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Case Reports

Landrace Swine Mortality Due to Colibacillosis in Conventional Farming

Kematian Babi Landrace Akibat Kolibasilosis Pada Peternakan Konvensional

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ABSTRACT

Background: Colibacillosis, caused by *Escherichia coli* infection, is a major health issue in pig farming, leading to high morbidity and mortality rates. This report describes a case that occurred on a conventional pig farm in Puhu Village, Gianyar District, Bali. **Purpose:** This study aimed to determine the cause of death in a 43 day old Landrace pig exhibiting clinical signs including brown watery diarrhea, dehydration, and weight loss. **Case(s):** A necropsy was conducted at the Veterinary Pathology Laboratory, Faculty of Veterinary Medicine, Udayana University. Bacteriological examination was performed by culturing organ samples on Nutrient Agar and Eosin Methylene Blue Agar, followed by biochemical testing using Triple Sugar Iron Agar and Sulfide Indole Motility media, among others. Parasitological examination was carried out using the fecal float concentration method. **Case Management:** Epidemiological assessment revealed morbidity, mortality, and case fatality rates of 1.89%, 0.63%, and 33.33%, respectively. Gross pathological findings included intestinal and gastric dilation and hemorrhage, intestinal edema, and lesions in the brain, trachea, lungs, heart, liver, and kidneys. Histopathological examination revealed localized intestinal congestion, generalized cardiac congestion, and inflammatory cell infiltration in the intestinal mucosa. Bacteriological analysis confirmed Escherichia coli with alpha-hemolytic activity on blood agar. *Eimeria spp.* oocysts were not detected in the fecal samples.. **Conclusion:** The pig's death was attributed to colibacillosis caused by *Escherichia coli* infection. This case highlights the importance of early detection, strict biosecurity measures, and proper sanitation practices to prevent disease outbreaks in conventional pig farming.

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ABSTRAK

Latar Belakang: Kolibasilosis yang disebabkan oleh infeksi *Escherichia coli* merupakan masalah kesehatan utama pada peternakan babi, karena dapat menyebabkan tingkat morbiditas dan mortalitas yang tinggi. Laporan ini menggambarkan satu kasus yang terjadi pada peternakan babi konvensional di Desa Puhu, Kabupaten Gianyar, Bali. **Tujuan:** Penelitian ini bertujuan untuk mengetahui penyebab kematian seekor babi Landrace berumur 43 hari yang menunjukkan gejala klinis berupa diare cair berwarna cokelat, dehidrasi, dan penurunan berat badan. **Kasus:** Nekropsi dilakukan di Laboratorium Patologi Veteriner, Fakultas Kedokteran Hewan, Universitas Udayana. Pemeriksaan bakteriologis dilakukan dengan menumbuhkan sampel organ pada media Nutrient Agar dan Eosin Methylene Blue Agar, dilanjutkan dengan uji biokimia menggunakan media Triple Sugar Iron Agar dan Sulfide Indole Motility, serta beberapa media lainnya. Pemeriksaan parasitologis dilakukan dengan metode konsentrasi apung tinja. **Penanganan Kasus:** Pemeriksaan epidemiologis menunjukkan tingkat morbiditas sebesar 1,89%, mortalitas 0,63%, dan Case Fatality Rate (CFR) sebesar 33,33%. Hasil pemeriksaan patologis menunjukkan adanya dilatasi dan perdarahan pada usus serta lambung, edema pada usus, dan lesi pada otak, trakea, paru-paru, jantung, hati, serta ginjal. Pemeriksaan histopatologi memperlihatkan kongesti lokal pada usus, kongesti umum pada jantung, serta infiltrasi sel radang pada mukosa usus. Hasil pemeriksaan bakteriologis mengonfirmasi adanya Escherichia coli dengan sifat alfa-hemolitik pada media agar darah. Tidak ditemukan *Eimeria sp.* pada pemeriksaan feses. **Kesimpulan:** Kematian babi disebabkan oleh kolibasilosis akibat infeksi *Escherichia coli.* Kasus ini menegaskan pentingnya deteksi dini, penerapan biosekuriti yang ketat, dan pemeliharaan kebersihan kandang untuk mencegah wabah penyakit pada peternakan babi konvensional.

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INTRODUCTION

Colibacillosis is a common bacterial disease affecting pigs worldwide. This condition is caused by *Escherichia coli (E. coli)*, particularly pathogenic strains such as enterotoxigenic *E. coli* (ETEC), enteropathogenic E. coli (EPEC), and enterohemorrhagic *E. coli* (EHEC). Colibacillosis in pigs can manifest in various forms depending on the age and immune status of the animal (Fairbrother and Nadeau, 2019). Although *E. coli* is part of the normal intestinal flora, dietary changes may disrupt the microbial balance, thereby increasing susceptibility to pathogenic strains originating from contaminated feces or the farm environment (Luppi, 2017). Colibacillosis contributes to economic losses due to reduced weight gain, treatment expenses, and mortality, particularly in suckling piglets and weaners. In Asian countries such as Japan, the prevalence of colibacillosis reaches 62.9%, while in Indonesia it is reported at 42%. Globally, the disease has a mortality rate of approximately 20%–30% (Besung, 2010; Castro *et al.,* 2022; Barros *et al.,* 2023).

