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# Anatomical pathology features in day-old chicks with omphalitis

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**ABSTRACT:** Omphalitis, an infection caused by various bacteria entering the exposed umbilicus or bloodstream, significantly contributes to chick mortality within the first week post-hatch, often due to suboptimal hygiene practices during hatching. This study aimed to characterise the effects of omphalitis on day-old chicks (DOCs) by examining the anatomical and pathological changes. Necropsies were performed on four DOCs at Poultry Breeding Development Center Jatiwangi, Majalengka, West Java, Indonesia. Observations revealed that the infected chicks had small body sizes, dull feathers, enlarged yolk sacs, and unhealed umbilici. Anatomical pathology revealed abdominal distension, necrotic yolk stalks, and greenish, foul-smelling yolk sacs.

**Keywords:**
day-old chick, omphalitis, anatomical pathology

## ■ INTRODUCTION

Omphalitis, also known as yolk sac infection, is a bacterial infection of the umbilicus and a leading cause of chicken mortality, particularly within the first week after hatching (Amare *et al*. 2013). Infections caused by various bacterial species can enter through an exposed umbilicus or via the bloodstream, leading to reabsorption failure and, in severe cases, septicaemia (Kaboudi *et al*. 2021). Omphalitis significantly reduces the quality of day-old chicks (DOC), resulting in considerable economic losses to poultry farms. Despite its endemic presence in Indonesia (Wibisono *et al*. 2022), published reports on omphalitis cases in DOCs are limited. This case study aimed to identify the anatomical and pathological characteristics of DOCs associated with omphalitis.

## ■ METHODS

Necropsy was performed at the Poultry Breeding Development Center (BPPTU) in Jatiwangi, Majalengka, West Java, Indonesia, on four DOCs samples. During antemortem examination, the chicks exhibited characteristics such as small body size, dull feathers, a protruding yolk sac, and an uncovered umbilicus (Figure 1). Postmortem examination involved opening the abdomen to observe any anatomical pathological changes in the selected DOC samples (Figure 2).

## ■ RESULT AND DISCUSSION

The performance characteristics of DOCs affected by omphalitis included smaller body size, weighing less than 30 g, and displaying dull, sparse feathers (Figure 1). Omphalitis also causes the umbilicus to fail to close correctly, leading to protrusion of the yolk sac (Figure 2A, Figure 2B). Anatomical pathology revealed abdominal distension (Figure 2D) and necrosis (Figure 2F) of the yolk stalk and conduit between the gastrointestinal tract and yolk sac. This necrosis is identifiable by its blackened appearance, with the yolk turning greenish and emitting a foul odour (Figure 2G).

Figure 1. Changes in the external appearance of a day-old chick (DOC) with omphalitis, small body and dull coat.

In this case study, DOCs affected by omphalitis exhibited distinctive traits such as small body size, dull feathers, and discharge from the yolk sac due to incomplete closure of the umbilicus. This condition also led to inflammation and discolouration of the yolk sac, accompanied by a noticeable foul odour. According to Amare *et al*. (2013), the highest

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mortality rate among chickens due to omphalitis occurs within the first 4-5 days of life, with a subsequent decline in mortality observed between days 7-10.

