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Antibiotic Poisoning and Food Poisoning through Chicken

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ABSTRACT

Chicken is one of the most popular foods. There can't be many people who do not enjoy chicken curry, chicken pakoda, roast chicken, stew or barbecued chicken on a Sunday. This includes children as well as adults who both enjoy the taste and versatility of chicken. Since the 1940s, antibiotics have played a critical role in protecting the public's health, and are responsible for saving millions of human lives. About 90% of antibiotics produced in the world are given to farm animals. The use of low doses of antibiotics by the modern food animal industry is responsible for drug-resistant bacteria emerging on farms which reach the general population through human or animal carriers, and through the food consumers eat. The chicken is one of the worst offenders when it comes to food poisoning. Many of us have either experienced this first hand or know someone who has suffered from this nasty illness.

Keywords: Drug Utilization Pattern, Effectiveness, Oral hypoglycemic Agents, Diabetes Mellitus

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USE OF ANTIBIOTICS IN ANIMAL FEED

Now a days, the following antibiotics are used in poultry feed: chlortetracycline, procaine penicillin, oxytetracycline, tylosin, bacitracin, neomycin sulfate, streptomycin, erythromycin, linomycin, oleandomycin, virginamycin, and bambermycins. These include three major classes of compounds: arsenical, nito-furan, and sulfa compounds. Arsenical compounds include arsanilic acid, 3-nitro-4-hydroxy phenylarsonic acid, and sodium arsanilate; nitro-furan compounds include furazolidone and nitro-furazone; sulfa compounds include sulfamethazine, sulfathiazole, sulfaquinoxaline. Other chemicals are also used as antiprotozoal agents to prevent coccidiosis and histomaniasis in chickens. Antibiotics are used regularly in animal feed at a rate of 2 to 50 grams per ton for improved performance in the animals increased growth rate and a lower morbidity /mortality rate in general. The levels of antibiotics are often increased to 50-200 grams/ton or more when specific diseases are being targeted as when the spread of a particular disease is rampant. Tetracycline and penicillin show improvement in egg production, feed efficiency and hatchability. Chlorotetracycline, oxytetracyclin and penicillin also show an improved growth rate.

RISKS OF ANTIBIOTICS IN ANIMAL FEED

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After animals have been fed antibiotics over a period of time, they retain the strains of bacteria which are resistant to antibiotics. These bacteria proliferate in the animal. The resistant bacteria are transmitted to the other animals, thus forming a colonization of antibiotic resistant bacteria. The bacteria flourish in the intestinal flora of the animal, as well as, in the muscle. As a result, the feces of the animal often contain the resistant bacteria. Transfer of the bacteria from animal to human is possible through when the bacteria ingested as meat, when humans clean the feces, which contain the bacteria, of the animals on farms. Likewise, in slaughterhouses, during slaughter, the intestine is severed. After initial transmission and infection to humans, the transmission to other humans has a couple paths. Multiple infections could potentially produce a supergerm which is resistant to many drugs due to resistance sharing between bacteria.

Mechanisms of resistance: There are several general methods through which a cell can become resistance to an antibiotic. These mechanisms are:

1. Decreased cell permeability to the drug - the cell can change its membrane structure so that the drug cannot enter the cell and perform its function
2. Alter the drug binding/recognition site - by changing the structure of the membrane surface, the site which previously allowed the drug to bind to the cell can no longer do so.
3. Active transport - the transport of drug molecules out of the cell. In many cases, this is done via a drug/proton antiport system. With this mechanism, H+ ions are pumped into the cell as drug molecules are pumped out.
4. Enzyme or pathway alteration - the cell can change the pathway or enzyme used to carry out a cell process occurs. By doing this, the cell can bypass the enzyme that is affected and cause the drugs effects to have no bearing on the functioning of the cell.

HOW DOES CHICKEN FOOD POISONING OCCUR?

