ASAP LABORATORY NEWS MAY 2015 – PART A

Hi everyone

Please find below Part A of our May ASAP newsletter. As its going to be a big one, we thought we would break it up to 2 parts, starting the popular Adrenal Series by Dr Sue foster.

ADRENALS: What you won't find in a textbook

Dr. Sue Foster, our medicine specialist consultant, is sharing her knowledge and experience in an 8-part series on Adrenal Disease. Here is the third part. Please let us know what you think.

PART 3: ROUTINE CLINICAL PATHOLOGY

Hyperadrenocorticism (hyperA)

HAEMATOLOGY

1. Lymphopenia and absolute eosinopenia are the most frequently cited haematologic abnormalities (approximately 80% of dogs according to Feldman and Nelson 2004). However, they are not always present. Lymphocyte counts in hyperA dogs at our lab quite often seem to be normal which would be consistent with the finding in one study that only 14% dogs with hyperA had lymphopenia (Peterson, 1984). Eosinopenia seems far more common than lymphopenia (consistent with the figure of 84% by Peterson, 1984). However, eosinophils can be normal to increased if there is a concurrent eosinophilic process (uncommon but occasionally seen).
2. Nucleated red cells are seen quite commonly (usually in low numbers, 1-3/100 WBC). Whilst this number would be classed as normal, it is more common in dogs with hyperA than in other dogs of similar age with no reported history or signs typical of hyperA. It is associated with reduced splenic trapping of the nucleated red cells (Cowell et al 2008).
3. High normal or increased platelet counts are often apparent. The cause and significance of this is unknown.

BIOCHEMISTRY

1. Increased alkaline phosphatase (ALP) is widely cited as the most common routine laboratory abnormality but it is not always increased. A normal ALP does not rule out hyperA.
2. Increased ALP is largely due to induction of a specific ALP isoenzyme by glucocorticoids. Although this isoenzyme can be evaluated, it has been shown that an increase can be caused by a variety of disorders and is not specific for hyperadrenocorticism (Solter et al 1993). The steroid-induced iosenzyme cannot be used to distinguish spontaneous or iatrogenic hyperA from liver disease or diabetes mellitus for example. It is often stated that 70-100% of the increase in hyperA dogs will be due to this isoenzyme but this is certainly not always the case with either iatrogenic or spontaneous hyperA (Feldman and Nelson 2004).
3. Lipaemia is very common in hyperA dogs. Most of the old studies that reported biochemistry findings did not report the frequency of hypertriglyceridaemia in hyperA dogs as veterinary laboratories have not typically run triglyceride concentrations. The triglyceride increases in hyperA dogs are often quite marked and the serum/plasma consequently often has a strawberry milkshake appearance, even on a fasted sample. HyperA should always be on the DDx list for fasting hypertriglyceridaemia in an otherwise well dog (or cat!). This also

holds for breeds such as Miniature Schnauzers, not of all which will have familial hypertriglyceridaemia; Miniature Schnauzers do get hyperA (see Adrenal News 1). If the sample is fasted, it is worth requesting triglyceride concentration in addition to routine serum biochemistry on any geriatric dog blood in addition to suspected hyperA cases.
4. Mild hyperglycaemia is reported as occurring in 45-60% of hyperA dogs (Peterson 1984, Feldman and Nelson 2004) but this would not be the case in most of our Australian cases. Whilst hyperglycaemia can occur, it would seem to occur at a much lower rate in our patients.
5. Alanine aminotransferase (ALT) is commonly increased but again, not necessarily. It is not usually increased to the same extent as ALP.
6. Urea concentration may be decreased due to polydipsia.
7. Hypokalaemia and hypernatraemia may occasionally be seen and are probably more common in dogs with adrenal tumours as the cause of their hyperA (presumably excessive mineralocorticoid secretion).
8. Bile acids test results may be increased in dogs with hyperA (Center et al 1985).
9. Serum lipase may be increased by exogenous corticosteroids (dexamethasone) thus possibly by endogenous glucocorticoids also. Although it would not be routinely measured in hyperA cases, this must be borne in mind when analysing lipase in potential pancreatitis cases. A recent study has confirmed the suspicion of most internists that cPLI is often increased in healthy dogs with hyperadrenocorticism (Mawby et al 2014).

