

## **Causes/Etiologies of the disease**

Etiology is the study of cause of disease. It gives precise causal diagnosis of any disease. Broadly, the cause of diseases can be divided into two:

a. Intrinsic causes, b. Extrinsic causes

### **INTRINSIC CAUSES**

Those causes, which determine the type of disease present within an individual over which he has no control. These causes are further divided into following subgroups:

**Genus:** Specific diseases occur in a particular genus or species of animals. *e.g.* Hog cholera in pigs, Canine distemper in dogs

**Breed/Race:** Diseases do occur in particular breed of animals such as: Dairy cattle are more prone for mastitis. Brain tumors common in Bull dog/ Boxer.

#### **Family**

Genetic relationship plays a role in occurrence of diseases in animals. *e.g.* some chickens have resistance of leucosis; hernia in pigs due to weak abdominal wall.

#### **Age**

Age of animal may also influence the occurrence of diseases such as:

- Young age- diarrhoeal pneumonia.
- Old age- Tumor
- Canine distemper- Young dogs
- Strangles- Young horse
- Prostatic hyperplasia- Old dogs
- Coccidiosis- Young chickens

#### **Sex**

Reproductive disorders are more common in females.

- Milk fever, mastitis and metritis in females.
- Nephritis is more in male dogs than female
- Bovine nephritis is more common in females.

#### **Colour**

Colour may also play role in occurrence of diseases. *e.g.* Squamous cell carcinoma in white coat colour cattle, melanoma in gray and white horses

#### **Idiosyncrasy**

An unusual reaction of body to some substances such as:

- Drug reaction, small dose of drug may produce reaction.

- Individual variations.

## **EXTRINSIC CAUSES**

The etiological factors which are present in the outside environment and may cause/ influence the occurrence of disease. These are also known as exciting cause/ acquired cause. Majority of cause of diseases falls under this group which are further classified as physical, chemical, biological and nutritional causes.

## **PHYSICAL CAUSES**

### **TRAUMA**

Traumatic injury occurs due to any force or energy applied on body of animal *e.g.* During control, restraining, shipping or transport of animal.

### **Contusions! Bruises**

Contusions or bruises arise from rupture of blood vessel with disintegration of extravassated blood.

### **Abrasions**

Abrasions are circumscribed areas where epithelium has been removed by injury and it may indicate the direction of force.

### **Erosions**

Partial loss of surface epithelium on skin or mucosal surface is termed as erosion .

### **Incised wounds! cuts**

Incised wounds are produced by sharp edged instrument. They are longer than deep

### **Stab wound**

Stab wounds are deeper than longer produced by sharp edged instrument.

### **Laceration**

Severance of tissue by excessive stretching and is common over bony surfaces or are produced by cut through a dull instrument.

### **Compression**

Compression injury is produced as a result of force applied slowly *e.g.* During parturition.

### **Blast injury**

Force of compression waves against surfaces followed by a wave of reduced pressure. It can rupture muscles/ viscera.

### **Bullet wound**

Hitting at 90° by firearms to produce uniform margins of abrasion. Exit wounds are irregular and lacerated.

## **ELECTRICAL INJURY**

High voltage currents induce tetanic spasms of respiratory muscles and hits the respiratory centre of brain. It also produce flash burns. Lightning causes cyanotic carcass, postmortem bloat, congestion of viscera, tiny haemorrhage and skin damage.

## **TEMPERATURE**

### **Burns**

#### **I degree burns**

There is only congestion and injury to the superficial layers of epidermis *e.g.* sun burn on hairless parts or white skinned animal.

#### **II degree burns**

Epidermis is destr'oyed; hair follicles remain intact and provide a nidus for healing of epithelium.

#### **III degree burns**

Epidermis and dermis both are destroyed leading to fluid loss, local tissue destruction, laryngeal and pulmonary oedema, renal failure, shock and sepsis: Till 20 hrs of burn, the burn surface remains sterile then bacterial contamination occurs. After 72 hrs millions of bacteria enters in the affected tissue. Bacteria such as staphylococci, streptococci and *Pseudomonas aeruginosa* invade the deeper layers of skin and cause sepsis. There is a state of immunosuppression in severe burns leading to impaired phagocytosis by neutrophils .

### **Hyperthermia**

Hyperthermia means increased body temperature due to high environmental temperature *e.g.* Pets in hot environment without water. Hyperthermia leads to increased respiration (hyperpnoea), rapid heart beat (tachycardia), and degeneration in myocardium, renal tubules and brain.

### **Hypothermia**

Hypothermia means decreased body temperature and includes freeze induced necrosis of tissues at extremities

## **RADIATION INJURY**

Radiation as a result of exposure to X-rays, Gamma rays or UV rays leads to cell swelling, vacuolation of endoplasmic reticulum, swelling of mitochondria, nuclear swelling and chromosomal damage resulting in mutation. The impact of radiation is more on dividing cells of ovary, sperm, lymphocytes, bone marrow tissue, and intestinal epithelium. It is characterized by vomiting, leucopenia, bone marrow atrophy, anemia, oedema, lymphoid tissue and epithelial necrosis.

## **BIOLOGICAL CAUSES**

## **Virus**

Viruses are smallest organisms, which have only one type of nucleic acid DNA or RNA in their core covered by protein capsid.

## **Sub viral agents**

- Prion proteins are infectious proteins without any nucleic acid. *e.g.* Bovine spongiform encephalopathy.
- Viroids are having only nucleic acid without proteins. They do not cause any disease in animals. However, they are associated with plant diseases.

## **Rickettsia**

*Coxiella burnetti* causes Q-fever

## **Mycoplasma**

*Mycoplasma mycoides* is responsible for pneumonia, joint ailments and genital disorders.

## **Chlamydia**

*Chlamydia trachoma tis*, *C. psittaci* cause abortions, pneumonia, and eye ailments.

## **Spirochaete**

*Leptospira* sp. causes abortion, icterus. *Borrelia ansarina* causes fowl spirochetosis in chickens.

## **Bacteria**

Bacteria are classified as Gram positive and Gram negative on the basis of Gram's staining. Gram positive bacteria include Staphylococci, Streptococci, Corynebacterium, Listeria, Bacillus Clostridia. Gram negative bacteria are *E. coli*, Salmonella, Proteus, Klebsiella, Pasteurella, Pseudomonas, Brucella, Yersinia, Campylobacter etc. Besides, there are certain organisms stained with Zeihl Neelson stain and are known as acid fast bacilli *e.g.* *Mycobacterium tuberculosis* and *M. paratuberculosis*.

## **Fungi**

Fungi pathogenic for animals are mostly belongs to fungi imperfecti. *e.g.* Histoplasmosis  
Fungi cause three type of disease-

- Mycosis *e.g.* Actinomycosis;
- Allergic disease *e.g.* Ringworm;
- Mycotoxicosis *e.g.* Aflatoxicosis.

## **Parasites**

Parasites are classified mainly in 3 groups:

1. **Protozoan Parasites:** *Trypanosoma evansi*, *Theileria annulata*, *Babesia bigemina*, *Toxoplasma goodii*, *Eimeria* Spp.
2. **Helminths**
  - Nematodes-** Roundworms *e.g.* Ascaris,
  - Trematod-** Flat worms *e.g.* Liverfluke
  - Cestodes-** Tapeworms *e.g.* *Taenia* spp.

3. **Arthropods:** Ticks, Mites, Flies, Lice