

# FIRST DETECTION OF SYSTEMIC PORCINE CIRCOVIRUS 3 ASSOCIATED DISEASE IN SWITZERLAND

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## Introduction

Circoviruses are single-stranded DNA viruses that infect a wide spectrum of animals. In pigs, four different circoviruses have been identified. Porcine circovirus 3 (PCV-3), first reported in 2015, has been detected worldwide in pigs with or without clinical signs. However, knowledge of clinicopathological and epidemiological aspects of PCV-3 infection and the pathogenic effect of the virus is limited.



**Figure 1:** 6-week-old piglet with «humpy-back syndrome» (lumbar kyphosis and thoracic lordosis).

## Material and Methods

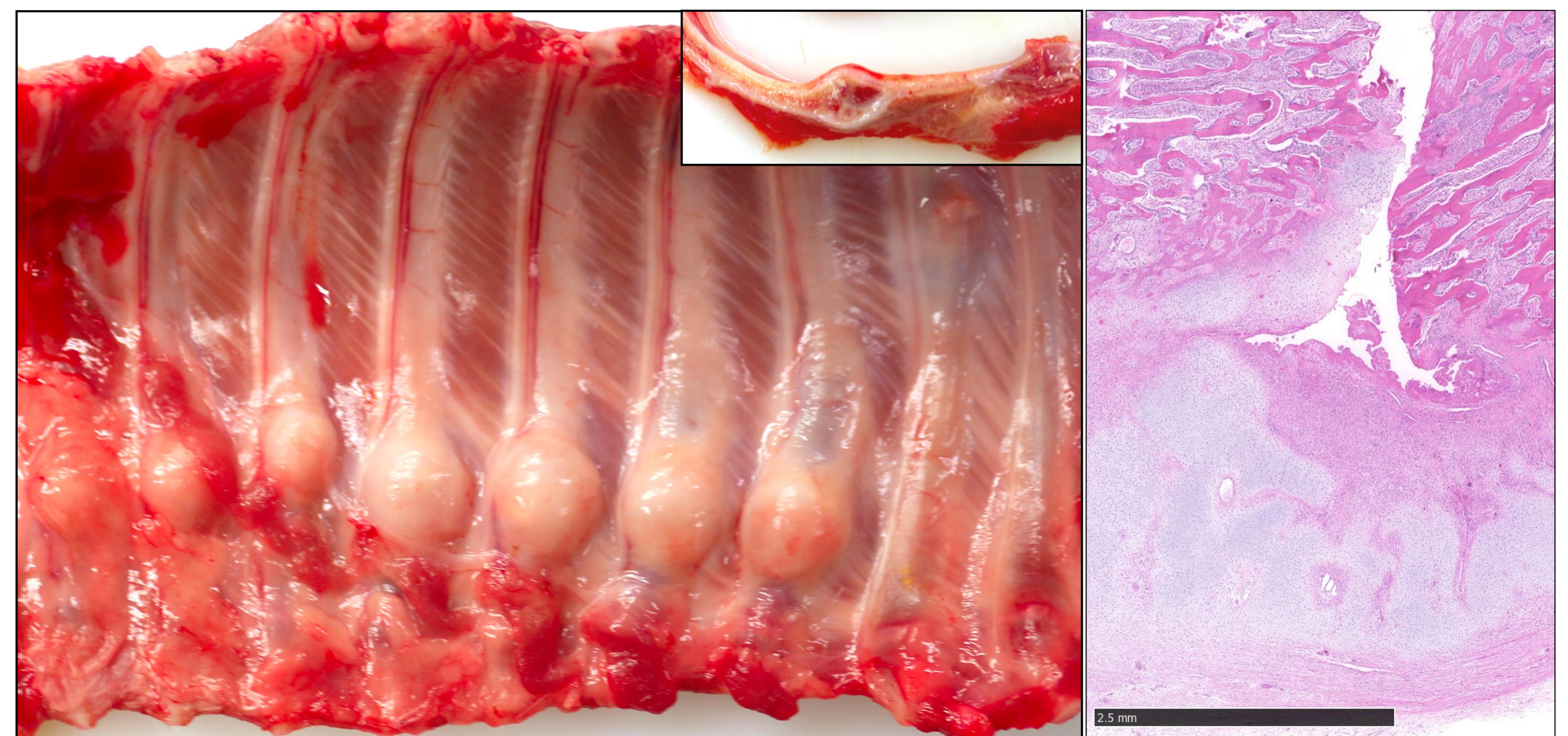
In March 2023, an increase in spinal deformities, characterised by an upward curvature of the lumbar spine (kyphosis) and downward curvature of the thoracic spine (lordosis), a condition known as “humpy-back syndrome” (Fig. 1) was reported in a Swiss breeding farm. Additionally, suckling and weaners piglets showed thickened ribs and facial oedema in otherwise unremarkable clinical condition.

Three 4- to 6-week-old piglets were euthanized and submitted for diagnostic examinations.