Pigs may become infected with pathogenic *E. coli* through contact with infected animals, contaminated pens, feed, and water, transport vehicles, and even airborne transmission of the F4-ETEC strain (Barros *et al.,* 2023). Enterotoxigenic *E. coli* can survive for up to six months in pig feces and may be spread by other animal species (Costa *et al.,* 2017). Clinically, pigs affected by colibacillosis exhibit signs such as sticky, wet hair and watery diarrhea, which may appear yellowish-grey, white, pinkish, grey, or brown (Duarte *et al.,* 2023; Luppi *et al.,* 2023). The diarrhea results from enterotoxins produced by pathogenic *E. coli*, which induce hypersecretion of electrolytes and fluids in the intestines. Excess fluid that cannot be reabsorbed by the large intestine is excreted as watery feces, leading to dehydration. Increased intestinal permeability further contributes to weight loss and may result in death. However, ETEC strains can also be detected in pigs without diarrhea, depending on the degree of bacterial colonization, including in clinically healthy animals (Barros *et al.,* 2023).

Pathological changes typically include dilation, mild edema, and hyperemia of the small intestine. The stomach may be distended and filled with curdled milk or dry feed. In piglets or post-weaning pigs, hyperemia of the gastric fundus may also be observed (Luppi, 2017). Given these considerations, accurate identification and isolation of the causative agent through pathological, bacteriological, and parasitological examinations are crucial. This report investigates the cause of death in a 43-day-old Landrace pig from Puhu Village, Payangan Sub-district, Gianyar Regency, which presented with watery brown diarrhea, sticky wet hair, decreased appetite, weight loss, and depression. Several diagnostic examinations were performed to determine the aetiology.

CASE REPORT

Anamnesis and Signalement

The animal in this case was a 43-day-old female Landrace pig weighing 4 kg, originating from Puhu Village, Payangan District, Gianyar Regency, Bali Province. The herd kept by Mr. Yuki consisted of 18 pigs, including four adult sows and 14 piglets. The pigs were raised under an intensive management system on land adjacent to the owner's residence. Routine cleaning was conducted by periodic watering, resulting in a generally clean pen environment. However, during the rainy season, the pen floor tended to remain slightly damp (Figure 1). This swine was not given any vaccines or treatment. Three piglets were separated from the main group after being observed to show signs of illness by the owner. One of these animals, identified with protocol number 4A/N/24, exhibited clinical symptoms beginning on January 20, 2024. A necropsy was performed on January 23, 2024. The animal presented with brown watery diarrhea, reduced appetite, wet and sticky hair coat, and signs of depression. In contrast, other piglets from the same sow showed body weights ranging from 8 to 10 kg, whereas the affected pig weighed only 4 kg.

Epidemiological data were obtained from interviews with barn officers when taking case animals, including looking at several samples of cages around Mr. Yuki's cage for population calculations, namely 158 swines. Based on this, the calculation of morbidity, mortality, and case fatality rate (CFR) was carried out as follows: morbidity = (number of sick animals / population) x 100%; mortality = (number of dead animals / population) x 100%; and CFR = (number of dead animals / number of sick animals) x 100%. The results of epidemiological calculations showed a morbidity of 1.89%, mortality of 0.63%, and CFR of 33.33% (Dewi *et al.,* 2025, Melo and Melo, 2025).

Laboratorium Examination

The pig with protocol number 4A/N/24 was used as the sample for examination. Observations of gross pathological changes were conducted during necropsy, and the findings were documented and recorded on the necropsy report form. Histopathological examinations were performed using organ samples measuring approximately 1 × 1 × 1 cm, which were fixed in 10% Neutral Buffered Formalin (NBF). The histological preparations were processed at the Veterinary Pathology Laboratory, Faculty of Veterinary Medicine, Udayana University. The tissues were dehydrated through a graded ethanol series (70%, 85%, 95%, and absolute ethanol), cleared in xylene, and infiltrated with molten paraffin. The paraffin-embedded tissues were sectioned at a thickness of 5 µm using a microtome and stained with Hematoxylin and Eosin (H&E). The stained sections were then mounted on glass slides using a suitable mounting medium and covered with a cover slip. (Dharmayanti, 2022; Sewoyo *et al.,* 2022). Microscopic examination of the slides was conducted using a light microscope at the same laboratory.

