Staphylococcosis in Poultry

❑ Definition:

- Staphylococcosis is a systemic disease of poultry, mostly turkeys and broiler chickens.
- caused by *Staphylococcus aureus.*
- characterized mostly by purulent arthritis, tenosynovitis, osteomyelitis, gangrenous dermatitis, omphalitis and septicemia.

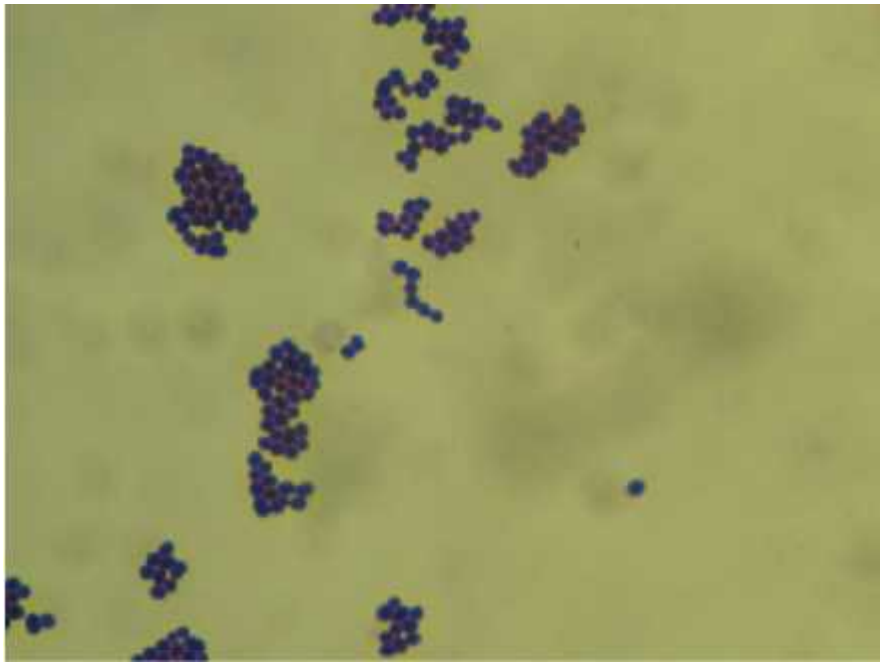
❑Occurrence:

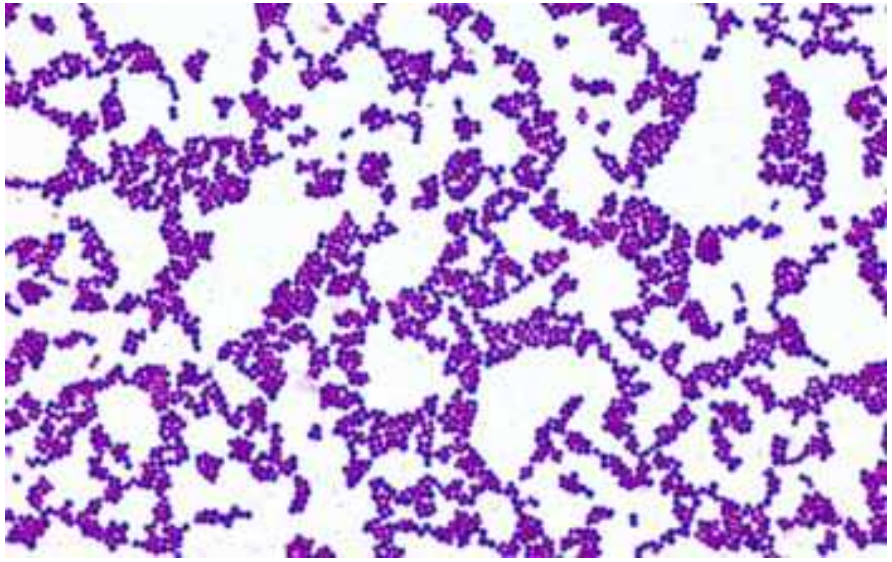
- All classes of birds.
- Mainly important in **turkeys and broilers**.
- Most diseases produced by Staph. species is associated with a **break in the skin**.
- *S aureus* and other species ubiquitous in the environment and are part of the normal flora of the skin and other mucous membranes of poultry and other animals, and can be isolated from the litter, dust and feathers.
- They also cause disease in immunocompromised birds

- There are two major types of staphylococcosis:
  - Systemic infection (Septicemia and gangrenous dermatitis).
  - Localized lesions (arthritis, tenosynovitis, osteomyelitis, and omphalitis).

❑Etiology:

- The genus *Staphylococcus* contains dozens of species, but *S aureus* is the most pathogenic. *S aureus* is a **gram-positive, catalase-positive,** coccoid bacteria that appears in **grape-like clusters** on stained smears
- Most pathogenic strains have been coagulase-positive; however, coagulase-negative *Staphylococcus*, including *S hyicus*, *S epidermidis*, *S simulans*, and *S gallinarum* have been reported from clinical cases
- Toxins produced by Staph. increase virulence.





Staphylococcus aureus showing gram-positive staining from a pure SA isolate.