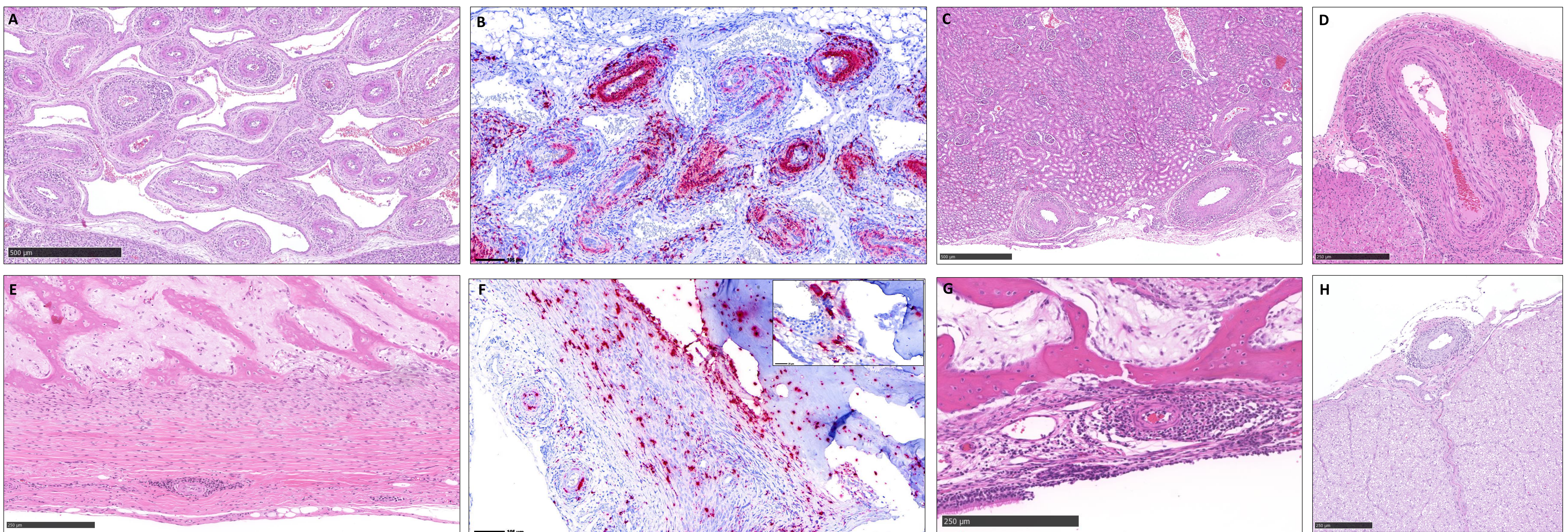
Full necropsy and histological examination were performed. Based on the findings of the histological examination, a qPCR and *in situ* hybridisation (ISH) were performed to detect PCV-3 DNA and RNA, respectively, in multiple organs.

## Results

- In macroscopic examination, the animals showed multiple differently pronounced rib fractures with prominent callus formation. Histologically, callus formations were composed mainly of cartilage (Fig. 2).
- Histologically, several internal organs (including vascular mesenteric plexus, kidney, nasal turbinate, heart and spinal cord) and costal periosteal arteries exhibited (peri-)arterial lymphohistiocytic and plasmacytic infiltrates (Fig. 3).
- ISH detected abundant PCV-3 RNA in rib (periosteal arterial wall, osteocytes and osteoblasts), mesenteric arteries (intima and media; Fig. 3B, 3F) and renal arteries.
- The qPCR for PCV-3 revealed high viral loads (Ct values 18 - 24) in kidney, heart and mesenteric lymph node.



**Figure 2:** Left thoracic rib cage showing seven adjacent ribs with prominent callus formation (left) and corresponding histological image (right). Insert: longitudinal section through callus revealing the rib fracture.



**Figure 3:** Histology and ISH. Vascular mesenteric plexus (A), kidney (C), myocardium (D), costal periosteum (E), nasal turbinate (G) and spinal meninges (H) showing lymphohistiocytic and plasmacytic (peri-)arterial infiltrates mainly involving the tunica adventitia. H&E. Vascular mesenteric plexus (B) with strong PCV-3 ISH positive signals of the arterial tunica intima and media as well as rib (F) with multifocal signals in the intima of the periosteal arteries, the periosteum and within osteocytes and osteoclasts (insert). PCV3-ISH, red-chromogenic staining counterstained with hematoxylin..

## Conclusions

This is the first report on PCV-3 infections in Switzerland. The histological lesions in this case match the descriptions of PCV-3 systemic disease, but for the first time the virus has been detected in bone lesions. In the last decade, authors reported cases of “humpy-back” pigs exhibiting histologically inflammatory vascular lesions comparable to those reported here. Therefore, pathomorphological investigations and possible detection of PCV-3 is recommended in pigs displaying bone lesions and “humpy-back” posture.

## References

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