Bacterial Culture and Identification

Bacteriological examination was performed at the Veterinary Bacteriology and Mycology Laboratory, Faculty of Veterinary Medicine, Udayana University, using samples from the heart, lungs, liver, and intestines. Bacterial isolation was conducted on Nutrient Agar (NA) and Eosin Methylene Blue Agar (EMBA). Gram staining and a catalase test were performed as

Figure 1. A. Condition of the Pen and Case Pig Condition of the pen seen from the outside. **B.** Condition of the pen seen from the inside. **C.** Case Pig. **D.** Faeces of Case Pig

preliminary identification steps. Further biochemical characterization included culture on Triple Sugar Iron Agar (TSIA), Sulphide Indole Motility (SIM), Methyl Red (MR), Simmon's Citrate Agar (SCA), and a glucose fermentation test. The isolates were also cultured on blood agar as a differential medium (Dewi *et al.,* 2025). Identification was based on general characteristics observed during culture, including colony morphology, pigmentation, hemolysis patterns on blood agar, sugar fermentation reactions, gas or hydrogen sulfide production, and metabolic profiles shown in biochemical tests. These combined phenotypic characteristics provide reference patterns used to differentiate and identify bacterial species (Okoko *et al.,* 2020).

Parasite Examination

Differential examination of the diagnosis of Coccidiosis disease that shows similar clinical symptoms requires qualitative testing, namely by flotation concentration, which is carried out at the Veterinary Parasitology Laboratory, Faculty of Veterinary Medicine, Udayana University. This examination is carried out to detect the presence of *Eimeria sp.,* which causes Coccidiosis disease, which is a differential diagnosis of Coccidiosis in pig (Luppi, 2017).

Table 1. Results of Anatomical Pathology Examination

Organs	Pathological Anatomical Changes
Brain	Hemorrhage
Trachea	Hemorrhage
Esophagus	There is no change
Lungs	Pneumonia
Heart	Hemorrhage
Liver	Changes in colour, haemorrhage, and swelling
Spleen	There is no change
Kidney	Haemorrhage and asymmetry
Stomach	Haemorrhage and the presence of a little mucoid secretion
Intestine	Hemorrhage
Uterine	There is no change

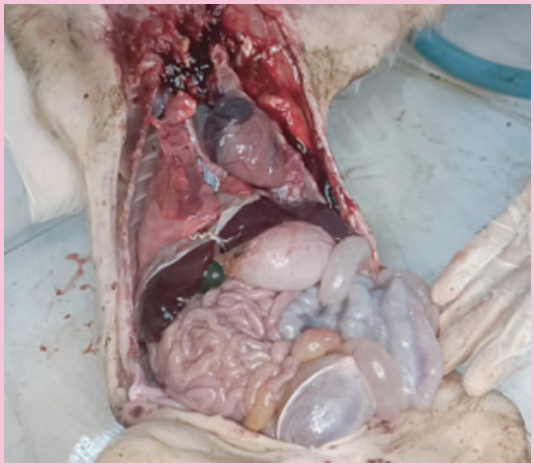

Figure 2. Necropsy Results of Case Pig

RESULT

Anatomical Pathology Examination

During necropsy, organ removal and separation were carried out for anatomical pathology observation and examination. The small and large intestines contained a slightly mucoid,

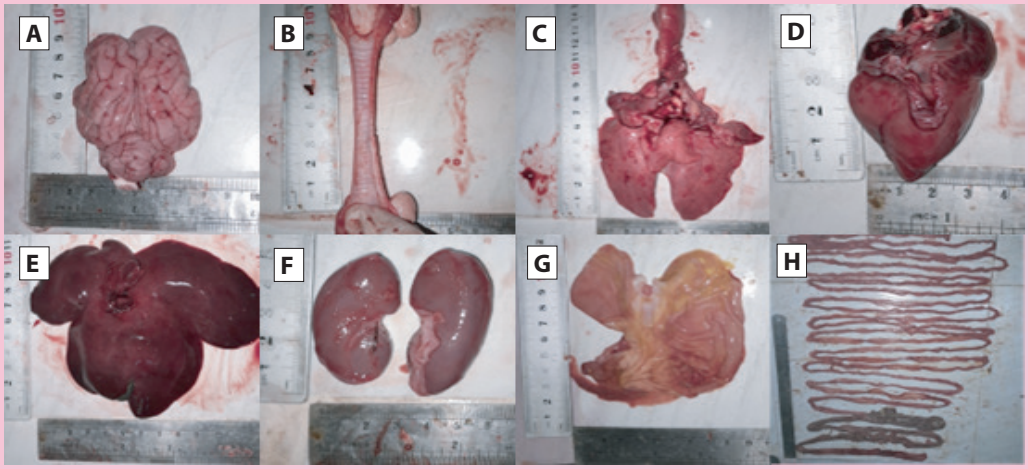

Figure 3. Pig Organ Case with Pathological Anatomical Changes Brain **(A)**, Trachea **(B)**, lungs **(C)**, Heart **(D)**, Liver **(E)**, Kidneys **(F)**, Stomach **(G)**, and Intestines **(H)**.