Transmission, Epidemiology, and Pathogenesis

- Skin wounds, minor surgical procedures (ie, beak, toe, or comb trimming), vaccine injection, and compromised intestinal mucosa can introduce *Staphylococcus* to local tissue or into the bloodstream.
- Infection can also occur in the hatchery as a result of contamination of an open navel.
- Once in the bloodstream, *Staphylococcus* can produce systemic disease or localized lesions in tissues.
- *S aureus* can invade the metaphyseal area of joints, leading to arthritis and osteomyelitis.

- In addition, recent studies have shown that another major route of entry for staphylococcus may be through the respiratory tract. Poor air quality or “hot” respiratory vaccines will facilitate staphylococci entry through the respiratory tract.

- Once in circulation, **staphylococci have a high affinity for collagen-rich surfaces**, such as the articular surface of joints, and synovial sheaths located around joints and tendons.
- Staphylococci also tend to localize in the growth plate of actively growing bones.
- **This explains the higher incidence of femoral head necrosis and osteomyelitis** in young chickens versus more mature chickens.
- **The incidence of staphylococci infection will increase,** when the host immune system is impaired.

Clinical disease and lesions:

1. ***Omphalitis,*** **(Navel Ill, "Mushy Chick" Disease, Yolk Sac Infection)**

Sources of the bacterium include

- the breeder flock,
- hatchery environment,
- hatchery workers

2. Staphylococcal Gangrenous dermatitis:

It is a typical secondary infection, usually resulting from immunosuppressive infections (IBD, CIA). Affected skin areas are dark red to blue-greenish, moist and sharply defined from the adjacent healthy skin.

3. Cellulites (Inflammatory Process)

- A purulent inflammation is present in subcutaneous tissues. The overlying skin tends to be dry and discolored.

4. Abscesses: **Bumblefoot** (pododermatitis)

The planter surface of the foot (footpad) is a common site and results in bumble foot (Plantar abscess). It is usually occurred after wound or traumatic infection. The severe swelling of the footpad and toes results in subsequent lameness.

- Other local forms of staphylococcosis are **<u>sternal bursitis</u>**.
- The sternal bursa is enlarged because of gathering of purulent substance. Sometimes, the covering skin is necrotized.

❑*Septicemia:*

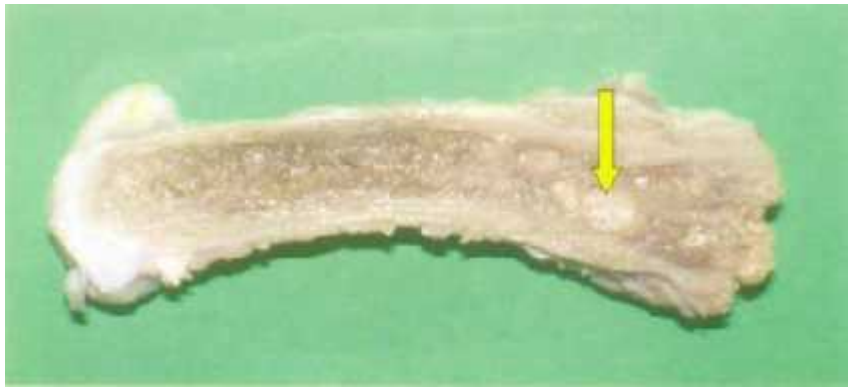
- There is acute increase in mortality with congestion of the internal organs.
- Hyperemia, enlargement and various-degree coagulation necrosis in the liver or the spleen are observed

❑*Arthritis/synovitis:*

- Unilateral or bilateral lameness, reluctance to move and lying down.
- When opened, will find white to yellow colored fibrinopurulent exudates, then become caseous, fibrosis occur late.

❑ *Osteomyelitis (infection of the bones)*

- Occur as a sequel to septicemia,. The lesions are usually detected in the region of the proximal femur; where inflammatory necrotic foci in the bone marrow.
- When the femur is affected, the proximal head of the femur will separate from the shaft when disarticulated from the hip joint *(femoral head necrosis).*



When the tibiotarsal joints are affected, swellings, fever and sometimes necrosis of overlying tissues and purulent exudation are observed

❑*Endocarditis*

- This is an uncommon sequel to septicemia. There are vegetations on the mitral and/or aortic valves. Emboli from valve lesions cause infarcts in the brain, liver and spleen.

❑ Diagnosis

- Gross lesions are suggestive.
- Identifying the typical cocci in tissue smears can make presumptive diagnosis.
- Bacterial isolation and identification.

❑ Control

- Elimination of the source and reservoir of infection from environment.
- Avoid of immunosuppression causing diseases by routine vaccination against IBD and others.
- Adopt measures to reduce the occurrence of traumatic lesions and damage of intestinal mucosa.
- Recently, exposing turkeys to a specific strain of Staphylococcus epidermidis (strain 115) by aerosol at 10 days and again at 4-5 weeks substantially reduce losses from arthritis/synovitis.
- Avoid stress-conditions.

❑ *Treatment:*

- High levels of antibiotics effective against staph. may be helpful if given early in the course of the disease.
- **Antibiotic sensitivity testing** must be done to avoid resistance.
- Treatment using antibiotics such as **penicillin, tetracycline, flouroquinolones and streptomycin, erythromycin, lincomycin, and spectinomycin**