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Common Diseases of Pigs and Their Control Measures

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Abstract

Compared to other farming practices, Pig farming is especially vulnerable to infectious diseases that are capable to transmit among animals, affecting their health, productivity and endangering the human lives through exposure. Among the bacterial pathogens, *Brucella suis*, *Salmonella* spp., *Escherichia coli*, *Listeria monocytogenes*, *Staphylococcus aureus* and *Streptococcus suis* are prominent. All of these pathogens have the potential of transmit from animals to humans and therefore poses serious public health concerns. Other than bacterial infections, viral diseases such as swinepox, African swine fever (ASF), swine erysipelas and Aujeszky's disease (or pseudorabies) are also associated with high morbidity and death in pig populations. Nowadays, disease management is becoming more complex as these pathogens spread, are more virulent and can survive in different environment conditions. To stop the transmission, it is essential to require effective diagnostics, strategic vaccination, effective biosecurity and farmer's education. This article discusses the clinical features, diagnostics, transmission methods and integrated control techniques of major pig diseases using credible scientific sources.

Keywords: Biosecurity, Diagnostics, Vaccination, Zoonoses

Introduction

The pig farming industry holds a central role in the global agricultural framework and contributes an important role in livelihood creation, food security and economic growth. The piggery sector in the Indian context has gained specific significance in the tribal and rural areas, where it has emerged as a major component in ensuring food security in the region as well as generating a long-term income of sustainable livelihood through the low input small holder livestock systems. In spite of the socio-economic prospect, swine production in India is facing a lot of challenges; the worst of which is the occurrence of infectious diseases that not only affect the productivity of the animals, but also affect the entire public health.

Some of the major concerns are the bacterial diseases, which include brucellosis caused by *Brucella suis*, salmonellosis caused by *Salmonella* spp., colibacillosis caused by *Escherichia coli*, listeriosis caused by *Listeria monocytogenes*, staphylococcal infections caused by *Staphylococcus aureus* and streptococcal meningitis caused by *Streptococcus suis* (Rajkhowa *et al.*, 2023). Not only the pathogens provoke the significant clinical signs of pigs, which include reproductive failures, gastrointestinal disorders and systemic diseases, but they also possess the zoonotic potential by becoming an occupational hazard to meat handlers, farmers and veterinarians. The resulting high morbidity and mortality contribute substantially to economic losses in the sector.

Viral infections further compound the health burden in pig farming. Different pathogens like African swine fever (ASF), swinepox, Aujeszky disease and swine erysipelas are known to have acute outbreaks at the herd levels with serious impacts. ASF is particularly alarming due to its approx. 100% mortality rate and the absence of effective vaccines yet; whereas, Aujeszky's disease effects both reproductive efficiency and neurological function (Jurado *et al.*, 2018; Aznar *et al.*, 2022).

Because of diverse transmission dynamics, an environmental resilience and virulence profile of these pathogens, a multidimensional and integrated approach is vital for effective disease prevention. Strategies should not only

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be limited to the routine veterinary services but also have the capacity of advanced diagnostics, farmer sensitisation, high standards of hygienic farming practices and sound biosecurity. Preventive vaccination still remains a pillar in the control of endemic diseases like swine erysipelas and Aujeszky disease (Habte *et al.*, 2021).

Considering the zoonotic threats and economic implications associated with these infections, the adoption of the One Health framework has emerged as a vital paradigm. By integrating animal, human and environmental health disciplines, this approach offers a holistic basis for surveillance, prevention and disease management. This article provides a critical examination of the key bacterial and viral diseases affecting pigs, with emphasis on their aetiology, transmission patterns, clinical manifestations and evidence-based strategies for prevention and control.

Major Bacterial Diseases

Bacterial infection poses significant threats in swine production as they incur economic losses and cause diseases to move among the animal and human population as well as damage the animal health. Virulence mechanisms include toxin synthesis, immune evasion and biofilm formation, which enhance the persistence and severity. The proper care of these infections requires knowledge about their clinical features together with their transmission methods and diagnostic procedures.

1. Brucellosis

The bacterium *Brucella suis* (Figure 1) causes Brucellosis in pigs which creates severe health risks for farmers, veterinarians and slaughterhouse workers (Rajkhowa *et al.*, 2023). The disease leads to late gestation abortions, orchitis, infertility in boars and swollen lymph nodes. The disease spreads through physical contact of infected tissues, aborted fetuses and contact with contaminated feed and tools. The pathogen survives within the host macrophages through its Type IV Secretion System (T4SS) that leads to prolonged infections. This makes eradication difficult without consistent testing and culling strategies. The diagnosis of this disease requires tissue culture from reproductive organs, PCR tests, ELISA and Rose Bengal Test serological examinations.

