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CHALLENGES IN EXOTIC ANIMAL MEDICINE

Or Exotic Animal Medicine, how I see it.

POVM a 4 Step Process
- Problem-oriented veterinary medicine is a cyclical process directed toward identifying a specific diagnosis and implementing effective treatment.
- At each step mistakes can throw the system off track

Problems with POVM

- P-issues:
  - What test is validated?
  - What drugs work?

What is the other option?
- Evidence-based veterinary medicine is a process used to guide clinical decision making, by integrating current best evidence with individual clinical expertise, client wishes, and patient needs.

Relatively New Concept
- Introduced in 1992
- Has the potential to be considered "elitist"
- Does not mean personal experience and expertise should be thrown out the window

This is where we go wrong
- Dr. A sees a patient with a disease that has to be treated with a drug B that has not been well researched in the species C.
- The drug B is given by Dr. A
- The client calls later to report that the animal died 8 hours later the same day.
- The owner (and Dr. A) now believe that it was drug B that killed the animal.

How to start?
- The process starts by composing a focused clinical question,
- then answering that medical uncertainty through the use of critically appraising evidence.

Without evidence, there should be no conclusion
- Often no necropsy is performed (no toxicology data is collected) !!
- Often allometric scaling is not considered and the drug was overdosed!!
- Would you use the drug again? Or call you colleagues to warn them not to use the drug again in this species?

Finding Evidence to Answer the Question
- Look in peer reviewed journals, books, online.
- And evaluate the evidence
- One of the most difficult parts.

Appraising the Available Evidence
- The evidence should be integrated with the client's wishes, the specific patient's needs, and the expertise and judgment of the attending veterinarian.
- Almost all exotic animal medicine review articles are "narrative,"citing published literature in support of the authors' opinions.

Final step: Evaluate !

Stay balanced
- For instance, an academician might prioritize research-based evidence.
- And not offer any treatment/advice until an expensive diagnostic test (e.g. CT scan) is performed.
- 'Parachute approach to evidence based medicine'

Randomized control study really needed?

The Clinician
- Practitioners may concentrate on personal clinical experience and expertise.
- "We have always done it like this…"
- 'Eminence based medicine....'

The 'Animal lover'

- The "animal lover" may focus primarily on the emotional value of the pet, often without taking clinical experience, facts or research-based evidence into consideration.

Who is the animal's advocate?

- Owners may act emotionally and may not see the animal suffering.
- Clinicians might put their skill set as highest priority.
- Patient can't voice preference.

The Obvious and others
Problems with EBVM

- One challenge is locating and assessing relevant publications before making a clinical decision.
- Many articles are published in other languages, and numerous publications are either out of print, not listed by familiar internet search engines, etc.
- An overwhelming quantity of scientific information is published in biological or human medical journals instead of the veterinary literature.

In reality..

- it is not a true lack of evidence that precludes us from practicing EBVM; rather, it is a perceived lack of readily accessible, clinically applicable scientific evidence.

The psychological factor

- Self-directed criticism is difficult to accept for many veterinarians, but it can be rewarding when a retrospective review of similar case presentations is compared with current practice methods using EBVM.
- Self-improvement is gratifying and can motivate continued dedication to EBVM.

Examples

- Different cases to illustrate EBVM in exotic animal medicine in action.
- These cases have all been presented at national meetings.

Signalment

- A 650 gm two-year old intact male pet rat presented due to a 3-week history of decreased thirst, apparent blindness and sudden personality change.
- The animal appeared more aggressive towards the owner and did not appear to see fingers approaching.
- The owners noticed that he stopped drinking.
- On physical examination, he was in good body condition and able to move around his cage.
- However, he appeared unaware of his surroundings, was visually unresponsive and seemed aggressive.

The tentative diagnosis

- Based on the history, the physical examination findings and the animal's age, our primary differential diagnosis was a pituitary tumor.
- The owner consented to an MRI scan of the rat's brain.
- The imaging study was performed with the MRI magnet at Tufts Cummings School of Veterinary Medicine.
  - The magnet has a field strength of 1.5 Tesla.

Conclusion

- Conclusion: Large mass, likely pituitary in origin, with peripheral mineralization or hemosiderin deposition. Cerebellar compression and possible herniation

Treatment

- The rat was immediately placed on cabergoline (0.6 mg/kg PO q72h).
- The drug was compounded by a local pharmacy into a liquid.
- The cost was about $30 per treatment
- ($10/day or $300/month)
- The owner did not report any problems with the oral delivery of the drug.