This occurs as a result of poor food preparation and/or hygiene. For example:

- The juices from raw chicken being allowed to drop onto cooked poultry or other types of foods.
- Chicken which has not been cooked at the correct temperature.
- Chicken which has not been allowed to cook for the right length of time.
- Failure to allow chicken to defrost thoroughly
- Using the same chopping board for raw and cooked chicken
- Eating chicken after the 'sell by' date

Chicken food poisoning is caused by two types of bacteria:

- Salmonella
- Campylobacter

Salmonella: Salmonella is a type of bacteria that can cause illness such as typhoid fever and food poisoning. Salmonella Heidelberg is a complex type of Salmonella as there are seven different strains of Heidelberg and some are resistant to antibiotics. This means that the infection can be harder to treat.

Symptoms of Salmonella Heidelberg include: Fever, Nausea, Vomiting, Diarrhea, and Abdominal Pain. Other infections which can be caused by salmonella include: bone infections (osteomyelitis), joint infections (arthritis), infection of the sac containing the heart (pericarditis), infection of the tissues which cover the brain and spinal cord (meningitis), hepatitis, lung infections (pneumonia), infections in the center of already-existing tumors or cysts.

Chloramphenicol was the first antibiotic successfully used to treat salmonella food poisoning. Ampicillin and trimethoprim-sulfonamide have been used successfully in the treatment of infections caused by chloramphenicol-resistant strains. Newer types of antibiotics, such as cephalosporin or quinolone, are also effective. These drugs can be given by oral route or intravenously.

Campylobacter jejuni is the most common cause of bacterial foodborne illness in the globe. Itis found most often in food, particularly in chicken. Food is contaminated when it comes into contact with animal feces. In fact, studies have found *Campylobacter* contamination on up to 98 percent of chicken carcasses.

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Symptoms of food poisoning from *Campylobacter* include: Diarrhea with blood, Fever, Nausea, Vomiting, Abdominal pain, Headache, Muscle pain. The long-term consequences of *Campylobacter* infection are Arthritis, appendicitis or infect specific parts of the body, including the abdominal cavity, the heart, the central nervous system, the gall bladder, the urinary tract, or the blood stream.

Campylobacter infections usually resolve after about a week, although treatment with antibiotics can shorten the course of the illness. Patients with *Campylobacter* poisoning should drink lots of fluids to stay hydrated as long as the diarrhea lasts. Antidiarrheal medication may also help lessen symptoms.

Antibiotic resistant bacteria: One out of six cases of campylobacter infection, (the most common cause of bacterial food poisoning), is resistant to the antibiotic most often used to treat severe food poisoning. Almost all strains of staphylococcal (staph) infections in the world are resistant to penicillin and newer drugs.

Researchers found that chicken treated with quinolones antibiotics were being colonized by campylobacter bacteria resistant to the drug, and that those bacteria were being passed to humans.

Virginiamycin in feed produces resistance in bacteria called enterococci, which inhabit the intestines of humans and animals. They generally do not cause disease, and so there is no inherent risk involved with their development of antibiotic resistance. They can, however, become very dangerous if their resistance transfers to other enterococci that inhabit human wounds, catheter infections and other hospital-acquired contagions.

Researchers believe that animal resistance to Virginiamycin is appearing as Synercid resistance in those now very dangerous enterococci.

PREVENTING CHICKEN ANTIBIOTIC POISONING FOOD POISONING

- This type of food poisoning can be prevented by following a few simple procedures which include:
- Avoid buying meat, milk or eggs from animals that were routinely fed antibiotics.
- Washing hands before and after handling poultry
- Checking cooking instructions and following these thoroughly
- Ensuring that any frozen chicken has been completely defrosted before use.
- Storing chicken at the right temperature in the fridge
- Placing leftover chicken in small containers in the fridge
- Keeping cooked and raw chicken separate.
- Make sure that you cook food thoroughly, especially meat. This will kill bacteria. Food should be cooked right through and be piping hot in the middle. Don't reheat food more than once.
- Your fridge needs to be kept between 0°C and 5°C. Also, don't leave the door open unnecessarily.
- Cool leftover food quickly and then refrigerate. Taking it out of the cooking pot and putting it into a shallow container can speed the cooling process up.

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