

Antibiotics and AMR

-antibiotic microbial resistance

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Differences between bacterias, viruses and parasites

Bacterias are organisms with one cell able to multiply on their own

Viruses are a kind of parasites that penetrates the cells in the body, transfer their genetic material and make the cells start to produce more viruses

Parasites are organisms that lives in or on an organism of another species (its host) and benefits by deriving nutrients at the other's expense.

- Bacterial infections can be treated with antibiotics, viruse infekctions are more difficult to be treated.

Bacterias and illnesses

There are very many types of bacterias causing illnesses. One bacteria can cause different kind of illnesses for example:

Streptococci » tonsillitis, erysipelas (severe infection in skin), post partum fever

Staphylococci » skin infections (mostly with pus), sepsis, food poisoning

Pneumococci or sometimes Hemophilus » pneumonia

Salmonella, Shigella, E coli » gastroenteritis from light to severe for example typhoid fever (Salmonella), dysentery (Shigella)

E coli » most common bacteria in UTI (urinary tract infection). Usually quite harmless

Other illnesses

Malaria - caused by a parasite spread by mosquitos

Brucellosis - bacterial infection

Kala-azar - caused by a parasite spread with sandflies

Tuberculosis -caused by a very resistant bacteria

Upper respiratory illness=common cold, is caused by viruses

HIV- also caused by a certain kind of virus

Why is it so important to know about the cause of an infection or illness?

If you don't know the cause (the kind of bacteria, virus or parasite) you will not be able to prescribe the right treatment. Too many guesses usually leads to using the wrong and maybe too broad antibiotics which leads to resistance.

When should we treat with antibiotics?

Severe bacterial infections for example sepsis, pneumonia, tb, Brucellosis, typhoid fever, dysentery, puerperal fever, infections in the joints, abscesses and severe soft tissue infections, high UTI (pyelonephritis) etc

Parasite diseases as kala-azar, malaria

Severe virus infections like HIV and yellow fever.

Do **NOT** treat common colds or simple sinusitis, tonsillitis, short lasting vomiting/diarrhea without fever and general impact with antibiotics!

How to plan before using antibiotics?

Try to figure out the cause of the infection

Avoid antibiotics if not necessary

Start with the most narrow antibiotic first (first line) when there isn't a severe infection

If severe infection or the first line doesn't work, use second line antibiotic

If the patient recovers, stop after five days (there are exceptions when you need a longer treatment).

If the patient doesn't recover—rejudge and change

Different types of antibiotics and area of use

First line: Benzyl-penicilline - pneumonia

Amoxicillin - otitis, tonsillitis, pneumonia, ITU, typhoid fever etc

Flukloxacillin - soft tissue infection

Nitrofurantoin - ITU

Second line: Ceftriaxon - useful drug but very broad. Area of use for ex severe infections in skin and joints, gonorrhoea, syphilis, severe intraabdominal infections

Others: Gentamicin (very broad) - use when sepsis and severe bacterial infections

Metronidazole - illnesses caused by anaerobic bacterias for ex gynecological infections, amoeba

Azithromycin - otitis, bacterial sinusitis, tonsillitis, pneumonia, STI etc. Try to avoid -too many side effects. In Sweden we therefore do not use it anymore



Side effects of antibiotics

Most antibiotics may cause rashes, allergic reactions, diarrhoea

Ceftriaxon also impact on blood cells and liver

Benzyl-pc may caus thrombophlebitis

Metronidazol usually gives you a irritable stomach, sometimes leukopenia

Gentamicin is ototoxic and can cause kidney failure

Streptomycin - seldom used - is “famous” for deafness

What is AMR - antibiotic microbial resistance?

Antimicrobial resistance occurs when changes in bacteria or other pathogens cause the drugs used to treat infections to become less effective.

What causes AMR?

When antibiotics are misused or overused, resistance can develop that is when treating simple infections with broad antibiotics and when prescribing antibiotic prophylactic for no reason. Also when given in large animal stocks (breeding)

Why do the bacterias become resistant?

Different reasons:

- The bacteria mutate (change) its genetic code and becomes immune to antibiotics
- The bacteria produce a thick wall so the antibiotic can not reach the bacteria
- The bacteria process a subject which kills the antibiotic
- All the good and vital bacterias for example in your intestines, will be wiped out and therefore there will be more room for the resistant bacterias

Reasons for extensive antibiotic use and eventually AMR

- In settings where there is lack of access to clean water and sanitary arrangements, people catch bacterial infections more easily
- When inadequate control and prevention of diseases in health care settings, for example immunization
- In places where diagnostic capabilities (such as microbiology laboratories) are limited, it can be difficult to pinpoint the cause of an infection and which drugs will work best to combat it.
- We want a “quick fix” so the patient can be discharged earlier, which sometimes might prevent new infections in the hospital

Statistics

- According to WHO, more than 1 million people/year will die because of antibiotic microbial resistance
- Between 2025 and 2050 around 39 million people will die of AMR
- In Kenya in 2019, there were 8,500 deaths attributable to AMR and 37,300 deaths associated with AMR
- In Sweden there is a low presence of AMR according to strict use of antibiotics

Why is AMS a threat?

When first developed, antibiotics were a major breakthrough in medical science, providing reliable treatments for infectious diseases. But as organisms become resistant to drugs, we have fewer tools in our treatment toolbox. Some bacteria are already resistant to multiple drugs, and there are concerns about pathogens developing resistance to all current therapies. Such a “superbug” could spread unchecked through populations, potentially causing another global pandemic.

Which diseases are resistant to antibiotics?

Various types of infections are caused by resistant bacteria, including infections of the lower respiratory tract, urinary tract, bloodstream, and abdomen.

Who is at risk?

- Children under 5 years are at particular risk of acquiring an AMR infection because they interact with more unsanitary environments and have a less developed immune system.
- Elderly people, especially those with comorbidities, are similarly threatened.
- As AMR increases, more and more people will be at risk.

How can you prevent AMR? 1/

As an individual:

- Don't take an antibiotic for a virus
- Don't save an antibiotic for the next time you get sick
- Take antibiotics exactly as prescribed. Don't skip doses. Complete your full course of treatment even if you are feeling better
- Never take an antibiotic prescribed for someone else
- Wash your hands

How can you prevent AMR? 2/

On national and international level:

- Rational use of antimicrobials
- Regulation on over-the-counter availability of antibiotics
- Reimproving hand hygiene
- Improving infection prevention and control for example immunization of children

Problems in Kacheliba

During my short stay, I have realised you have very many challenges for not using antibiotics in the “right way” for example lack of clean water and sanity in the villages (and in the hospital from time to time), lack of proper lab tests, night closed lab, people living very far from the hospital so you have to “secure” them before they go home, and many more challenges.

Changes take time and I know you are doing your very best for your patients.

So be patient and try to make small changes step by step.

If you want to read more about antibiotic therapy in Kenya

KNH guidelines for empiric antibiotic therapy

Thank you for your attention!