Figure 1: *Brucella suis*

2. Salmonellosis

Salmonella typhimurium (Figure 2) and *Salmonella choleraesuis* are the primary bacteria that are responsible for salmonellosis in pigs. Both of these microorganisms can also impact humans. The afflicted pigs exhibit diarrhea (sometimes bloody), fever and lethargy (especially piglets). Chronic infection can impede growth in pigs. The transmission is mainly fecal-oral, facilitated by contaminated water, feed and asymptomatic carriers. Salmonella causes damage to intestinal cells through endotoxins, the enterotoxin *stn* and promotes inflammation (Rajkhowa *et al.*, 2023). The diagnosis includes bacterial culture, PCR detection of virulence genes and ELISA for herd surveillance.

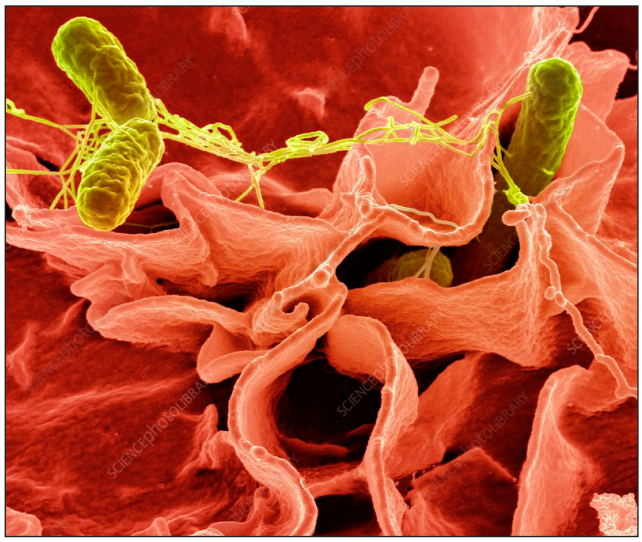

Figure 2: *Salmonella typhimurium*

3. Escherichia coli Infections

ETEC, EPEC and EHEC strains of pathogenic *E. coli* (figure 3) are linked with serious diarrhea for neonatal and post-weaning piglets. These strains also lead to dehydration, poor weight gain and sometimes sudden death from septicemia. Spread occurs through contaminated water, feed and poor nursery area hygiene. Shiga toxins which damage endothelial cells are produced by some EHEC strains while other strains with ESBL-producing *E. coli* will inactivate several antibiotics using beta-lactamase enzymes (Rajkhowa *et al.*, 2023). This is a serious public health concern, emphasizing the need for responsible antibiotic use in livestock. Diagnosis involves culture PCR for resistance and toxin detecting genes as well as ELISA for toxin detection.

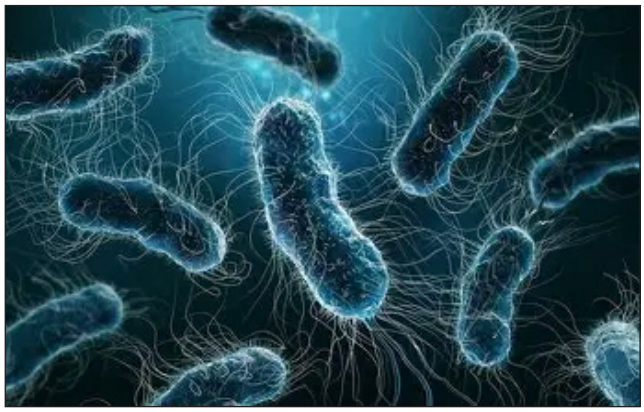

Figure 3: *E. coli*

4. Listeriosis

Listeria monocytogenes (Figure 4) is present in soil, water and decaying silage. It causes listeriosis in pigs, mostly occurring without overt symptoms. It can cause encephalitis in piglets and abortions. These animals mostly get infected from silage feeding. This pathogen escapes host phagosomes by using listeriolysin O which ensures survival within cells and also enables dissemination throughout the body (Rajkhowa *et al.*, 2023). Confirmation of diagnosis requires brain or placenta culture, PCR targeting *hly* gene and histopathological examination.

Figure 4: *Listeria monocytogenes*

5. Staphylococcus spp. *Infections*

Staphylococcus aureus (Figure 5) and MRSA strains in pigs may result to skin abscesses, mastitis and joint infections. Additionally, it causes pneumonia or more severe systemic diseases. Transmission occurs through direct contact as well as through equipment and personnel with zoonotic risks (Rajkhowa *et al.*, 2023). Its pathogenicity involves toxins like PVL and superantigens such as TSST-1. Diagnostic strategies include swab culture and toxin profiling as well as PCR testing for the *mecA* resistance gene.

