Equine*Review*

Introduction: this edition of the Equine Review has a focus on strangles, looking at serological testing, the possibility of an insect vector, issues of contamination of equipment used for diagnosis and the effect of penicillin on the immune response.

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Serological testing for *Streptococcus equi* subsp *equi* antigens to identify carriers

In the *Equine Veterinary Journal*, Andy Durham and Jeremy Kemp-Symonds presented the results of screening tests from horses admitted to the Bransby horses sanctuary (2020. https://doi.org/10.1111/evj.13276). At admission, horses undergo both paired serological testing for antibodies against *Streptococcus equi* antigens A and C and bilateral guttural pouch lavage to identify strangles carriers. Of 287 horses examined, nine (3.1%) were found to be guttural pouch carriers. There was no significant association between serological status and guttural pouch carriage of *S. equi*. Only one of the nine carriers (11%) was seropositive using a cut-off of OD ≥0.5, and only three of nine (33%) using a cut-off of OD ≥0.3. Of the 35 seropositive horses, only one was positive on polymerase chain reaction (PCR) of bilateral guttural pouch lavage samples. The authors advised caution when relying on serology as a screening test for chronic carriage of *S. equi*.

In an editorial in the same issue, Philip Ivens and Scott Pirie discussed the diagnosis of *S. equi* (2020. https://doi.org/10.1111/evj.13319). They postulated that a proportion of *S. equi* carriers undergo a temporal reduction in serological response to the residual bacteria present within the guttural pouch; for example through reduced epitope exposure, bacterial genetic mutation or immunological adaptation.

Molecular detection of *S. equi* subsp *equi* in face flies during a strangles outbreak

In *Medical and Veterinary Entomology*, Nicola Pusterla from The University of California, Davis with colleagues from other institutions presented data that open up the possibility of *S. equi* being transmitted by insect vectors (2020;34(1):120–122. https://doi.org/10.1111/mve.12394). A total of 1856 face flies (*Musca autumnalis*) were trapped during an outbreak of strangles and 0.54% were positive for *S. equi* on PCR. It would be a big leap from *S. equi* DNA being present in flies to demonstrating that flies can carry and transmit sufficient bacterial loads to spread infection and induce clinical strangles. However, muscid flies are vectors in the transmission of *S. dysgalactiae* in cattle and *Corynebacterium pseudotuberculosis* in horses.

Residual contamination by *S. equi* subsp *equi* of endoscopes and twitches

Transmission of *S. equi* on fomites is well established. Svonni and colleagues from the Swedish University of Agricultural Sciences evaluated the efficacy of different disinfectant methods to eliminate *S. equi* from experimentally contaminated endoscopes and twitches (2020. https://doi.org/10.1111/evj.13248). Endoscopes were experimentally infected and then cleaned with ethanol, 2-aminoethanol and didecyldimethylammoniumchloride disinfectant (Everbrite super), ortho-phthalaldehyde disinfectant (Cidex) or Automatic Endoscope Reprocessor, acetic acid disinfectant (APERLAN Poka-Yoke Agent A and Agent B). Cultures were negative following cleaning on all occasions except one when ethanol was used. PCR frequently remained positive following cleaning with all solutions, indicating the presence of residual DNA. Twitches were experimentally infected and then either cleaned by wiping/dipping or disinfected by submersion for 10 minutes. Cleaning with a surfactant-based cleaner (Yes Original, Procter & Gamble) did not eliminate *S. equi* on either plastic handles or cotton ropes. Following disinfection with potassium monopersulphate (DesiDos), potassium peroxymonosulphate (Virkon), cidex (Ortho-phthalaldehyde) or sodium hypochlorite solution (Klorin), *S. equi* was not identified on culture. Only sodium hypochlorite solution was effective in eliminating DNA such that PCR tests gave negative results.

Effect of penicillin treatment on seropositivity to *S. equi* subsp *equi* specific antibodies

Another publication from the Swedish University of Agricultural Sciences investigated the effect of penicillin on humoral antibody responses (2020;34(1):294–299. https://doi.org/10.1111/jvim.15668). While it has long been suggested that antimicrobial treatment of horses with strangles impaired the development of immunity to *S. equi*, the only evidence was a single case report. In a field outbreak of strangles, seven horses received penicillin within 11 days of onset of fever, five between 16 and 22 days after onset of fever, and the remaining 29 received no antibiotics during clinical disease. Although all horses were seropositive to *S. equi* within 2 months of the index case, significantly fewer horses treated early remained seropositive by 4–6 months. This supports the assertion that antimicrobials may impair the long-term humoral immune response.

Intramuscular vaccination with Strangvac is safe and induces protection against strangles

An exciting development in the battle against strangles is the prospect of an effective vaccine. In work led by researchers from The Animal Health Trust, the immunogenicity and efficacy of a novel multi-component chimeric fusion protein vaccine (Strangvac) was assessed following administration to ponies via intramuscular injection (2020;38(31):4861–4868. https://doi.org/10.1016/j.vaccine.2020.05.046). Strangvac was safe and induced robust antibody responses toward the vaccine components in serum and the nasopharynx. These were boosted by revaccination up to 12 months after a primary course of two vaccinations 4 weeks apart. The vaccine response did not cross-react with the diagnostic serological test which identifies horses that have been exposed to *S. equi*, showing that it was possible to differentiate infected from vaccinated animals. The authors concluded that Strangvac is a valuable tool with which to protect horses from strangles. EQ