Common causes of **arthritis in pigs**

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YOU ARE HEADING to a lifestyle block to see six-month-old pigs. Some are non-weight-bearing lame on one limb, others are reluctant to move. What diseases would you be thinking about while examining these pigs? What if they were weanling piglets with multiple swollen joints and ataxia?

The causes of arthritis-related lameness in pigs include septic arthritis, *Mycoplasma* infection, rickets and osteochondrosis dissecans.

BACTERIAL ARTHRITIDES

Bacterial arthritides are commonly due to the haematogenous spread of bacteria from infected navels (neonatal piglets) or ulcerated skin (all ages; Figure 1).

Bacteria such as *Escherichia coli* and *Trueperella pyogenes* may result in localised abscess formation within joints, including between vertebrae (Figure 2) or tendon sheaths.

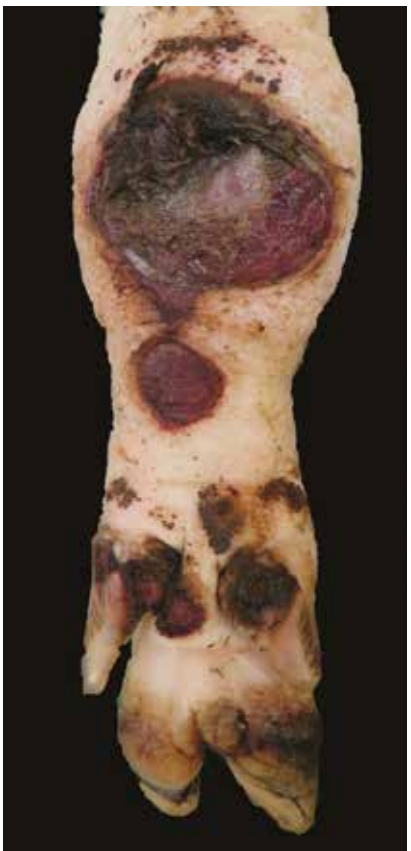

FIGURE 1: Decubital ulcers on the lower limb of a growing pig.

BOX 1:

Common bacterial isolates in porcine polyserositis

Streptococcus suis (type II)
Haemophilus parasuis (Glasser's disease)
Mycoplasma hyorhinis

Common isolates from septic joints in pigs also cause polyserositis (Box 1). Polyserositis is the concurrent inflammation of multiple serous membranes, including the pleura, pericardium, peritoneum, meninges and synovium.

STREPTOCOCCUS SUIS (TYPE II)

Streptococcus suis is most commonly seen in weanling piglets and growers up to market weight. It is common for piglets to present with neurologic signs, including lateral recumbency, paddling, incoordination and ataxia, tremors, blindness and swollen joints. As the disease course is often short, pigs may lack premonitory signs and simply be found dead.

Postmortem lesions may include bronchopneumonia, fibrinopurulent meningitis, polyserositis, lymphadenopathy and, in chronic cases, vegetative valvular endocarditis, myocarditis, and fibrinopurulent to fibrous pericarditis.

A diagnosis of *Streptococcus suis* can be made presumptively based on history, clinical signs and gram-positive cocci within lesions. However, culture is needed for a definitive diagnosis.

HAEMOPHILUS PARASUIS (GLASSER'S DISEASE)

Haemophilus parasuis is most common in pigs two weeks to four months old. It has a sudden onset and short disease course. Pigs may be found dead or die within two days of the onset of clinical signs. Signs include swollen joints, lameness and inability to rise. If bacterial infection affects the central nervous system, the pigs may present with tremors, incoordination, posterior paresis or lateral recumbency, anorexia and depression.

Postmortem lesions include swelling of one or more major leg joints in combination with lesions at other sites. These lesions include polyserositis, bronchopneumonia, fibrinous peritonitis, pericarditis, pleuritis, myositis and septicaemia. Occasionally, the only grossly visible lesion is fibrinopurulent exudate on the ventral aspect of the brain.