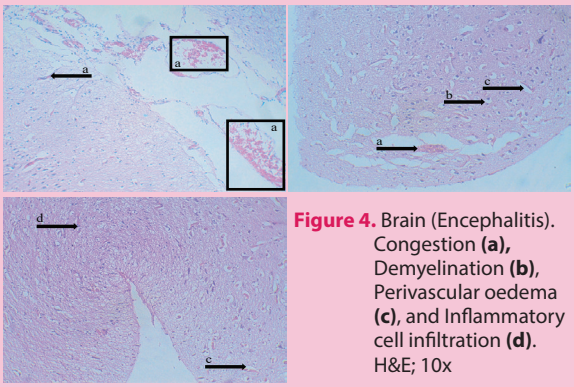

Figure 4. Brain (Encephalitis). Congestion **(a),** Demyelination **(b)**, Perivascular oedema **(c)**, and Inflammatory cell infiltration **(d)**. H&E; 10x

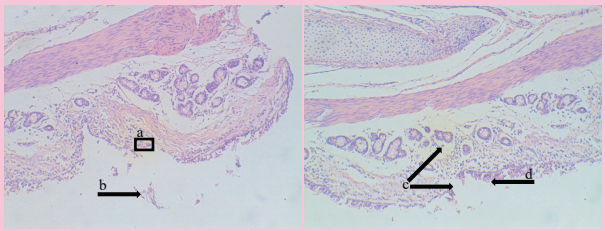

Figure 5. Trachea (Tracheitis haemmoragica et necrotican). Congestion **(a)**, Erosion of tracheal epithelial cells **(b)**, necrosis of tracheal epithelial cells with inflammatory cell infiltration **(c)**, and haemorrhage **(d)**. H&E; 10x

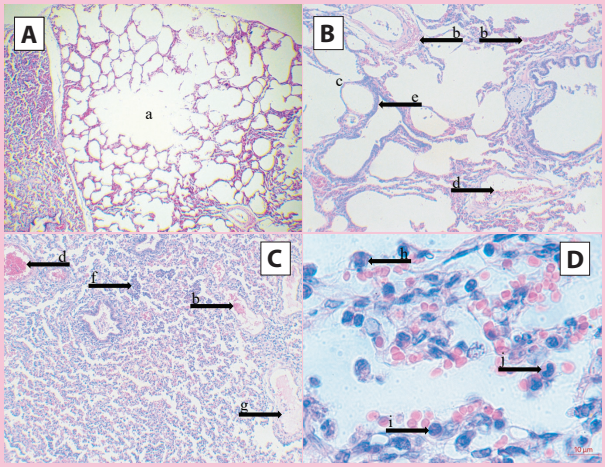

Figure 6. Lungs (Bronchopneumonia haemmoragica et necrotican), H&E; 4x **(A)**, 10x **(B and C)**, and 100x **(D).** Emphysema **(a)**, haemorrhage **(b)**, necrosis of alveolar septa **(c)**, congestion **(d)**, thickening of alveolar septa **(e)**, inflammatory cell infiltration **(f)**, oedema **(g)**, histiocyte inflammatory cells **(h)**, neutrophil inflammatory cells **(i)**, and monocytes **(j)**

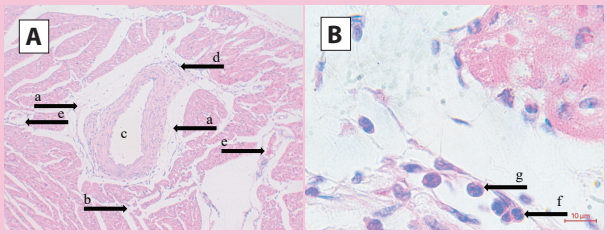

Figure 7. Heart (Myocarditis fibrinosa et necrotican), H&E; 10x **(A)** and 100x **(B)**. Fibrin **(a)**, myocardial necrosis **(b)**, oedema **(c)**, inflammatory cell infiltration **(d)**, congestion **(e)**, neutrophil inflammatory cells (f), and histiocyte inflammatory cells **(g)**.