Clinical course

- The owner reported a significant improvement of the clinical signs approximately 2 days after the first dose was given.
- The owner was under the impression that the animal was able to see.
- Attitude of animal improved, eating and drinking normally
- Follow up
- Eight weeks after the start of the therapy the patient returned for a follow-up imaging study.

- The owner reported significant improvement at home including loss of aggressive behavior and increase in activity.
- The physical examination was unremarkable.

A final recheck

- About 8.5 months after the start of the treatment the animal was represented for a recheck and re-evaluation of the pituitary mass.
- This time the animal was in poor condition and showed similar clinical signs to those shown during the initial presentation.
- The animal appeared to be paralyzed in the hind legs but was visual.
- The haircoat was rough and the animal had lost a significant amount of bodyweight (from 650 gr to 500 gr).
- Significant respiratory distress was present.
- Due to the poor quality of life, Jerry was humanely euthanized.
- A fully necropsy was performed.
- The pituitary gland stained positive with IHC for prolactin.

Case 2:

The lame goose

Clinical Presentation

- Presented to the clinic with 1 week history of decreased appetite, mild lethargy, and intermittent limping
- On the physical exam the patient was bright and alert, no swelling, no limp
- Radiographs were unremarkable (DDX: soft tissue injury)
- Carprofen

Second Clinical Presentation

- Returned due to more severe lameness on left leg
- Eating well, intermittent activity despite lameness
- No lameness during the physical exam
- Radiographs repeated

Radiographs

- Bony changes noted in left mid-tibiotarsal bone
- Recommended nuclear scintigraphy

Nuclear Scintigraphy

- Increased uptake in the left mid-tibiotarsal bone consistent with increased metabolic activity

Diagnostic Biopsy

- Palpable mass 0.5 x 1 cm, biopsy revealed interlacing bundles and streams of spindled cells.

Avian Osteosarcoma

- Most publications report single cases or retrospective pathology studies, or are on discussion boards (VIN)
- Most reported cases were euthanized shortly after the diagnosis.
- More pathology data than clinical data.
- No published case series studying treatment of avian osteosarcoma

Avian Osteosarcoma
Doolen M. Proc Ann Conf Assoc Avian Vet, 1994.

Adriamycin Chemotherapy in a Blue-Front Amazon with Osteosarcoma.

- 6 mo with swelling from commissure of mouth to canthus of eye
- Biopsy c/w osteosarcoma, no complete resection, recurred
- Treated with doxorubicin based on canine (30 mg/m2) extrapolation for metabolic rate, 60 mg/m2 monthly x4
- Report complete clinical and radiographic remission at 20 months

Avian Osteosarcoma
Radiotherapy in the avian patient

– Study of high-dose RT done in 12 ring-necked parakeets
– Treated with 48, 60, or 72 Gy in 12-18 fractions
– No mucosal, skin, or clinical differences between groups
– Doses up to 72 Gy may be used safely
– One case report using RT for osteosarcoma in birds
– 14 yo umbrella cockatoo with right orbital osteosarcoma
– Enucleation, then total dose 68 Gy in 17 fractions
– Completed therapy without complications or evidence of recurrence or metastases, died 2 months later

Treatment Plan
- Combination of palliative radiotherapy and chemotherapy
- Radiation for 3 doses of 8 Gy over 3 weeks for a total of 24 Gy
- Chemotherapy with carboplatin (5 mg/kg IV) q3-4 weeks
- Monitor for myelosuppression and other systemic side effects prior to each dose
  – (CBC and Chem profile)
- Continued carprofen, tramadol, and gabapentin for ongoing lameness

Clinical Course
- Tolerated radiotherapy, however lameness increased in severity
- Birds appear resistant to RT side-effects (and treatment)
- Repeat scintigraphy with increased uptake, possibly due to remodeling/ healing or persistent disease. No new lesions

Clinical Course
- Tolerated carboplatin well but remained painful after several months.
  – Pamidronate (1 mg/kg slow i.v. Infusion (~ 3 hours) q 3-4 weeks) added for bone pain management.
- Bisphosphonates
  – They inhibit osteoclast function via induction of apoptosis, thus inhibiting bone resorption
  – In vitro, they inhibit cancer cell growth, angiogenesis, cytokines
  – Potential clinical use in bone pain and metastasis inhibition
  – A recent study in canine osteosarcoma found single-agent pamidronate (1.0 mg/kg) was effective for palliative bone pain and increased relative bone mineral density in affected bones.