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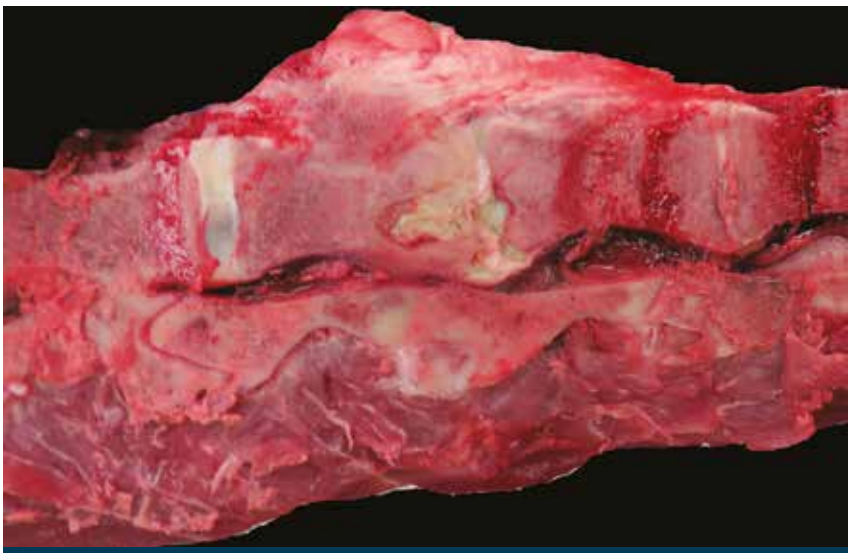


FIGURE 2: Bacterial osteomyelitis in the vertebrae of a multi-parturient sow.

Aerobic culture of the joint fluid or capsule, meninges or brain, lung, or serosal exudate is required for a definitive diagnosis. However, history, clinical signs and distribution of lesions may be highly suggestive of disease.

MYCOPLASMA ARTHRITIDES

While *Mycoplasma hyorhinis* and *M hyosynoviae* can cause arthritis in pigs, *M hyorhinis* affects younger pigs (three to 10 weeks) and *M hyosynoviae* should be considered in pigs 12 to 24 weeks old. Clinically significant disease and lesions are sporadic for both organisms, however, only *M hyorhinis* is associated with polyserositis. Clinical signs for *M hyorhinis* include lameness, swollen joints and ill-thrift. Other clinical signs are similar for *M hyosynoviae* but may also include stiffness and leg lameness. Necropsy findings may include serosanguineous or serofibrinous synovial fluid, red and often thickened synovium for both organisms, and fibrinous pericarditis, pleuritis and peritonitis (singly or in combinations) in *M hyorhinis*. In chronic cases, pigs may present with pannus and joint erosion.

Diagnosis of mycoplasmal arthritis requires polymerase chain reaction (PCR) assay and appropriate histologic changes.

RICKETS

Rickets is a disease of young, weaned and growing pigs, characterised by failure of or abnormalities in the mineralisation of osteoid and the cartilaginous matrix in the growth plates. Depending on the severity of the disease, thickening and irregularity of growth plates in long bones may occur.

The underlying pathogenesis involves a deficiency, imbalance or a failure to utilise vitamin D, phosphorous or calcium. Phosphorous or vitamin D deficiencies are most common. In pasture-raised swine, phosphorous deficiency is common in animals that have no or insufficient grain or protein supplementation. In pigs grown indoors, the lack of sunlight may necessitate vitamin D supplementation.

Clinical signs of rickets may include poor growth, short stature, enlargement of the ends of long bones and angular limb deformities. As bearing weight on poorly mineralised bones is painful and may result in bone fractures (Figure 3), pigs may be reluctant to move or be lame on one or multiple legs.

The age of the pigs, clinical signs and postmortem lesions are useful in diagnosing rickets. Postmortem lesions, in addition to recent or healing fractures, include ribs that bend significantly before fracturing or that bend without snapping. Long bones are widened and thickened,

FIGURE 3: Poorly mineralised bones (increased radiolucency) and fractures of the tibia and fibula (limb on the left) and of the humerus (limb on the right). (Postmortem radiograph courtesy of David Thurgood, of Whitianga Peninsula Veterinary Services.)