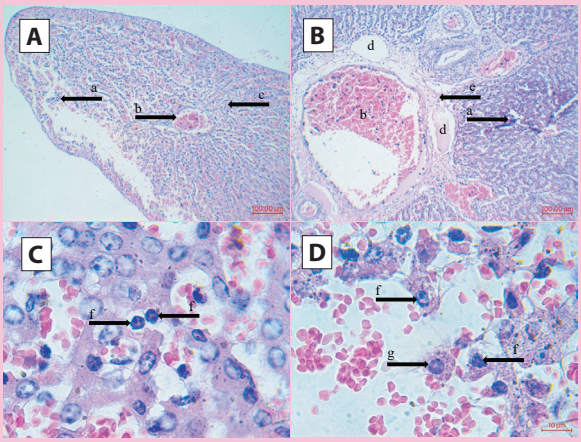

Figure 8. Liver (Hepatitis fibrinosa et necrotican), H&E; 10x **(A and B)**, 100x **(C and D)**. Necrosis **(a)**, Congestion **(b)**, Haemorrhage **(c)**, Oedema **(d)**, Fibrin **(e)**, Neutrophil inflammatory cells **(f)**, and Histiocyte inflammatory cells **(g)**.

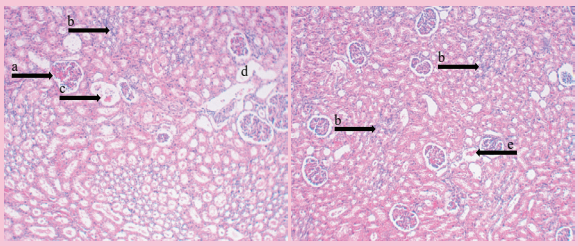

Figure 9. Kidney (interstitial nephritis). Glomerular haemorrhage **(a)**, Inflammatory cell infiltration **(b)**, Glomerular necrosis **(c)**, Oedema **(d)**, and Congestion **(e)**. H&E; 10x.

yellowish fluid, and both the large intestine and stomach appeared dilated. Gross lesions were also observed in the lungs, heart, and liver (Figure 2). The organs were subsequently separated, examined for pathological changes, and documented (Figure 3). The findings from these observations were summarized and recorded (Table 1).

Histopathology Examination

Histopathological samples were collected from organs suspected to have pathological changes based on clinical signs, allowing microscopic evaluation of tissue alterations (Figures 4–12). Based on the results of clinical examination, gross pathological findings, and histopathological observations under light microscopy, the case was diagnosed as Colibacillosis, with transmissible gastroenteritis (TGE) and coccidiosis considered as differential diagnoses.

Bacteriological Examination

Culture on Nutrient Agar produced round bacterial colonies measuring approximately 1–3 mm in diameter, with a convex surface and a milky-white appearance. Growth on Eosin Methylene Blue (EMB) Agar yielded elongated to round colonies displaying a characteristic metallic green sheen,

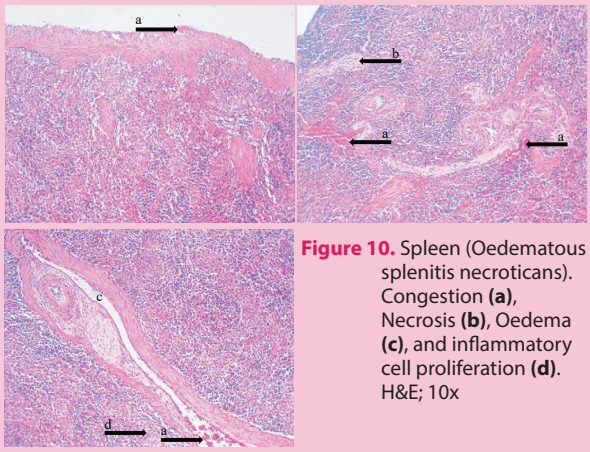

Figure 10. Spleen (Oedematous splenitis necroticans). Congestion **(a)**, Necrosis **(b)**, Oedema **(c)**, and inflammatory cell proliferation **(d)**. H&E; 10x

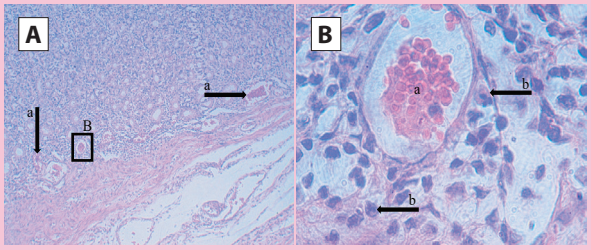

Figure 11. Stomach (Gastritis). H&E; 10x **(A)** and 100x **(B)**. Congestion **(a)** and neutrophil inflammatory cell infiltration **(b)**

