IDEXX LABORATORIES

DIAGNOSTIC UPDATE

IDEXX Reference Laboratories • March 2014

IDEXX Reference Laboratories Introduces the Canine Circovirus RealPCR™ Test

Veterinarians now have a routine diagnostic test to detect this new canine pathogen

Introduction

Circoviruses infect birds and mammals and cause a variety of disease syndromes. Until recently, porcine circovirus types 1 and 2 (PCV1 and PCV2) were the only two circoviruses reported to infect mammals.[1] PCV2 is widespread and one of the most economically important viral pathogens in the pig industry worldwide.[2,3] One of the more salient features of PCV2 infections is the frequency of coinfection with other pathogens and the synergistic effect of this on the outcome and severity of disease.

Canine circovirus: a new disease entity in dogs

Canine circovirus (DogCV) was first detected in 2012 in serum samples from several dogs[4] and was discovered independently in multiple tissues from sick dogs.[5,6] Prevalence studies indicate that infection with DogCV is ubiquitous but not common. In one study, the virus was present in 2.9% (6/205) of serum specimens tested, although the health status of those dogs was not presented.[4] In an independent retrospective study using real-time PCR, the detection rate of DogCV in blood specimens from dogs with thrombocytopenia and neutropenia or dogs with fever of unknown origin was not significantly different from the prevalence of virus detected in serum from healthy dogs (3.3% [19/480][5] and 2.9% [6/205][4], respectively). DogCV was, however, more prevalent in fecal specimens from dogs with diarrhea (11.3% [19/168]) compared to fecal specimens from healthy dogs (6.9% [14/204])[5].

Canine circovirus associated disease

Canine circovirus is detectable in blood and feces of both healthy and sick dogs. It is likely that many, if not most, infections with DogCV would be associated with mild disease or are subclinical. However, in retrospective studies, there is a subset of animals in which DogCV infection contributes to disease and/or death. DogCV has been documented in the blood, feces, liver, spleen, lymph nodes, kidney, pancreas and intestines of sick animals by multiple methods, including PCR, immunohistochemistry (IHC) and in situ hybridization (ISH)[5]. Presenting signs of identified animals to date have included vomiting, diarrhea, hemorrhagic diarrhea, lameness and tetraparesis.

The spectrum of gross and histologic lesions in these infected dogs was broad, but the common finding was either vasculitis or overt vascular necrosis.[5] Other less consistent microscopic findings included granulomatous lymphadenitis, pancreatitis, adrenalitis, interstitial nephritis and renal tubular necrosis.

Circovirus coinfections common in animals with diarrhea

Circovirus-associated diseases have been shown to be multifactorial in pigs, and the same is believed to be true for dogs. The interaction between PCV2 and host is complex, but PCV2 is accepted as the essential causal agent.[7–9] In particular, concomitant viral and bacterial infections with PCV2 increase the incidence or severity of disease.[7] In a comparable study, among dogs with diarrhea and infected with DogCV, the majority (68%) were determined by the IDEXX Canine Diarrhea RealPCR™ Panel to be coinfected with one or multiple other pathogens, including canine enteric coronavirus, *Cryptosporidium* spp., *Clostridium perfringens* alpha toxin, *Giardia* spp., *Salmonella* spp., *Campylobacter jejuni* and/or *Campylobacter coli*.[5] While the significance of coinfection in the pathogenesis of DogCV is currently unclear, testing for other intestinal pathogens is important to help establish the causal role of DogCV.

Using the Canine Circovirus RealPCR™ Test in your practice

The Canine Circovirus RealPCR™ Test has been incorporated into the Canine Comprehensive and Comprehensive Plus Diarrhea RealPCR™ Panels. It is also available as a stand-alone test that can be added to other canine diarrhea RealPCR panels or can be performed on other appropriate specimens when carcovirus is suspected in animals with other compatible clinical signs.

Consider testing dogs with the following:

- Diarrhea (possibly hemorrhagic) and hematochezia
- Progressive vomiting
- Unexplained vasculitis
- Intracavitary hemorrhage
- Unexplained progressive neurologic signs

Treatment

Supportive treatment similar to other enteric infections is indicated. In addition, because circovirus is associated with vasculitis, dogs should be carefully monitored for development of disseminated intravascular coagulation and cardiovascular compromise.