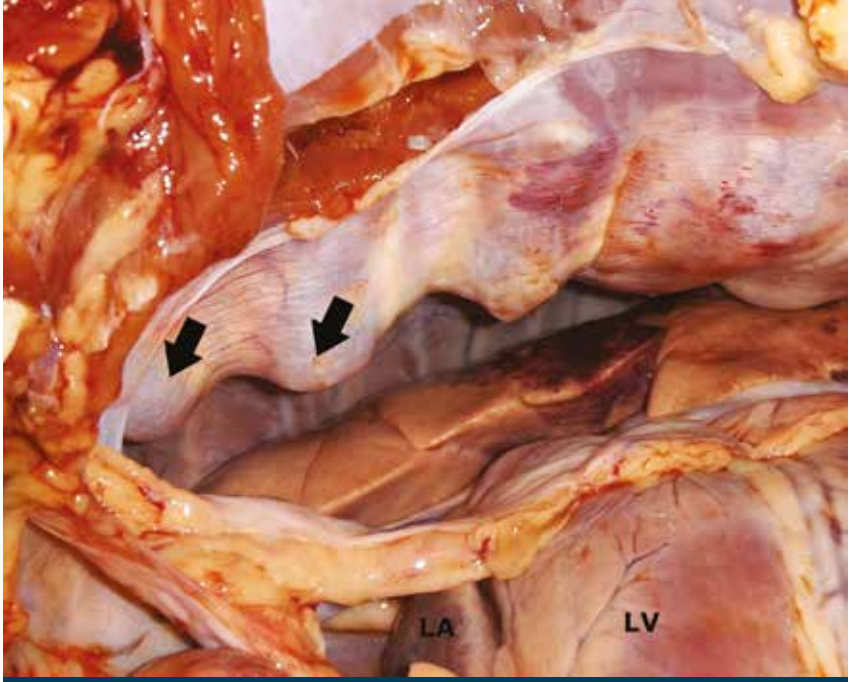


FIGURE 4: Thorax with ribs reflected showing the widened and thickened costochondral junction (arrows). This change is often referred to as the rachitic rosary and is highly suggestive of rickets. LA: left atrium; LV: left ventricle. (Image courtesy of David Thurgood.)

which is best visualised as the classic 'rachitic rosary' at the costochondral junction of fixed ribs (Figure 4). Irregularities of the growth plate are also present and are most easily seen in longitudinally sectioned long bones. In general, softening of the bones in young, rapidly growing animals and beading of the ribs are highly suggestive of rickets.

OSTEOCHONDROSIS DISSECANS

Osteochondrosis dissecans (OCD) is a developmental abnormality that is clinically seen in pigs approaching market weight or breeding age. It is characterised by defects in the articular cartilage and the adjacent subchondral bone.

Failure of the cartilage canal blood supply leads to ischaemic chondronecrosis and is a key pathologic change in osteochondrotic lesions. OCD is a multifactorial disease with many risk factors, including genetic, traumatic and infectious factors. The genetic background of the animals may affect conformation, and pigs (such as commercial strains of pigs) have increased early weight-bearing pressure on cartilage. Trauma may be increased by certain types of flooring and housing and can include increased exercise in predisposed animals. In pigs, bacteria (such as *M hyosynoviae*) can bind to developing cartilage, disrupt the blood supply and lead to chondronecrosis.

Pigs with OCD will present with abnormal gaits or lameness. The most common sites of OCD lesions are listed in Box 2.

