Bacterial food borne Infections

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Salmonellosis

- The salmonellae constitute a group of organisms with over 2000 different serotypes
- These organisms are capable of causing disease in animals and man when taken into the body in sufficient numbers
- Many salmonella species have a wide host range. These are the organisms which commonly cause food poisoning.

Salmonellosis

- However, some are restricted to a single host species e.g. *Salmonella abortus ovis* causing abortion in ewes, and *Salmonella gallinarum* the cause of fowl typhoid.
- Conversely, some salmonella serotypes are associated with human disease and are not known to affect animals e.g. *S. typhi* and *Salmonella paratyphi*.
- Salmonellae are ubiquitous in the gut of human and animals and act as sources of food contamination.

Salmonellosis cont..

- People who are carriers of the salmonellae contaminate the food.
- A heavy dose up to 10,000 -1,000,000 organisms per gram of food is required to cause infection
- Salmonellae grow well on food and can exist for a considerable period in feces, and on pastures.

Common food poisoning serotypes

- Some of the salmonella species involved in food poisoning include; *Salmonella typhimurium, Salmonella enteritidis, Salmonella dublin, Salmonella softenburg, Salmonella virchow, Salmonella montevideo, Salmonella infantis,* and *salmonella newport.*
- These species are also involved in causing diarrhoea in animals

Heat resistance

- The salmonellae are killed by temperatures attained in commercial pasteurization,
- They can remain alive in moist earth for one year and in dry earth for 16 months,
- They are not destroyed in carcasses or offal maintained at chilling or freezing temperatures, or in the usual pickling solutions

Salmonella food poisoning outbreaks

Outbreaks occur in different forms:

a). Sporadic cases involving only one or two persons in a household

b). Family outbreaks in which several members of the family are affected

c). Large outbreaks caused by a widely distributed infective food item

d). Institutional outbreaks which may be caused by a contaminated single food item.

Factors associated with Salmonella food poisoning outbreaks

- Consumption of inadequately cooked or thawed meat or poultry,
- Cross-contamination of food from infected food handlers.
- Presence of flies, cockroaches, rats, in the food environment that act as vectors of the disease.

Transmission

- Salmonellae reach food in many different ways;
  a) Directly from slaughter animals to food
  b) From human excreta, and transferred to food through hands, utensils, equipments, flies etc.
- Food poisoning is more likely to occur if the total number of microorganisms present is high. A smaller number may have no ill effect.

Foods involved

- Any food contaminated with salmonellae may be involved.
- However, foods commonly involved are animal derived foods such as:
  a. meat and meat products,
  b. milk and milk products,
  c. egg and egg products

Clinical symptoms

- The ordinary symptoms include abdominal pain, headache, diarrhea, fever, vomiting,, prostration and malaise.
- In severe cases there is septicaemia with leucopenia, endocarditis, pericarditis.
- Severe cases are encountered in babies, young children , the sick and in elderly persons. The mortality is upto 13 %.

Control measures

- Efficient refrigeration and hygienic handling of food.
- Consumption of properly cooked meat,
- Complete thawing of frozen meats and adequate cooking.
- Heat processing of meat, milk , fish and poultry to destroy salmonella organisms in food

Typhoid and Paratyphoid fever (Enteric fevers)

- Enteric fevers include typhoid and paratyphoid fevers caused by *Salmonella typhi* and *Salmonella paratyphi* A, B and C respectively.
- The serotypes are similar to other salmonella bacteria, but unlike them, they are essentially parasites of man.
- *S. typhi* possesses capsular (vi). antigen in addition to the usual O and H antigens found in other serotypes.

Disease symptoms

- The incubation period is usually 2 weeks, but might vary between 3 and 28 days for typhoid fever and between 1 and 15 days for the paratyphoid fevers.
- The enteric fevers are generalized septicaemic infections with a frequent, if not constant bacteraemia during the first two weeks of the disease.
- The abdominal symptoms are severe, while fever and illness may continue for 4-6 weeks.

Transmission

- The typhoid and paratyphoid bacilli are essentially human parasites and are acquired mostly from human sources, namely, patients and carriers.
- The bacteria can be transmitted by the contamination of water, milk or food by flies.
- Only a few organisms are needed to cause disease.

Control measures

- Hygienic control of food and water supplies
- Detection and treatment of chronic carriers
- Vaccination using TAB-vaccine. The vaccine contains a mixed culture of *S. typhi, and S. paratyphi.* The vaccine protects for 5-7 yrs.