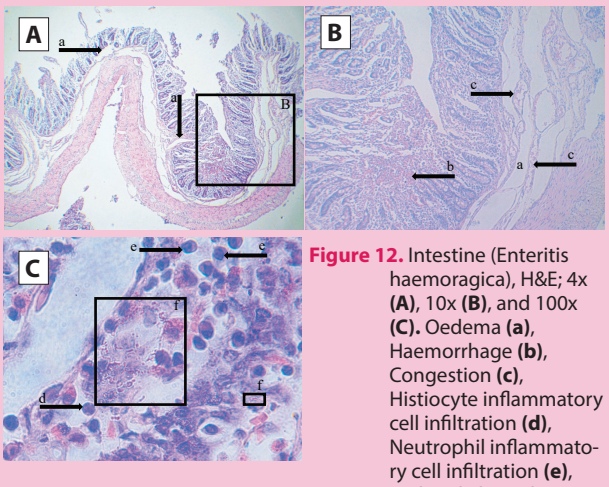

Figure 12. Intestine (Enteritis haemoragica), H&E; 4x **(A)**, 10x **(B)**, and 100x **(C).** Oedema **(a)**, Haemorrhage **(b)**, Congestion **(c)**, Histiocyte inflammatory cell infiltration **(d)**, Neutrophil inflammatory cell infiltration **(e)**, and Rod-shaped bacteria are visible **(f)**.

consistent with lactose-fermenting enteric bacteria typically found in intestinal samples. Gram staining demonstrated red-coloured, rod-shaped organisms, indicating the presence of Gram-negative bacteria. Primary and biochemical tests further characterized the isolate. The organism was catalase positive. On Triple Sugar Iron Agar (TSIA), it produced an acid slant and an acid butt without gas formation and without hydrogen sulfide production. The Sulfide Indole Motility (SIM) test showed positive indole production and motility, while sulfide formation remained negative. The isolate also tested positive on the methyl red assay, indicating stable acid production from glucose fermentation. In contrast, the

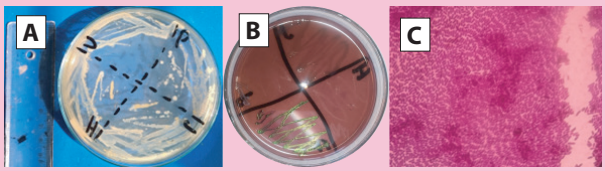

Figure 13. Results of Bacterial Isolation in NA **(A)** and EMBA **(B)** Media and Gram Staining of Intestine Samples **(C).** Intestinal (U), liver (H), lung (P), and heart (J) samples

Simmon Citrate Agar test was negative, demonstrating an inability to utilize citrate as the sole carbon source. The glucose fermentation test was positive, confirming the isolate's capacity to ferment glucose. Based on the cultural, morphological, and biochemical characteristics, the isolate is consistent with a Gram-negative, lactose-fermenting, indole-positive enteric bacterium. These findings strongly support the identification of *Escherichia coli* as the causative agent in this case.

Parasitology Examination

A differential diagnostic evaluation for coccidiosis, a condition that can present with clinical signs similar to other enteric diseases, was conducted using a qualitative flotation concentration technique. This examination aimed to detect *Eimeria spp.,* the etiological agents of coccidiosis, in order to confirm or exclude the disease as a differential diagnosis in the affected swine. Parasitological testing was performed on fresh cecal fecal samples using three standard methods: native examination, sedimentation concentration, and flotation concentration. All methods yielded negative results, indicating the absence of *Eimeria spp.* in the samples examined. Based on these findings, coccidiosis can be excluded as the underlying cause of the clinical manifestations observed in this case.

DISCUSSION

Colibacillosis caused by enterotoxigenic *Escherichia coli* (ETEC) in pigs is a major contributor to economic losses worldwide, including in Indonesia. Based on the epidemiological findings in this case, the morbidity rate was 1.89%, the mortality rate was 0.63%, and the case fatality rate reached 33.33%. Although these values are lower than those reported in Japan and Bali (Besung, 2010; Barros *et al.,* 2023), they still demonstrate that the disease had a clinical impact on the affected pig. The relatively lower mortality compared to global estimates (Castro *et al.,* 2022) further suggests that the outbreak was limited in scope on this farm. E. coli accumulating in feces serves as the primary source of infection, and the bacteria can survive for extended periods and be transmitted mechanically (Olaitan *et al.,* 2015; Costa *et al.,* 2017).

The clinical signs observed in this pig brown watery diarrhea, decreased appetite, and depression are characteristic of ETEC infection. ETEC colonizes the jejunum and ileum through fimbriae and produces enterotoxins that stimulate excessive secretion of water and electrolytes, resulting in diarrhea, dehydration, and weight loss (Barros *et al.,* 2023). The onset of clinical signs shortly after weaning further supports this

pathogenic mechanism. Histopathological findings were consistent with ETEC colibacillosis. The small intestine exhibited dilation, edema, and hemorrhage, while the stomach showed dilation accompanied by fundic hemorrhage (Luppi, 2017). Hemorrhages were also present in the brain, trachea, liver, and heart. The lungs showed evidence of pneumonia, and the kidneys were asymmetric with areas of hemorrhage. These multisystemic lesions indicate circulatory disturbances and increased vascular permeability associated with ETEC enterotoxins (Rahmawandani *et al.,* 2014; Meha *et al.,* 2016). The spleen and uterus showed no abnormalities.