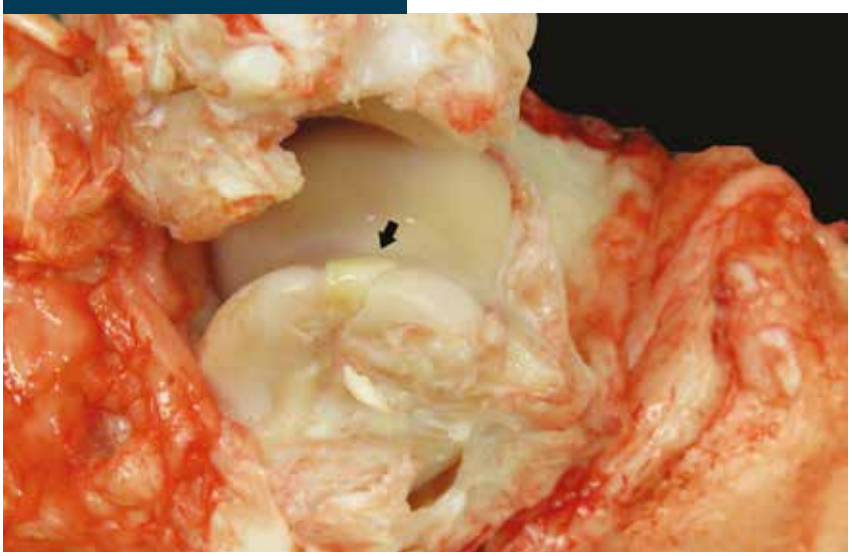
Clinical signs and postmortem lesions are pathognomonic, but subtle lesions may not be seen on radiographs. Early and mild lesions of articular surfaces may include thickened white areas on the articular cartilage, or depressions of the articular cartilage due to collapse of subjacent cartilages in early lesions. In advanced lesions, separation of the cartilage may occur and present as cartilaginous flaps (Figure 5) or deep ulcers with exposure of subchondral bone (Figure 6). In pigs, the physeal cartilage may also be affected. OCD of the femoral physis may result in a fracture at the level of the growth plate. This lesion is termed slipped capital femoral epiphysis (formerly referred to as epiphysiolysis).

BOX 2:

Common sites of porcine osteochondrosis lesions

Medial femoral condyle
Humeral condyle
Humeral head
Glenoid of the scapula
Distal ulna
Lumbar vertebrae

FIGURE 5: Flap of articular cartilage (arrow) on the medial condyle of the talus (hock joint) in a multi-parturient sow.



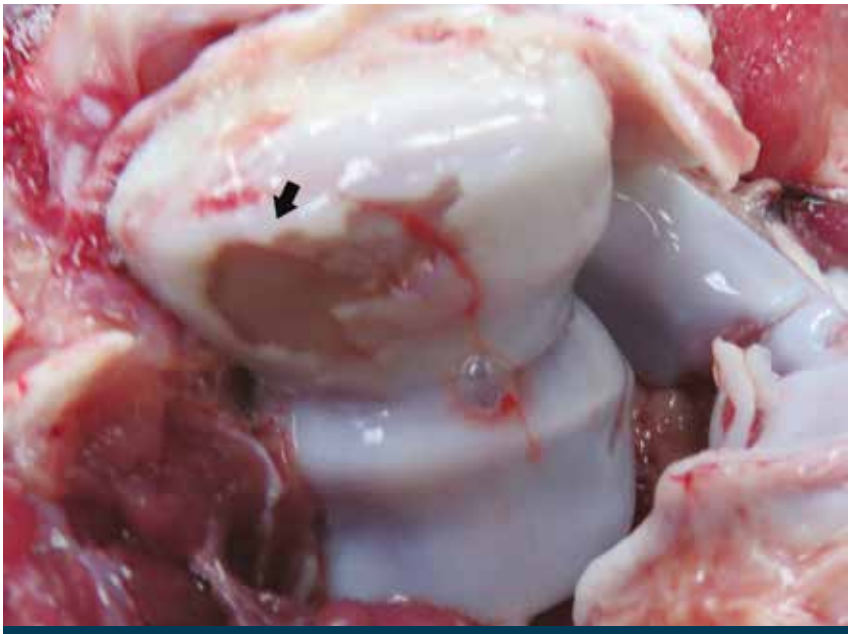


FIGURE 6: Osteochondrosis dissecans. Deep ulcer with exposure of the subchondral bone (arrow) at the distal femur in a multi-parturient sow.

SUMMARY

Common causes of lameness in pigs include septic arthritis, rickets and osteochondrosis. Diagnosis of lesions involves a good history (which must include the age of the pigs), observing the animals for clinical signs (gait assessment, neurologic signs) and appropriate diagnostics, including postmortem examination (with or without histopathology), radiographs, bacterial culture and/or PCR for *Mycoplasma* spp. VS

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