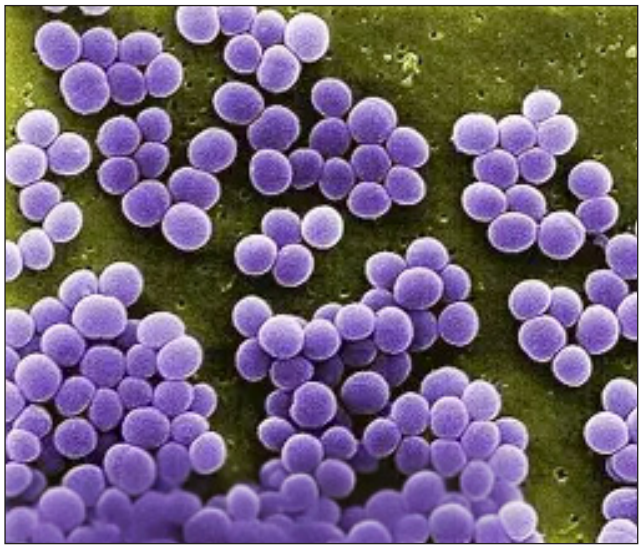

Figure 5: *Staphylococcus aureus*

6. Streptococcus suis Infection

Streptococcus suis (Figure 6) is a gram-positive infectious agent that mainly causes septicemia, endocarditis and meningitis in pigs. Infections are transmitted by skin wounds and through respiratory droplets as well as during the birthing process. Factors such as suilysin along with tissue degrading enzymes help infect the host (Rajkhowa *et al.*, 2023). Diagnosis of this condition requires culture from brain or blood, PCR for capsular and virulence genes and histopathology.

Figure 6: *Streptococcus suis*

7. Swine Erysipelas

Although Swine Erysipelas is an illness that is caused by the bacterium *Erysipelothrix rhusiopathiae*, the disease is regularly included among the major pig diseases due to its severity and zoonotic nature. Humans can get infected through cuts or abrasions during pig handling. It manifests acutely (fever, skin lesions), sub-acutely (mild illness) and chronically (lameness, joint swelling, endocarditis). It is transmitted through feces, contaminated feed or skin wounds and diagnosed by bacterial culture PCR and ELISA (Habte *et al.*, 2021).

Figure 7: *Erysipelothrix rhusiopathiae*

Major Viral Diseases in Pigs

Viral diseases can cause some of worst disease outbreaks worldwide in pigs and these include significant economic losses, animal suffering and trade restrictions. In comparison

to the bacterial diseases, most viral infections do not have any antiviral medication and therefore, the strict biosecurity, vaccination (where applicable) and early diagnoses are crucial. Several pig viruses represent a global threat because of their persistence in the environment, zoonotic potential and rapid spread.

1. Swinepox

The Swinepox virus (SWPV) is a contagious viral disease belonged to the *Suipoxvirus* genus of *Poxviridae* family (Figure 8). This is a host-specific DNA virus affecting pigs, replicates in the cytoplasm. The disease is characterized by skin lesions which progress from macules to pustules and crusts; usually in the abdomen, groin and inner thighs. Piglets younger than four months are most vulnerable and may suffer from secondary infection, emaciation and stunted growth. The mechanisms of transmission include direct contact with lesion exudates or indirect transmission *via* contaminated objects and vectors, such as pig lice (*Haematopinus suis*) and housefly (*Musca domestica*). It is mostly diagnosed clinically; although it can be confirmed *via* virus isolation in PK-15 cell lines or PCR targeting SWPV-specific genes (Mech *et al.*, 2018).

Figure 8: Swine pox

2. African Swine Fever (ASF)

African swine fever (Figure 9) is a highly lethal disease, which is caused by the ASF virus (ASFV), a large double-stranded DNA virus of the *Asfarviridae* family. It is unique among the DNA viruses for being transmitted by arthropods, mainly soft ticks (*Ornithodoros* spp.). ASF is endemic in some parts of Africa and has reached Asia and Europe with recent outbreaks in India. ASFV is exceptionally resilient in the environment and can survive in pork products and fomites. Transmission of disease occurs through direct contact with infected pigs, ingestion of contaminated materials and vector bites. Acute cases show clinical signs of high fever, cyanosis, respiratory distress and sudden death with the mortality rate almost 100%; while chronic cases may show arthritis and weight loss. Laboratory diagnosis is required and the most significant diagnostic tools include PCR, ELISA and virus isolation (Jurado *et al.*, 2018; Rai, 2024).