Ordering information

test code	test name and contents
2625	**Diarrhea RealPCR™ Panel (Comprehensive)—Canine** *Campylobacter coli, Campylobacter jejuni,* canine circovirus, canine distemper virus (CDV), canine enteric coronavirus (CECoV), canine parvovirus 2 (CPV-2), *Clostridium perfringens* alpha toxin (CPA) gene, *Cryptosporidium* spp., *Giardia* spp. and *Salmonella* spp. RealPCR™ tests. If positive for *Salmonella* spp., a culture with susceptibilities on selective media for *Salmonella* will be automatically performed at no additional charge. **Note:** The reflex culture will only be performed if a specimen in fecal culture transport media is received. • 5 g (1 g minimum) fresh feces in a sterile container (keep refrigerated) for RealPCR panel and 3–5 g fresh feces in fecal culture transport media for reflex *Salmonella* spp. culture if indicated. Collect specimen prior to antibiotic administration.
3257	**Diarrhea RealPCR™ Panel (Comprehensive Plus)—Canine** *Campylobacter coli, Campylobacter jejuni,* canine circovirus, canine distemper virus (CDV), canine enteric coronavirus (CECoV), canine parvovirus 2 (CPV-2), *Clostridium perfringens* alpha toxin (CPA) gene Quant, *Clostridium perfringens* enterotoxin (CPE) gene Quant, *Cryptosporidium* spp., *Giardia* spp. and *Salmonella* spp. RealPCR™ tests. If positive for *Campylobacter* spp. or *Salmonella* spp., a culture on selective media (with susceptibilities for *Salmonella*) will be automatically performed at no additional charge. Includes quantification of *Clostridium perfringens* enterotoxin (CPA and CPE) genes if PCR positive. **Note:** The reflex culture will only be performed if a specimen in fecal culture transport media is received. • 5 g (1 g minimum) fresh feces in a sterile container (keep refrigerated) for RealPCR panel and 3–5 g fresh feces in fecal culture transport media for reflex *Salmonella* spp. culture if indicated. Collect specimen prior to antibiotic administration.
3571	**Circovirus RealPCR™ Test—Canine** • Ideal specimen depends on clinical manifestation. Acceptable specimens include 5 g (1 g minimum) fresh feces in a sterile container, 2 mL EDTA whole blood (LTT), 0.5 mL (0.1 mL minimum) CSF; tissue aspirates or biopsies. Keep feces, blood and fluids refrigerated.

Turnaround time: 1–3 working days; allow additional time for culture if indicated.

Contacting IDEXX

Laboratory Customer Support

If you have any questions regarding test codes, turnaround times or pricing, please contact our Laboratory Customer Support Team at 1-888-433-9987.

Expert Feedback When You Need It

Our team of internal medicine specialists is always available for complimentary consultation. Please call 1-888-433-9987, if you have questions.

Turnaround time

The IDEXX nationwide network of reference laboratories provides daily courier service or IDEXX-Direct® service to pick up your samples and forward them to our IDEXX Molecular Diagnostics Laboratory in California. IDEXX RealPCR tests are run daily, Monday–Friday. Samples received on Saturday or Sunday are processed on Monday. You can expect results within 1–3 working days, depending on shipping time.

References

1. Segalés J, Kekarainen T, Cortey M. The natural history of porcine circovirus type 2: from an inoffensive virus to a devastating swine disease? *Vet Micro.* 2013;165(1–2):13–20.
2. Opriessnig T, Meng XJ, Halbur PG. Porcine circovirus type 2 associated disease: update on current terminology, clinical manifestations, pathogenesis, diagnosis, and intervention strategies. *J Vet Diagn Invest.* 2007;19(6):591–615.
3. Chae C. Postweaning multisystemic wasting syndrome: a review of aetiology, diagnosis and pathology. *Vet J*. 2004;168(1):41–49.
4. Kapoor A, Dubovi EJ, Henriquez-Rivera JA, Lipkin WI. Complete genome sequence of the first canine circovirus. *J Virol*. 2012;86(12):7018.
5. Li L, McGraw S, Zhu K, et al. Circovirus in tissues of dogs with vasculitis and hemorrhage. *Emerg Infect Dis.* 2013;19(4):534–541.
6. Delwart E. Animal virus discovery: improving animal health, understanding zoonoses, and opportunities for vaccine development. *Curr Opin Virol.* 2012;2(3):344–352.
7. Opriessnig T, Halbur PG. Concurrent infections are important for expression of porcine circovirus associated disease. *Virus Res*. 2012;164(1–2):20–32.
8. Langohr IM, Stevenson GW, Nelson EA, et al. Vascular lesions in pigs experimentally infected with porcine circovirus type 2 serogroup B. *Vet Pathol.* 2010;47(1):140–147.
9. Delwart E, Li L. Rapidly expanding genetic diversity and host range of the Circoviridae viral family and other Rep encoding small circular ssDNA genomes. *Virus Res.* 2012;164(1–2):114–121.

The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment, you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical presentation and complete laboratory data. With respect to any drug therapy or monitoring program, you should refer to product inserts for a complete description of dosages, indications, interactions and cautions.

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