What's Your Diagnosis

The purpose of this section is to provide cases that challenge the reader to develop diagnostic plans, therapeutic regimens and case diagnoses. Both medical and surgical cases are encouraged. Figures, such as radiographs or ultrasounds, are highly recommended, but not necessary. Submissions should include an introduction, diagnosis and discussion of the case. Please contact Mark A. Mitchell, DVM, MS, Section Editor, Louisiana State University, School of Veterinary Medicine, Veterinary Clinical Sciences, South Stadium Drive, Baton Rouge, LA 70803, 225-346-3333, Fax 225-346-5748, E-mail mitchell@vetmed.lsu.edueditor regarding publishing requirements or radiographs, histopathology and clinical pathology results.

HISTORY

An 189.5 g, 18 month-old, male, captive-born inland bearded dragon, *Pogona vitticeps*, was presented with a four day history of anorexia.

The bearded dragon was housed in a glass enclosure (93 cm x 46 cm x 46 cm) covered by a wire mesh screen. The thermogradient within the enclosure was between 27 - 33°C (81 - 92°F) during the day and 21°C (70°F) at night. A basking area was provided using a 100 watt ceramic heat emitter (Zoo Med Laboratories, San Louis Obispo, CA). Relative humidity was maintained between 30 - 50%. The animal was provided with 14 hours of full spectrum lighting daily (ReptiSun 2.0, ZooMed Laboratories, San Louis Obispo, CA) and ten hours of darkness. A wire cage was used occasionally to allow access to natural sunlight on summer days. Exercise was encouraged outside the enclosure once or twice a week. The enclosure was disinfected with dilute bleach (1.5%), and the paper towel substrate was changed three times a week. The bearded dragon was soaked in one inch deep tepid water three times a week for 15 minutes. The animal was offered 25 pre-fed, dusted (Reptocal, Tetra Torrafauna, Morris Plains, NJ) crickets daily, and a salad of spinach and grapes twice weekly.

On physical examination the bearded dragon was bright, alert, and responsive. A firm, 1 cm mass was palpated within the left central coelomic cavity. No other abnormalities were noted. The owner was notified of the external physical examination findings and the need for further diagnostic testing. The owner agreed to a complete blood count and radiographs. The bearded dragon was manually restrained for venipuncture. Whole blood (0.15 ml) was collected from the ventral tail vein using a 25 ga needle on a 1 ml syringe and submitted for a complete blood count. Dorsoventral radiographs were obtained using manual restraint.

Please evaluate Figure 1 and Table 1. Make your list of differential diagnoses, develop a treatment plan for this patient before continuing.

Figure 1. Dorsoventral total body radiograph of a bearded dragon, *Pogona vitticeps*.

Table 1. Complete blood counts results from a male bearded dragon, *Pogona vitticeps*, that presented with a four day history of anorexia.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit%</td>
<td>27</td>
</tr>
<tr>
<td>WBC x 10⁷/µl</td>
<td>6.870</td>
</tr>
<tr>
<td>Heterophils (%)</td>
<td>41</td>
</tr>
<tr>
<td>x 10⁷/µl</td>
<td>2.817</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>49</td>
</tr>
<tr>
<td>x 10⁷/µl</td>
<td>3.366</td>
</tr>
<tr>
<td>Monocytes/Azurophils (%)</td>
<td>5</td>
</tr>
<tr>
<td>x 10⁷/µl</td>
<td>0.344</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>3</td>
</tr>
<tr>
<td>x 10⁷/µl</td>
<td>0.206</td>
</tr>
<tr>
<td>Basophils (%)</td>
<td>2</td>
</tr>
<tr>
<td>x 10⁷/µl</td>
<td>0.137</td>
</tr>
<tr>
<td>Total Solids g/dl</td>
<td>7.5</td>
</tr>
</tbody>
</table>
DIAGNOSIS

Hematocrit, total dissolved solids (refractometer), white blood cell count (Eosinophil Unopette, Becton-Dickson, Rutherford, NJ), and differential (hand count, Diff-Quick Stain, Dade Diagnostics, Aguada, PR, USA) were within normal limits (Campbell, 1996, Cranfield, et al, 1996, Ellman, 1997).

An irregular, radiopaque mass was noted in the left central coelomic cavity in the vicinity of the stomach (Figure 2). A lateral view was not obtained because of the dorsoventral compression of the animal, although it would have been beneficial in fully assessing the internal anatomy of the bearded dragon and the location of the stone. The final diagnosis was gastric mineral foreign body, resulting from the ingestion of a rock (pica). Treatment options were discussed with the owner and surgical intervention was elected. The surgery was scheduled for the next day.