Figure 9: American swine fever

3. Aujeszky's Disease (Pseudorabies)

Aujeszky's Disease (Figure 10), caused by *Suid herpesvirus 1* (SuHV-1), affects pigs and other mammals, but not humans. It leads to deaths and neurological symptoms in piglets. Older pigs may show reproductive or breathing symptoms. The virus is transmitted through body fluids and can remain latent in nerves, which reactivated when under stress. Wild boars act as reservoirs. Diagnosis includes PCR and serology. Control involves DIVA-compatible vaccines using gE-deleted strains (Aznar *et al.*, 2022).

Figure 10: Aujeszky's disease

Prevention Techniques and Measures for Pig Diseases

The prevention of pig disease, although caused by either bacteria or virus, needs to be well planned and scientific. These are proper management of farms, timely vaccination, maintaining hygiene, biosecurity and education to farmers. These precautionary measures are not only important to reduce economic losses in pig farming, but also to mitigate the risk of disease transmissions from animals to humans (Habte *et al.*, 2021; Rajkhowa *et al.*, 2023). Because most of the severe pig viral infections do not have effective antiviral drugs, it involves the most reliable and assured measures to take protective action through combined control measures.

1. Biosecurity Measures

Biosecurity is the first step in stopping the transmission of diseases. It includes both external biosecurity, which keeps viruses from getting onto the farm and internal biosecurity, which keeps them from spreading within the herd. Some important measures are to keep newly introduced animals

in quarantine for 21 to 30 days to keep latent infections from getting in (Jurado *et al.*, 2018), limit access to the farm and make sure that workers and visitors wear farm-specific protective clothing like gloves, boots and masks (Rajkhowa *et al.*, 2023). To stop the spread of ASF, visitors should not touch pigs for at least 48 hours after going to other farms or hunting. All-in-all-out production is one way to prevent disease transmission within the body. This approach lets for thorough disinfection between production cycles. Separating pigs by age and health, getting rid of sick carcasses properly and keeping rodents and insects under control all help to stop the spread of disease even more (Mech *et al.*, 2018; Habte *et al.*, 2021).

2. Hygiene and Sanitation

Hygiene is a major issue that should be maintained to prevent the risks of infectious diseases in the pig farms. The pig pens, feed trough and the water pipes can be cleaned and disinfected regularly with appropriate disinfectants which control the contamination in the environment. Manure also should be handled and managed properly to control the transmission of diseases by fecal-oral pathogens like *E. coli* and *Salmonella* (Rajkhowa *et al.*, 2023). Moreover, clean and uncontaminated feed with safe drinking water can prevent the serious infections like listeriosis, which is commonly related to spoiled or poor-quality silage (Rajkhowa *et al.*, 2023).

3. Vaccination

One of the best methods of preventing and controlling infectious diseases in pigs is vaccination, particularly when used with DIVA-compatible diagnostic methods. Such vaccines aid in determining whether an animal is naturally infected or merely vaccinated and this is beneficial in disease control and surveillance. The vaccines effective against the various pig pathogens are listed in table 1.

Table 1: Vaccines used for different pathogens

Pathogens	Type	Disease in Pigs	Vaccines
Salmonella typhimurium	Bacterium	Salmonellosis	*Enterisol Salmonella T/C* (Zoetis) – live oral vaccine (covers *T. & C.* serovars)
Salmonella choleraesuis	Bacterium	Salmonellosis (systemic form)	*Enterisol Salmonella T/C* (covers *choleraesuis*)
Escherichia coli (*E. coli*)	Bacterium	Colibacillosis, neonatal/ post-weaning diarrhea	Coliprotec F4/F18 (Elanco), *Suiseng, etc.*
Erysipelothrix rhusiopathiae	Bacterium	Swine erysipelas	*ER Bac Plus, Suvaxyn E, Porcillis Ery, etc.*
Suid herpesvirus 1 (SuHV-1)	Virus	Aujeszky's Disease (Pseudorabies)	*Bartha-K61* strain (live attenuated), *Suvaxyn Aujeszky*, *etc*.

Tips during Implementation:

i) Vaccinate gilts before first mating.

ii) Maintain cold chain integrity.

iii) Monitor seroconversion rates using ELISA.

