**-Diyala University -Internal medicine**

**-College of Vet. Medicine - Lecture (4)**

**- Dep. Of Internal and Preventive Medicine**

**Dr. Khalid M. Hammadi**

**Septicemia/viremia**

Septicemia is the acute invasion of the systemic circulation by pathogenic bacteria accompanied by sepsis or septic shock with possible bacterial localization in various body systems or organs if the animal survives. Septicemia is a common cause of morbidity and mortality in newborn farm animals which have not received a sufficient quantity of colostrum in the first 24 hours after birth. Bacteremia is different from septicemia in that bacteremia is not accompanied by sepsis or septic shock. The difference between septicemia and bacteremia is one of degree. In bacteremia, bacteria are present in the bloodstream for only transitory periods and do not produce clinical signs; for example, a clinically unimportant bacteremia probably occurs frequently after rectal examination or other manipulations in which mucosa is disturbed. In septicemia, the pathogen is present throughout the course of the disease and is directly responsible for initiation of the disease process.

**Viremia:** is the invasion of the systemic circulation by pathogenic viruses with localization in various body tissues and in which the lesions produced are characteristic of the specific virus.

- ETIOLOGY

- Calves

Bacteremia and septicemia are often associated with Escherichia coli and

Salmonella spp. E.coli is most frequently isolated from the blood of calves but Gram-positive infections may be found in 10 % of septicemic calves and polymicrobial infections in 28%.

-Foals

Septicemia with localization associated with E. coli, Actinobacillus equuli, Klebsiella , pneumoniae, (α-hemolytic Streptococcus, and Salmonella spp. are seen.

-Lambs

Septicemia associated with E. coli occurs most frequently.

- Cattle

Histophilus somni, Pasteurella multocida, Mannheimia haemolytica, Pasteurella , pseudotuberculosis, acute and chronic infections with bovine virus, diarrhea virus and bovine malignant catarrh are encountered.

- PATHOGENESIS

Two mechanisms operate in septicemia: the exotoxins or endotoxins produced by the infectious agents initiate a profound toxemia and high fever because of their initiation of the release of host mediators and because of the rapidity with which the agents multiply and spread to all body tissues.

The clinical manifestations are the result of the effect of the pathogens on monocytes and lymphocytes, which initiate the systemic inflammatory response syndrome . Localization of certain pathogens occurs in many organs and may produce severe lesions in animals that survive the toxemia. Direct endothelial damage and hemorrhages may also be caused. The same general principles apply to a viremia, except that toxins are not produced by viruses. It is more likely that the clinical manifestations are the result of direct injury of the cells invaded by the virus. Transplacental infection can occur, resulting in fetal mummification, abortion, or infection of the fetus.

**- Disseminated intravascular coagulation**

Disseminated intravascular coagulation (DIC) is common in severe spticemic disease, especially that which terminates fatally. It is initiated by vascular injury with partial disruption of the intima, caused by the circulation of foreign materials such as bacterial cell walls, antigen-antibody complexes and endotoxin, with subsequent platelet adherence and the formation of platelet thrombi.

- CLINICAL FINDINGS:

The major clinical findings in septicemia are fever, cardiovascular dysfunction and shock, and sub-mucosal and sub-epidermal hemorrhages that are usually petechial and occasionally ecchymotic. The hemorrhages are best seen under the conjunctiva and in the mucosae of the mouth and vulva. Tachycardia, tachypnea and shock-induced organ dysfunction with cardiovascular hypotension, myocardial asthenia and respiratory distress.

- CLINICAL PATHOLOGY

1- Blood culture:

Isolation of the causative bacteria from the bloodstream should be attempted by culture. Ideally. blood cultures should be obtained just before the onset of fever and from a major vein or any artery. The standard is three blood cultures or animal inoculation at the height of the fever.

2-Hemogram :

The presence of leukopenia or leukocytosis is an aid in diagnosis and the type and degree of leukocytic response may be of prognostic Significance.

3-Serology:

Serological tests are available for most infectious diseases.

-TREATMENT

The principles of treatment are similar to those described for the treatment of toxemia, fever and shock, and treatment should focus on broad-spectrum anti­microbial agents and general supportive measures.