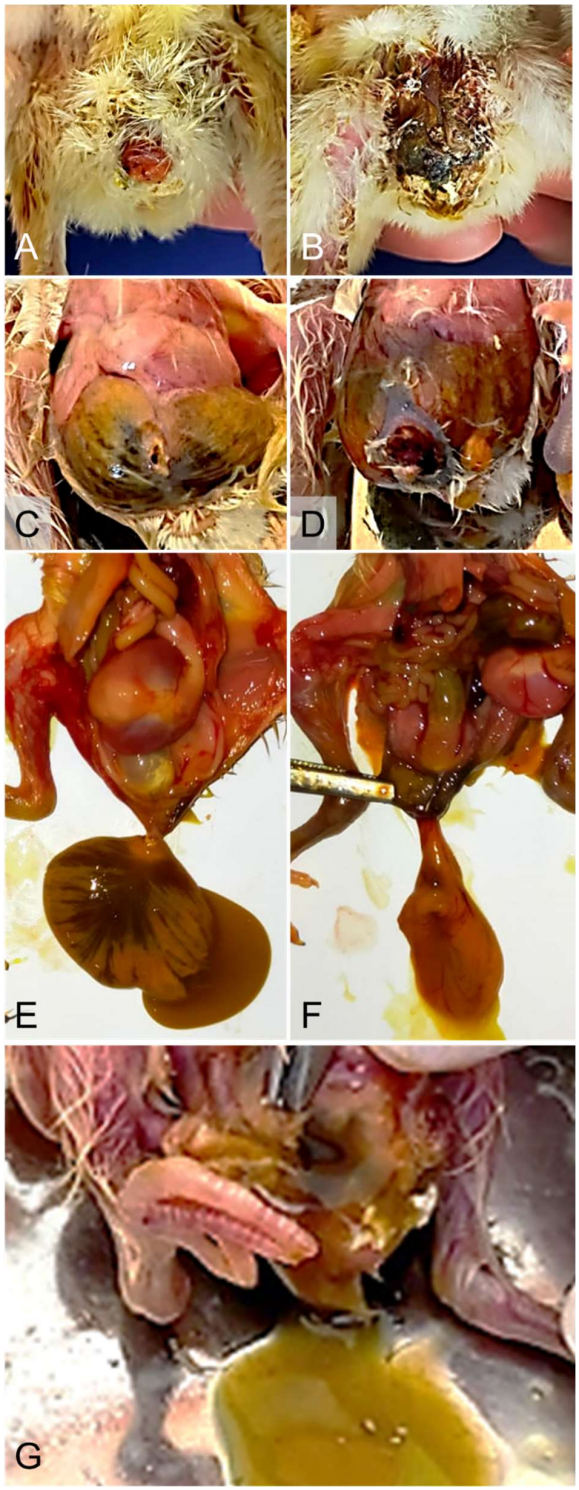


Figure 2. Anatomical pathology features of day-old chick (DOC) with omphalitis. Umbilicus not completely closed in (A) mild and (B) severe condition, (C) normal DOC abdomen, (D) abdominal distension in DOC with omphalitis, (E) normal and (F) necrosis of the diverticulum, and (G) greenish discoloration of the yolk.

The yolk sac plays a crucial role in the development of chicks, serving as a major site for haematopoiesis and serum protein synthesis while also acting as a biological barrier against pathogens. Before hatching, the yolk sac typically forms a diverticulum attached to the digestive tract and remains within the abdominal cavity after birth (El-Sawah *et al*. 2016). Omphalitis occurs when bacteria contaminate the eggshell and penetrate its pores, often due to inadequate hatchery management and hygiene. Poor practices, such as failure to disinfect eggs or equipment, especially hatching machines or unclean surfaces, significantly increase the risk of bacterial contamination. When contaminated eggs hatch, the bacteria can infect DOCs (Amare *et al*. 2013, Jalob *et al*. 2015). Common bacterial pathogens associated with yolk sac infections include *Escherichia coli*, *Staphylococcus* sp., *Streptococcus* sp., *Pasteurella* spp., and *Proteus* sp. (Poland & Raftery 2019, Jalob *et al*. 2015). Infection by *E. coli* can originate from the chick's digestive tract or bloodstream and may also occur while the chick is still in the hatchery (Swayne 2019, Poland & Raftery 2019).

## ■ CONCLUSION

In this case, day-old chicks (DOCs) suffering from omphalitis exhibited a distinct anatomical pathology, including abdominal distension and necrosis of the yolk stalk, resulting in black discolouration. Additionally, the yolk had a greenish hue and emitted a foul odour. The most noticeable physical sign of omphalitis was a protrusion of the yolk sac caused by incomplete closure of the umbilicus.

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## ■ REFERENCES

Amare A, Amin AM, Shiferaw A, Nazir S, Negussie H. 2013. Yolk sac infection (omphalitis) in Kombolcha poultry farm, Ethiopia. American-Eurasian Journal of Scientific Research. 8(1):10-14.

El-Sawah A, Dahshan A, Nasef S, El-Nahass E, Nayel A. 2016. Characterization of *E. coli* and *salmonella* spp. isolates associated with omphalitis in baby chicks. Journal of Veterinary Medical Research. 23(1):61-70.

Jalob ZK, Farhan WH, Ibrahiem ZY, Jumaa BN. 2015. Bacteriological and pathological study of omphalitis in broiler chicks. Kufa Journal for Veterinary Medical Sciences. 6(2):17-26.

Kaboudi K, Mamlouk A, Romdhane RB, Khayech M, Bouzouaia M. 2021. Gross pathology and bacteriological study of the yolk sac infections (omphalitis) in broiler chicks, North East Tunisia. Revue Marocaine des Sciences Agronomiques et Vétérinaires. 9(3).

Poland G, Raftery A. 2019. BSAVA manual of backyard poultry medicine and surgery.

Swayne DE. 2019. Diseases of poultry. 14th edition. John Wiley & Sons.

Wibisono F, Effendi M, Wibisono F. 2022. Occurrence, antimicrobial resistance, and potential zoonosis risk of avian pathogenic *Escherichia coli* in Indonesia: a review. International Journal of One Health 2022:76-85.