Bacteriological examination confirmed *E. coli* as the causative agent. The biochemical profile positive catalase, indole, motility, methyl red, and glucose fermentation, along with negative citrate and H_2S was consistent with *E. coli* (Giddey *et al.,* 2015; Dewi *et al.,* 2021). The A/A reaction on TSIA and alpha-hemolysis on blood agar further supported this diagnosis. Parasitological examination revealed no Eimeria spp. oocysts using native, sedimentation, or flotation techniques, thereby ruling out coccidiosis as a differential diagnosis (Pratiwi *et al.,* 2020). Transmissible gastroenteritis (TGE) was also considered due to overlapping clinical signs; however, the low morbidity and mortality observed on this farm were inconsistent with typical TGE outbreaks (Liu and Gerdts, 2021; Chen *et al.,* 2023a; Chen *et al.,* 2023b). Additionally, the anatomical pathology findings did not support a diagnosis of TGE, and the disease was excluded.

This case underscores the importance of improved hygiene and biosecurity to prevent fecal contamination, as *E. coli* can persist for long periods in the environment (Olaitan *et al.,* 2015; Costa *et al.,* 2017). Routine cleaning and disinfection, proper feed management, and vaccination of susceptible herds may help reduce disease incidence. Antibiotics such as amoxicillin, gentamicin, trimethoprim, and enrofloxacin may be administered when guided by antimicrobial susceptibility testing (Luppi, 2017). This study has several limitations. First, it is a single case study, and therefore the findings cannot be generalized to the broader pig population in the region. Second, bacterial identification was conducted using basic biochemical tests and did not include molecular confirmation such as PCR for fimbriae or toxin genes (e.g., F4, F18, LT, ST) thus limiting the characterization of the pathogenic *E. coli* strain. Third, virological examination was limited, so co-infections with viruses such as PEDV or rotavirus cannot be fully ruled out. Additionally, management factors such as feed changes or weaning stress could not be thoroughly investigated. These limitations should be considered when interpreting the findings and should be addressed in future research.

CONCLUSION

The pathological and histopathological examinations revealed hemorrhages in the brain, trachea, liver, heart, kidneys, stomach, and intestines, along with pneumonia in the lungs. The intestines and stomach also exhibited dilation and edema, accompanied by inflammatory cell infiltration in the intestinal mucosa. Bacteriological testing confirmed the presence of alpha-hemolytic *Escherichia coli,* while fecal parasitology yielded negative results, thereby excluding parasitic involvement. The convergence of clinical signs, characteristic gross and microscopic lesions, and bacteriological confirmation provides strong evidence that this case was caused by enterotoxigenic *E. coli* (ETEC), resulting in colibacillosis. These findings underscore the importance of integrating pathological and microbiological assessments to achieve an accurate diagnosis and to guide effective preventive and therapeutic strategies.

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CONFLICT of INTEREST

All authors declare that no conflict of interest exists.

FUNDING INFORMATION

This study received no external funding. All aspects of the case report, including data collection, analysis, and publication, were conducted using the facilities and infrastructure provided by the faculty.

ETHICAL APPROVAL

This case report did not require ethical approval, as no experimental procedures were performed on the animal. All diagnostic examinations and clinical assessments were conducted as part of routine veterinary care. Informed consent was obtained from the animal owner prior to the use of the clinical data and samples for publication purposes.

AUTHORS' CONTRIBUTIONS

The management of the clinical case, including data recording, data processing, and preparation of the initial manuscript draft, was carried out by GSDY. Supervision of case management, recommendations for diagnostic confirmation, evaluation of post-diagnosis outcomes, and critical revision of the manuscript were provided by IKTPG. The anatomical and histopathological assessments, along with guidance on diagnostic and post-diagnostic interpretation and critical input on the manuscript, were contributed by IBOW. Contributions to differential diagnostic analyses and constructive feedback on manuscript development were provided by IAPA. Support in processing and interpreting epidemiological data, as well as critical review of the manuscript, was offered by TKS.

REFERENCES

Barros, M.M., Castro, J., Araújo, D., Campos, A.M., Oliveira, R., Silva, S., Outor-Monteiro, D., and Almeida, C., 2023. Swine Colibacillosis: Global Epidemiologic and Antimicrobial Scenario. *Antibiotics,* 12, 682.

Besung, I.N.K., 2010. Kejadian Kolibasilosis Pada Anak Babi. *Majalah Ilmiah Peternakan,* 1–12.

Castro, J., Barros, M.M., Araújo, D., Campos, A.M., Oliveira, R., Silva, S., and Almeida, C., 2022. Swine Enteric Colibacillosis: Current Treatment Avenues and Future Directions. *Frontiers in Veterinary Science*, 9, 2022.

