. For that, we need to be able to kill off the microbes.

- How do we kill microbes? One way is to use medicines that kill microbes. We have seen earlier that microbes can be classified into different categories. They are viruses, bacteria, fungi or protozoa.
- Each of these groups of organisms will have some essential biochemical life process which is peculiar to that group and not shared with the other groups. These processes may be pathways for the synthesis of new substances or respiration. These pathways will not be used by us either.
- For example, our cells may make new substances by a mechanism different from that used by bacteria. We have to find a drug that blocks the bacterial synthesis pathway without affecting our own. This is what is achieved by the **antibiotics** that we are all familiar with. Similarly, there are drugs that kill protozoa such as the malarial parasite.

Why are Antibiotics effective against Bacterial Infections but not Viral Infections?

- One reason why making anti-viral medicines is harder than making antibacterial medicines is that viruses have **few biochemical mechanisms of their own**. This means that there are relatively few virus-specific targets to aim at.
- Despite this limitation, there are now effective anti-viral drugs, for example, the drugs that keep HIV infection under control.
- Taxonomically, all bacteria are closely related to each other than to viruses and vice versa. This means that many important life processes are similar in the bacteria group but are not shared with the virus group. As a result, drugs that block one of these life processes in one member of the group is likely to be effective against many other members of the group. But the same drug will not work against a microbe belonging to a different group.



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- As an example, let us take antibiotics. They commonly block biochemical pathways important for **bacteria**. Many bacteria, for example, make a cell-wall to protect themselves. The antibiotic penicillin blocks the bacterial processes that build the cell wall. As a result, the growing bacteria become unable to make cell-walls, and die easily.

- Human cells don't make a cell-wall anyway, so penicillin cannot have such an effect on us. Penicillin will have this effect on any bacteria that use such processes for making cell-walls. Similarly, many antibiotics work against many species of bacteria rather than simply working against one group.

- But viruses do not use these pathways at all, and that is the reason why antibiotics do not work against viral infections. If we have a common cold, taking antibiotics does not reduce the severity or the duration of the disease. However, if we also get a bacterial infection along with the viral cold, taking antibiotics will help. Even then, the antibiotic will work only against the bacterial part of the infection, not the viral infection.

Principles of Prevention

- What are the specific ways of prevention? They relate to a peculiar property of the immune system that usually fights off microbial infections.

- Let us cite an example to try and understand this property. These days, there is no smallpox anywhere in the world. But as recently as a hundred years ago, smallpox epidemics were not at all uncommon.
- In such an epidemic, people used to be very afraid of coming near someone suffering from the disease since they were afraid of catching the disease.
- However, there was one group of people who did not have this fear. These people would provide nursing care for the victims of smallpox.
- This was a group of people who had had smallpox **earlier** and survived it, although with a lot of scarring. In other words, if you had smallpox once, there was no chance of suffering from it again.
- So, having the disease once was a means of preventing subsequent attacks of the same disease. This happens because when the immune system first sees an infectious microbe, it responds against it and then remembers it specifically.
- So the next time that particular microbe, or its close relatives enter the body, the immune system responds with even greater vigour. This eliminates the infection even more quickly than the first time around. This is the basis of the principle of '**vaccination**' has come into our usage.
- We can now see that, as a general principle, we can 'fool' the immune system into developing a memory for a particular infection by putting something, that mimics the microbe we want to vaccinate against, into the body. This does not actually cause the disease but this would prevent any subsequent exposure to the infecting microbe from turning into actual disease.
- Many such vaccines are now available for preventing a whole range of infectious diseases, and provide a disease-specific means of prevention.
- There are vaccines against *tetanus, diphtheria, whooping cough, measles, polio* and many others.
- Introducing fishes like **Gambusia** in ponds that feed on mosquito larvae, spraying of insecticides in ditches, drainage areas and swamps, etc. can

prevent proliferation of mosquitoes. Such precautions have become all the more important especially in the light of recent widespread incidences of the vector-borne (**Aedes mosquitoes**) diseases like **dengue** and **chikungunya** in many parts of India.

- Traditional Indian and Chinese medicinal systems sometimes deliberately rubbed the skin crusts from smallpox victims into the skin of healthy people. They thus hoped to induce a mild form of smallpox that would create resistance against the disease.
- Famously, two centuries ago, an English physician named **Edward Jenner**, realized that milkmaids who had had cowpox did not catch smallpox even during epidemics.
- Cowpox is a very mild disease. Jenner tried deliberately giving cowpox to people, and found that they were now resistant to smallpox. This was because the smallpox virus is closely related to the cowpox virus. 'Cow' is 'Vacca' in latin, and cowpox is 'Vaccinia'.