4. Nutritional and Environmental Management

A proper feeding of pigs with balanced and nutritious diet can enhance the immunity of pigs and enhance the efficiency of the vaccines. Malnutrition increases susceptibilities of pigs to infections and delays recovery of the pigs. Along with proper feeding, it is also vital to keep suitable environmental conditions. Intense heat and cold can shock the body, hence causing issues in respiratory and digestion. Proper ventilation must be provided so that harmful gases like ammonia do not occur in large amounts, which can negatively affect the pig health.

5. Farmer Education and Surveillance

Education to farmers is crucial when it comes to detecting diseases early and responding it when outbreak occurs. Training farmers on identification of clinical signs of diseases, such as African swine fever (ASF) and erysipelas, assists in the implementation of timely and proper measures. Community workshops, extension services and dissemination of education materials that the farmers can understand, may improve awareness and encourage farmers to follow proper control measures (Rajkhowa *et al.*, 2023). Continuous monitoring of the pig health by conducting regular check-ups and laboratory tests is necessary to detect the infections early. It is also efficient in quick reporting and prompt management of disease outbreaks through mobile-based disease reporting systems (Jurado *et al.*, 2018).

6. Regulatory Support and Certification

Finally, the government policies and regulations are also essential in pig diseases control and prevention. Programmes such as certification of disease-free pigs, national programmes of disease eradication have brought positive results. To illustrate, one good model to emulate is the successful limitation of Aujeszky disease in Argentina by using marker vaccines and selective culling (Aznar *et al.*, 2022). National measures can be adopted according to the World Organization of Animal Health (OIE) guidelines that help in the improvement of disease management and supports safe and fair trade.

Combined, all these efforts comprise a holistic and feasible solution to the prevention of pig diseases and to promote safer and more sustainable pig farming.

Conclusion

Management of infectious diseases among pigs requires integrated approach that involves proper diagnosis, prevention and farmer training. Bacterial pathogens such

as *Brucella suis*, *E. coli* and *Streptococcus suis*, and viral diseases, such as African swine fever (ASF) and Aujeszky disease, continue to be major challenges due to their ability to spread to humans and survive in the environment. Education of farmers about the proper knowledge about the diseases and effective veterinary care are relevant to achieve pig farm success over long-term perspective. As because viral diseases still have limited treatment, strong biosecurity measures, planned vaccination and regular disease monitoring are essential. Measures must be implemented to strengthen the disease control by farmers' training and ensure compliance with legal and health regulations. A coordinated One Health strategy, which involves cooperation among veterinarians, farmers, governmental officials and health experts, is essential to establish sustainable pig farming and effective disease control.

References

Aznar, M.N., Bessone, F.A., Segurado, R., Duffy, S.J., 2022. Assessment of an Aujeszky's disease control strategy in a highly prevalent pig farm based on systematic vaccination with an inactivated gE-negative marker vaccine. *Frontiers in Veterinary Science* 9, 852650. DOI: https://doi.org/10.3389/fvets.2022.852650.

Habte, D., Tamir, D., Tilahun, T., 2021. Swine erysipelas: It's epidemiology, diagnosis, treatment, control, preventive measures and comprehensive review. *Journal of Veterinary Science & Technology* 12(6), 100. DOI: https://doi.org/10.37421/2157-7579.2021.12.100.

Jurado, C., Martínez-Avilés, M., De La Torre, A., Štukelj, M., de Carvalho Ferreira, H.C., Cerioli, M., Sánchez-Vizcaíno, J.M., Bellini, S., 2018. Relevant measures to prevent the spread of African swine fever in the European Union domestic pig sector. *Frontiers in Veterinary Science* 5, 77. DOI: https://doi.org/10.3389/fvets.2018.00077.

Mech, P., Bora, D.P., Neher, S., Barman, N.N., Borah, P., Tamuly, S., Dutta, L.J., Das, S.K., 2018. Identification of swinepox virus from natural outbreaks in pig population of Assam. *Virus Disease* 29(3), 395-399. DOI: https://doi.org/10.1007/s13337-018-0464-2.

Rai, S., 2024. Recent insights on epidemiology, diagnosis and control of Classical and African swine fever in pig industry. *Journal of Agriculture and Natural Resources* 7(1), 127-144. DOI: https://doi.org/10.3126/janr.v7i1.73220.

Rajkhowa, S., Sonowal, J., Borthakur, U., Pegu, S.R., Deb, R., Das, P.J., Sengar, G.S., Gupta, V.K., 2023. Meta-analysis of the prevalence of porcine zoonotic bacterial pathogens in India: A 13-year (2010-2023) study. *Pathogens* 12(10), 1266. DOI: https://doi.org/10.3390/pathogens12101266.