Clinical Course
- 3 weeks after starting with the pamidronate the patient was without gait abnormalities or evidence of pain
- He received more than 24 doses of carboplatin and 20 doses of pamidronate without any apparent side effects.

Our conclusion so far:
– Carboplatin and pamidronate have been effective at controlling osteosarcoma progression for a long time with no apparent side effects in this patient.

Clinical update
- Boswell is doing okay 50 months after the diagnosis of osteosarcoma.
- He is the longest known surviving avian patient with osteosarcoma.

~20 months later

Case 3:
Hyperthyroidism in the Guinea pig
Facts
- Guinea pigs have a relatively high number of thyroid pathologies on post mortem exams.
- Only a few reports exist in the literature.
- They are usually PM reports
- No clinical papers exist.
- In the English literature

Facts
- In the German literature, the clinical problem of hyperthyroidism in guinea pigs is stated as a common problem.
- Treatment is considered routine.

Questions
- Why do we not see any cases in our clinics?
- Why is there no mention of this problem in the English literature?
- Why do clinicians in other countries see it and treat it ?

A closer look
- Why do other clinicians see it and treat it ?
- It appears that the problem is over-diagnosed in Germany.
- Author of book established T4 value from own GP population (n<20) .
- These values appear significantly lower when compared to scientific publications

Possible feedback
- Why do we not see any cases in our clinics?

AND

- Why is there no mention of this problem in the English literature?

Clinical presentation
- Common clinical findings
- However, a wide variety of clinical signs have been reported.

The hungry pig

- weight loss, anorexia, alopecia/thin pleage on dorsum
- weight loss, anemia, tachycardia, alopecia/thin pelage on dorsum, 2x3 cm neck mass
- weight loss, anemia, tachycardia
- pig eats voraciously but has now dropped to 0.55 kg and is very thin...eats lots of pellets and veggies
- chronic weight loss and just overall not acting normal for a few weeks
- noticeable weight loss despite a great appetite
- few months history of wt loss, acting fine, eating well, teeth OK
- Unable to keep body condition for several years. Body condition score 2/9. Has continued to have a good appetite. Very active. Small (3 mm) oval subcutaneous mass palpable on R side of ventral neck. Dry skin and coat

Clinical Suspicion

Diagnosis
- The diagnosis can be difficult as results from various diagnostic tests can often be inconclusive.
- The T4 and T3 blood concentrations have been somewhat unreliable indicators, both to confirm disease and to monitor the response to medical treatment.
- It is possible to encounter an animal with severe clinical signs but without significantly elevated T4 and T3 levels.

Published normal values exist

Diagnosis
- The diagnostic option of choice is nuclear scintigraphy as it appears to be a reliable method to detect a hyperactivity of an organ.
- As an alternative choice of imaging an ultrasound exam of the thyroid can be performed to detect any anatomical changes.

Diagnosis

Therapy
- The drug of choice is methimazole
- Drug dosages have been extrapolated from cat dosages and range from 0.5 to 2 mg/kg PO q24h.
- Surgical excision can be a complicated due to the anatomical location of the thyroid gland.
- Thyroid carcinomas might not be possible to excise completely due to extensive vascular and other vital tissue involvement.
- So far 2 patients have been treated with I-131 resulting in a great quality of life.
- In both cases 1 mCi was administered subcutaneously once.
- One died 14 months later, one is still doing well, 10 months post-treatment.
- The patient's T4 level was rechecked 3 weeks, 3 months and 6 months later.
- Basically 3 options ranging from non-invasive, to minimally invasive, to very invasive

Summary
- primary pathology of the thyroid gland in the guinea pig was described over 40 years ago
- it appears that functional (clinical) hyperthyroidism truly exists in the guinea pig population
- it is surprising that no peer-reviewed article existed in the literature describing the clinical aspects of this pathology

EXOTICS

Final conclusion:
"I don't know"
are the three most important words in exotic animal medicine.

Remember to "Do No Harm"

"Kill as few patients as possible."
—Oscar London, MD