The patient was hospitalized and maintained at 30°C (86°F). Pre-operative therapy included polyionic fluids (Normosol-R, Abbott Laboratories, North Chicago, IL) 20 ml/kg/day SC and piperacillin (Piperacil, 200 mg/ml, Lederie, Bloomington, IN), and maintained on 3.5 - 4.0% isoflurane (Normosol-R, Abbott Laboratories, North Chicago, IL) 25 mg/kg IM, intubated with a 1.5 mm inner diameter non-cuffed silicone tube (Cook Veterinary Products, Aarrane, Fort Dodge Animal Health, Fort Dodge, IA) and oxygen delivered at one L/min with intermittent positive pressure ventilation. The patient was placed in dorsal recumbency and the surgical site prepared with alternating chlorhexidine gluconate scrub (Chlorhexiderm, DVM Stain, Dade Diagnostics, Aguada, PR, USA) and extended through abdominal musculature with iris scissors. Upon entering the coelomic cavity, the foreign body was readily identifiable within the stomach. A 15 mm incision was made over the greater curvature of the stomach and the foreign body removed. The gastrotomy site was lavaged with 60 ml of 0.9% saline and closed in a Cushing’s inverting pattern with 5-0 polydioxanone (PDS II, Ethicon, Inc, Somerville, NJ) The abdomen wall and peritoneum were closed simultaneously using 5-0 PDS II in a simple continuous pattern and the skin closed with 5-0 PDS II using an evertting horizontal mattress pattern. Recovery from anesthesia was uneventful (Figure 3).

Nutritional support was initiated 48 hours post-operatively (0.5 ml baby food (sweet potato, Gerber Products Co., Fremont, MI) PO q 24 hr 2 d). Small meals (six crickets) were resumed 96 hours post-operatively and increased to normal levels (25 crickets) over two weeks. Vegetables were offered after two weeks, and water was provided via syringe and by misting of the vegetables. Sutures were removed 45 days after surgery.

Pica is defined as the “compulsive eating of non-nutritive substances” (Dorland’s, 1988). It is a common clinical presentation in veterinary medicine, but the etiology is rarely determined. Mineral deficiency and genetic predisposition have been implicated in domestic species, but may be difficult to diagnose (Fraser, et al, 1991, Lewis, et al, 1992). Several species of reptiles have been reported to voluntarily ingest rocks or soil during feeding (Peaker, 1969, Sokol, 1971, Kramer, 1973, Rhodin, 1974, Rubel and Frye, 1991). It has been suggested that ingested stones may serve to control buoyancy in aquatic species and to aid the digestion of fibrous plant material or bony prey items. While active lithophagy is not considered a common occurrence in captive bearded dragons (Frye, 1999), it is possible that gastric stones could contribute to digestive efficiency (Sokol, 1971). Unfortunately, in this case the stone could not be submitted for analysis because it was part of a collection. The bearded dragon could have selected it, however, based on its mineral composition, size, shape, or surface characteristics.

Lithophagy has also been attributed to dietary insufficiency in reptiles (Sokol, 1971). The vitamin and mineral supplement offered to this animal has been compared to other commercially available supplements and is considered incomplete (Donoghue, 1995a). Also, although spinach is acceptable when limited or mixed with other vegetables, it contains high levels of oxalates and could interfere with the absorption of calcium or other minerals (Donoghue, 1995b, Donoghue and Langenberg, 1996). A high quality reptile multivitamin (Herptivite, Rep-Cal Research Labs, Los Gatos, CA) was recommended for use once every seven days for six months, and then every 14 days for life. A calcium carbonate supplement (Herpcare calcium supplement, Mardel Laboratories, Glendale Heights, IL) was also recommended as a dusting powder on the prey items twice a week for six months and then once a week for life. It was also recommended that the full spectrum lighting (ReptiSun 5.0, ZooMed Laboratories, San Louis Obispo, CA) be placed within 30.5 cm (12 in) of the basking site, and that the bulbs be replaced every six months.

Recommendations to increase the diversity of the diet, including offering infant mice, other species of prepared (fed and dusted) insect prey, and a variety of vegetable items including, but not limited to, collard greens, turnip greens, endive, sweet potato, squash, and red bell peppers, were also made. To improve the nutritional value of invertebrate prey items, the owner was instructed to offer the crickets access to a water source and a high calcium commercial cricket chow for a minimum of 24 hours before being fed to the bearded dragon.

Foreign body ingestion in captive lizards is considered to be inadvertent in most cases (Boltz, 1989, Frye, 1991, Rosskopf, 1992, Barten, 1996, McKeown, 1996, Frye, 1999, Ware, 1997). Indigestible materials such as sand, wood chips, bark, gravel or cloth are often ingested and can lead to gastrointestinal ulceration, functional ileus, and obstruction (Frye, 1991, Funk, 1996, Ware, 1997). Conservative medical therapy for a foreign body using fluids, tepid water soaks, laxatives, and enemas has been reported and may be successful (Frye, 1991). In this case, however, the size of the foreign body and immediate onset of anorexia provided sufficient...
indication for early surgical intervention.

This report was submitted by Paul M. Gibbons, DVM, Niles Animal Hospital and Bird Medical Center, 7278 North Milwaukee Avenue, Niles, IL 60714.

REFERENCES


Frye FL, DVM, MSc, FRSM. Personal communication, 1999.


Figure 3. Mineral foreign body removed from the stomach of a bearded dragon, *Pogona vitticeps*.

Figure 2. Same as Figure 1. The arrows point to the irregularly, radiopaque mass in the left central coelomic cavity.