Diseases in Indian Children

Gastroentitis

- Gastroentitis is an infection in the digestive system and it is one of the most common childhood illnesses.
- Symptoms of gastroentitis include diarrhoea, nausea and vomiting, tummy cramps, and fever.
- One of the main risks with gastroentitis is that it causes **dehydration** in children.

Rickets

- Rickets occurs due to **Vitamin D deficiency**.
- Deficiency of Vitamin D occurs in a child because of **lack of exposure to sunlight**.
- Lack of adequate **calcium** in the diet can also cause rickets.
- Rickets is a disease which involves softening and **weakening of bones** in children.

- Children between the ages of 6 to 24 months are at the highest risk of developing the disease because that is the age when their bones are rapidly growing.

Conjunctivitis

- Conjunctivitis is caused due to inflammation of the **conjunctiva**.
- Conjunctiva is the outermost layer of the eye and the inner surface of the eyelids.
- Conjunctivitis often starts in one eye at first and then spreads to the other eye.
- For children suffering from conjunctivitis it is important to see a doctor to know what kind of conjunctivitis it is.
- Symptoms of conjunctivitis include redness of eyes, irritation in the eye, and eye watering.

Scabies

- Scabies is an infection of the skin.
- Scabies is caused by tiny insects called **mites**.
- These scabies mites burrow into the skin and lay eggs which become adult mites very soon.
- Symptoms of this infection include superficial burrows, rash and severe itching.
- Blisters on the palm and soles of the feet are characteristic symptoms of scabies in infants.
- Scabies is one of the highly contagious diseases and a child can develop it by coming into contact with someone else who has been infected.
- Children with scabies must not be sent to school or day care until it gets completely cured.

Upper Respiratory Tract infection (URTI)

- Upper Respiratory Tract Infections are extremely common due to air pollution and vehicular emission.

- Upper respiratory tract infections include common cold, influenza and sore throat.
- **Tonsillitis** is also one of upper respiratory tract infections.
- Tonsillitis is caused due to infection of the tonsils.
- Tonsils are the areas of **lymphoid tissue** on either side of the throat.
- Symptoms of tonsillitis include a severe sore throat, coughing, headache and difficulty swallowing.

Tuberculosis

- Tuberculosis also affects children and is known as Primary Complex or Childhood Tuberculosis infection.
- Children under the age of two years are more at risk of developing tuberculosis because their immune system is under developed or still developing.
- Tuberculosis is completely curable and early diagnosis can help in effective treatment.

Typhoid

- It is a water borne disease rampant in children due to poor sanitation.
- Cases of typhoid are more common in countries like India and some other South Asian countries and in other low developed nations and have been seen lesser in countries like the USA.
- Symptoms of typhoid in children are poor appetite, body ache, discomfort in abdomen, lethargy and weakness, fever with rising and falling pattern.
- Some children may also experience headache, chest congestion, diarrhoea and vomiting and rose spots on the abdomen.

Bronchitis and Asthma

- Bronchitis and asthma are common in children.
- Bronchitis and asthma are caused due to high exposure to air borne pollutants.

- Bronchitis and asthma need to be treated with antibiotics and bronchodilators.

Some Other Diseases

Diseases Caused by Worms

- **Ascaris**, the common **round worm** and **Wuchereria**, the **filarial worm**, are some of the **helminths** which are known to be pathogenic to man. Ascaris, an intestinal parasite causes **ascariasis**.
- Symptoms of these disease include internal bleeding, muscular pain, fever, anemia and blockage of the intestinal passage. The eggs of the parasite are excreted along with the faeces of infected persons which contaminate soil, water, plants, etc. A healthy person acquires this infection through contaminated water, vegetables, fruits, etc.
- **Wuchereria (W. bancrofti** and **malayi)**, the filarial worms cause a slowly developing chronic inflammation of the organs in which they live for many years, usually the lymphatic vessels of the lower limbs and the disease is called**elephantiasis or filariasis.** The genital organs are also often affected, resulting in gross deformities. The pathogens are transmitted to person through the bite by the female mosquite.

Old Age Diseases: Dementia

- Dementia is "one of the major causes of disability and dependency among older people worldwide"

Pollution related diseases: Silicosis

- Silicosis is a lung disorder caused by inhalation, retention and pulmonary reaction to crystalline silica, as a result of exposure during mining, stone crushing and quarrying activities.

Zoonotic Diseases

- zoonotic diseases — are spread between animals and humans, and are common in societies where poverty is widespread
- Chikungunya, dengue, Avian influenza, plague, SARS and acute encephalitis syndrome (AES) are some of the zoonotic diseases.