Chen, S., Zhang, H., Chu, M., Cheng, W., Zhai, J., Wang, H., Chen, X., and Qi, Y., 2023. Prevalence of Transmissible Gastroenteritis among Swine Populations in China during 1983–2022: A Systematic Review and Meta-Analysis. *Microbial Pathogenesis,* 183, 106320.

Chen, Y., Zhang, Y., Wang, X., Zhou, J., Ma, L., Li, J., Yang, L., Ouyang, H., Yuan, H., and Pang, D., 2023. Transmissible Gastroenteritis Virus: An Update Review and Perspective. *Viruses,* 15, 359.

Costa, A., Gusmara, C., Gardoni, D., Zaninelli, M., Tambone, F., Sala, V., and Guarino, M., 2017. The Effect of Anaerobic Digestion and Storage on Indicator Microorganisms in Swine and Dairy Manure. *Environmental Science and Pollution Research,* 24, 24135–24146.

Dewi, A.P., Wardaniati, I., and Suryani, E.Y., 2021. Identifikasi Bakteri Escherichia Coli Pada Air Minum Isi Ulang di Kelurahan Tampan Kecamatan Payung Sekaki Pekanbaru. *Jurnal Farmasi Higea,* 13(2), 73.

Dewi, N., Suarjana, I., Suardana, I., Winaya, I., and Apsari, I., 2025. Case Of Streptococcosis In Piglet At Tua Village, Marga, Tabanan, Bali. *Buletin Veteriner Udayana*, 7(3), 1062-1074.

Dharmayanti, A., 2022. Laporan Kasus: Gambaran Patologi Anatomi dan Histopatologi Babi Landrace yang Terinfeksi Hog Cholera dan Cacing. *Buletin Veteriner Udayana,* 14(2) 79-89.

Duarte, M.E., Garavito-Duarte, Y., and Kim, S.W., 2023. Impacts of F18+ Escherichia coli on Intestinal Health of Nursery Pigs and Dietary Interventions. *Animals,* 13(17), 2791.

Fairbrother, J., and Nadeau, E., 2019. Colibacillosis. Diseases of Swine. Wiley.

Giddey, K.F., Kidd, M., Britz, T.J., Sigge, G., and Lamprecht, C., 2015. Impact of Hydrogen Peroxide Treatment on Environmental Escherichia coli Strains. *Journal of Applied & Environmental Microbiology,* 3, 49-57.

Liu, Q., and Gerdts, V., 2021. Transmissible Gastroenteritis Virus of Pigs and Porcine Epidemic Diarrhea Virus (Coronaviridae), in: *Encyclopedia of Virology.* Elsevier, pp. 850–853.

Luppi, A., 2017. Swine Enteric Colibacillosis: Diagnosis, Therapy and Antimicrobial Resistance. *Porcine Health Management,* 3, 16.

Luppi, A., D'annunzio, G., Torreggiani, C., and Martelli, P., 2023. Diagnostic Approach to Enteric Disorders in Pigs. *Animals,* 13(3), 338.

Meha, H.K.M., Berata, I.K., and Kardena, I.M., 2016. Derajat Keparahan Patologi Usus dan Paru Babi Penderita Kolibasilosis. *Indonesia Medicus Veterinus,* 5(1), 13–22.

Melo, M., and Melo, C., 2025. Problemas de Epidemiología Veterinaria. Instituto Universitario de Innovación Ciencia y Tecnología Inudi Perú S.A.C.

Okoko, I.M., Maina, N., Kiboi, D., and Kagira, J., 2020. β-lactam Resistance in Bacteria Associated with Subclinical Mastitis in Goats in Thika Subcounty, Kenya. *Veterinary World,* 13(7), 1448-1456.

Olaitan, A.O., Thongmalayvong, B., Akkhavong, K., Somphavong, S., Paboriboune, P., Khounsy, S., Morand, S., and Rolain, J.-M., 2015. Clonal Transmission of A Colistin-Resistant Escherichia Coli from A Domesticated Pig to A Human in Laos. *Journal of Antimicrobial Chemotherapy,* 70, dkv252.

Pratiwi, D.A., Suratma, I.N.A., and Dwinata, I.M., 2020. Prevalence and Risk Factors of Coccidia Infection in Pig in The Highlands of Bali Province. *Indonesia Medicus Veterinus,* 9(6), 900–909.

Rahmawandani, F.I., Kardena, I.M., and Berata, I.K., 2014. Gambaran Patologi Kasus Kolibasilosis Pada Babi Landrace. *Indonesia Medicus Veterinus,* 3(4), 300-309

Sewoyo, P., Winaya, I., Berata, I., Adi, A.a.a.M., Dayanti, M.D., Grahadi, R., and Takariyanti, D., 2022. Laporan Kasus: Klinikopatologi Anak Anjing yang Mengalami Enteritis dan Miokarditis Akibat Infeksi Canine Parvovirus. *Buletin Veteriner Udayana,* 14(6), 693-704