

# Small animal *Review*

**Summary:** In the Small Animal Review, we summarise three papers published recently in other veterinary journals. This month includes a paper on creating antibiograms, pathogenesis of gall bladder mucocoeles and using non-invasive high-flow nasal catheters to provide supplemental oxygen in hypoxemic animals.

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## Antibiograms in clinical practice

The increased prevalence of antimicrobial resistance is a major concern in veterinary health care, and practices are encouraged to develop a local antibacterial policy (LAP). The emphasis of a LAP should be placed on using data from culture and sensitivity, to inform the antimicrobial selection. However, there are occasions when this might not be possible, in which case the LAP will identify the antimicrobials that can be used empirically. This decision can be informed by data from an antibiogram, or a cumulative summary of resistance patterns.

Antibiograms are not yet widely used in veterinary practices, primarily because of issues with collating the necessary information. Frey and Jacobs (2020) (*AVMA* <https://doi.org/10.2460/javma.257.9.950>) identified a method for developing antibiograms. Using data from 391 isolates, primarily from urine and skin, they constructed antibiograms for 12 practices that showed the number of each bacteria isolated and the percentage of organisms sensitive to a range of antimicrobials. The main issue was achieving 30 isolates of each organism, which is the level recommended in human health care. Therefore, the authors opted to create antibiograms using a minimum of 15 isolates for each site, for each practice, but even then they were only able to create antibiograms for *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, and *Staphylococcus pseudintermedius*.

The outcome of their work is that practice level antibiograms are unlikely to be feasible because of the number of isolates required, although the authors produced a workflow to enable the production of an antibiogram, which might be useful to large practices or those with multiple branches. At this point in time, it is most likely that the use of local or

regional antibiograms, produced by individual diagnostic labs, will be valuable to guiding empiric antimicrobial use. An example is the Scottish One Health Antimicrobial Use and Antimicrobial Resistance report, produced by Health Protection Scotland. The antibiogram, although useful, is not an alternative to culture and sensitivity testing, but is an adjunct to guide empirical antibiotic use.

## Gall bladder mucocoele

Gall bladder mucocoele (GBM) is a biliary disorder characterised by distension of the gall bladder from the accumulation of bile and mucus. An increased risk has been suggested for various breeds, including Border Terriers, that may be associated with gluten sensitivity, which can result in gall bladder hypomotility caused by a reduction in cholecystokinin (CCK) secretion. Other suggested factors that may predispose its development include hyperlipidaemia, hyperadrenocorticism and hypothyroidism.

Barker et al (2020) (*J Small Anim Pract* <https://doi.org/10.1111/jsap.13211>) report on whether serum markers of gluten sensitivity are associated with CCK secretion in dogs with GBM. Data from 15 Border Terriers and 17 other breeds with GBM, and 14 control Border Terriers with non-biliary diseases, showed that the Border Terriers with GBM had significantly higher median transglutaminase-2-IgA (TG2 IgA) autoantibody levels and cholecystokinin concentrations than control Border Terriers, but there was no difference in their anti-gliadin IgG levels. No difference was reported between the affected other breeds and either of the other groups for these parameters. No differences were identified between the two affected groups in respect of histological changes, presence of endocrine disorders or bile bacteriology.

The diagnosis of gluten sensitivity in humans involves identifying serum antibodies to gliadin or auto-antibodies to transglutaminases but their value in dogs is less well understood. The report of increased TG2 IgA suggests a similar immunological disorder may exist in Border Terriers with GBM. The observation that CCK concentrations are lower in affected dogs supports the suggestion that gall bladder hypomotility underlies the formation of mucocoeles. Switching affected Border Terriers to a gluten-free diet leads to an improvement in clinical signs, brought on by raised CCK levels, as seen in humans. These results provide some evidence that diet might be helpful in managing this disorder in Border Terriers.

## Nasal oxygen delivery

Supplemental oxygen support may be required in hypoxemic patients, but its provision can be problematic. High-flow nasal cannula (HFNC) oxygen therapy, a non-invasive method used in human medicine, may be useful in supporting animals. The technique blends high-flow rates of oxygen and air to provide inspired oxygen (FiO<sub>2</sub>), in concentrations ranging from 21–100%. The mixture is warmed and humidified, then delivered via soft silicone binasal prongs allowing for flow rates of around 2 litres/kg/min. In humans, HFNC is better tolerated than traditional facemasks and improves respiratory function and blood gas variables. Jagodich et al (2020) (*J Vet Emerg Crit Care* <https://onlinelibrary.wiley.com/doi/full/10.1111/vec.12970>) reported their use of HFNC in 22 dogs with significant respiratory disease to determine the feasibility of its use and effect on managing hypoxemia. The 22 dogs were recruited where traditional methods of providing oxygen therapy ineffective. Oxygen was supplied by HFNC for up to 7 hours and, relative to measurements made while receiving oxygen in a traditional way, HFNC resulted in reduced respiratory rates and dyspnoea scores, and increased peripheral capillary oxygen saturation. Markers of respiratory function showed that 60% of dogs responded to the use of HFNC at 30 minutes, with 45% of the dogs responding by 7 hours and surviving. HFNC is a practical non-invasive method of improving oxygenation, that bridges the gap between traditional methods of oxygen support and mechanical ventilation.