URINE
1. Urine in dogs with hyperA is usually isosthenuric or hyposthenuric and in one old study (Meijer 1980), 80-85% of dogs had a USG <1.013. However, as we often pick up hyperA much earlier (ie before they become textbook classics) that figure is probably an overestimate in modern medicine. Not all hyperA dogs have polydipsa/polyuria as presenting signs; only 82% of 300 hyperA dogs had PU/PD in one report (Peterson 1984). In addition, many dogs can concentrate their urine reasonably after being in a hospital (see Adrenal News 2) so the urine concentration measured at any one moment, could be hyposthenuric, isosthenuric or concentrated.
2. Urinary tract infection (UTI) reportedly occurs in 40-50% of hyperA dogs (Feldman and Nelson 2004). Again, I think it would be interesting to review that figure. Frequency of UTI has probably decreased with earlier detection of the disease but as urine culture is not routine, this is impossible to assess.
3. It is important to remember that a) hyperA dogs with UTIs may not have any pyuria or haematuria (presumably because of the anti-inflammatory effect of excess glucocorticoids) and b) routine sediment examination on a wet preparation may fail to detect white cells and bacteria in dilute or weakly concentrated urine. A stained, air-dried smear will increase detection of both white cells and bacteria but culture is usually required to detect UTIs in dogs with hyperA. UTIs may well be undiagnosed in hyperA dogs.

Hypoadrenocorticism (hypoA)

HAEMATOLOGY
1. Lack of a stress leucogram in a sick dog can be an indication of hypoA and may be the only clinicopathologic abnormality in dogs with glucocorticoid deficient (atypical) hypoA. When I ask veterinarians about the leucogram in suspected hypoA cases, the common response is “Everything is normal”. Remember, a normal leucogram can be quite abnormal for a collapsed dog and each count should be assessed with respect to the dog.
2. Lymphocytosis is not always present.

3. Lymphopenia is a good "rule-out" for hypoA. I have never seen a hypoA case with lymphopenia however, a study on lymphocyte counts in dogs with hypoA (Seth et al 2011) did identify a few low lymphocyte counts. In this study, 100% of hypoA dogs had a lymphocyte count $>0.75x10^9$/L and 92% had lymphocyte counts $>1.00x10^9$/L.
4. Eosinophilia is also not always present.
5. I have never yet seen a hypoA dog with an eosinophil count of 0, thus an eosinophil count of 0 would be a good "rule-out" for hypoA. Let me know if you have a hypoA dog with an eosinophil count of 0!

BIOCHEMISTRY

1. A Na:K ratio of <27 is NOT diagnostic for hypoA. In one study only 24% of dogs with Na:K ratio <24 had hypoA and 41% of dogs had renal disease (Roth and Tyler 1999). It is worth noting that all dogs in that study with Na:K ratios <15 had hypoA. Other diseases causing low Na:K ratios include whipworm (and other gastrointestinal diseases), renal disease, pancreatitis, diabetes mellitus, pyometra and body cavity effusions. Another larger, more recent study showed that whilst hypoA was the most common cause of a Na:K ratio <27, only 16.7% of dogs with Na:K ratio <27 had hypoA (and that was after the cases with suspected EDTA contamination had been removed from the sample population).

GENERAL

1. Combining the Na:K ratio with the lymphocyte count is diagnostically superior for screening than either alone (Seth et al 2011).
2. A faecal flotation test should be performed in all dogs with a low Na:K ratio. Occasionally dogs have both whipworm and hypoA!!
3. A manual differential white cell count (of at least 100 cells) is mandatory in order to detect hypoA leucocyte "patterns" with any accuracy. Most of the in-house analysers would not perform with high enough accuracy (Papasouliotis et al 1999, Bienzle et al 2000, Papasouliotis et al 2006) to detect the subtle "patterns" of hypoA.

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Register for our next Webinar tuesday 2nd June, 8PM - Non-Chemotherapy Options for Cancer


Dr. Laura Brockley & Dr. Maureen Cooper. Registered Specialists in Small Animal Oncology. Victorian Animal Cancer Care

There are many ways to attack cancer, chemotherapy is NOT the only medical treatment. This lecture will touch on some more recent therapies such as immunotherapy, small molecule inhibitors and monoclonal antibodies.

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