AVTCP Case Report #1
Case Log #32
Oral Acanthomatous Ameloblastoma in a Domestic Rabbit *(Oryctolagus cuniculus)*
Best Tech-Ever, RVT

Signalment: "Krumb": 9-year-old F/S lop-eared, indoor, house rabbit

Presenting Complaint: Rapidly growing oral mass causing difficulty grooming and prehending food.

History: The rabbit was purchased as a house pet from a pet store approximately 8.5 years prior and spayed at 8-months-old. She lived indoors in a wire-bottomed cage and interacted daily with the family. Her diet consisted of free choice timothy hay, alfalfa pellets, and intermittent supplementation with fresh produce including leafy greens and carrots.

The owners reported that the patient started exhibiting abnormal behavior and difficulty grooming approximately 2 weeks prior to presentation. A large mass was noticed protruding from the oral cavity 7 days later. It had doubled in size since then and was causing the rabbit to have difficulty eating. The owners also reported a long-standing history of bilateral muco-purulent ocular discharge that had worsened over the last two weeks.

Physical Examination/Observations: The patient presented QAR. Orbital tightening and cheek flattening were obviously present characteristics, indicating she was painful as referenced on the Rabbit Grimace Scale. Krumb weighed 2.96kg with a BCS of 4/9 as referenced on the Pet Food Manufacturing Association Rabbit Size-O-Meter. Her temperature (T) was 102.4°F, HR was 240 bpm, and RR was 220 with a slight increase in effort. The patient's hair coat was poorly groomed and had a small amount of dried, bilateral ocular discharge. A large, malodorous, necrotic, cauliflower-like mass projecting from the buccal mucosa of the oral cavity prevented clear visualization of the mandibular teeth, however minor points were noted on the right mandibular premolars and molars. The large size of the mass restricted the patient from closing her mouth completely. No other abnormalities were found on physical examination.

Problem List/Differential Diagnosis: Krumb's problem list included: 1. Oral mass, differentials include: malignant neoplasia (carcinoma, sarcoma), benign neoplasm (ameloblastoma, odontoma, fibroplasia, epulis), and granuloma.
2. Hyporexia/weight loss/poor hair coat, differentials include: oral mass, dental disease, decreased grooming, arthritis

Diagnostic Approach: A whole blood sample was collected and submitted to an in house laboratory for evaluation of a CBC and plasma biochemical profile. The results were within normal limits.

The patient was premedicated with midazolam 2.96mg (1.0 mg/kg) IM and hydromorphone 0.29mg (0.1mg/kg) IM. A 20g, 1 inch, intravenous catheter was aseptically placed into the right cephalic vein. Normosol- R® was started at 30ml/hr (10ml/kg/hr) IV and pre-oxygenation with 100% O_2 was administered for 5 minutes via face mask. Her American Society of

Anesthesiologists (ASA) status was determined to be level II. Anesthesia was induced with 14.8mg of ketamine (5mg/kg) and 1.48mg of midazolam (0.5mg/kg) IV. She was nasally intubated with a 2.0mm uncuffed murphy eye endo-tracheal tube, and maintained on isoflurane in O_2 (2.5%/2L/min) for the anesthetic duration. Skull and dental radiographs confirmed a large, soft tissue mass originating from the buccal gingival tissue on the left side of the oral cavity. No osteolytic lesions were detected. The veterinary team recommended a CT scan of the skull to differentiate the mass and its origins, however the clients declined the test due to financial limitations. Following radiographs, the oral mass was gently investigated and a small surgical biopsy was collected for histopathology, cytology, and aerobic culture with sensitivity. The patient recovered uneventfully from anesthesia and was discharged later that day.

Treatment Plan: Pending histopathology and aerobic culture with sensitivity results, the patient was prescribed enrofloxacin 29.6mg (10mg/kg) PO Q12H and meloxicam 1.48mg (0.5mg/kg) PO Q24H for 3 days, followed by 0.59mg (0.2mg/kg) PO Q24H.

Final Diagnosis: Histopathology results described a benign oral epulis; acanthomatous ameloblastoma. Weight loss, hyporexia, and decreased grooming were presumed secondary to the physical barrier of the mass. Aerobic culture grew *Pasturella multocida*, presumably from chronic upper respiratory infection.

Plans were made for surgical removal. Arrangements for a whole blood transfusion were made in anticipation of blood loss associated with surgery. Surgery was scheduled one week following initial presentation.

Outcome: The patient's ASA status remained at level II. She was premedicated with midazolam 2.96mg (1mg/kg) IM and hydromorphone 0.29mg (0.1mg/kg) IM 20 minutes prior to anesthetic induction. A 20g, 1 inch, intravenous catheter was aseptically placed into the right cephalic vein. Warmed Normosol-R® was started at 30ml/hr (10ml/kg/hr) IV and pre-oxygenation with 100% O_2 was administered for 5 minutes via face mask. Anesthesia was induced with 14.8mg of ketamine (5mg/kg) and 1.48mg of midazolam (0.5mg/kg) IV. She was nasally intubated with a 2.0mm uncuffed murphy eye endo-tracheal tube, hooked to a non-rebreathing, circuit and maintained on isoflurane in O_2 (2.5%/2L/min) for the anesthetic duration. Throughout the anesthetic and surgical event, the patient was monitored with end tidal CO_2, pulse oximeter oxygen saturation, HR, RR, non-invasive BP, rectal temperature and ECG monitoring techniques.

During surgery, the patient had a moderate amount of blood loss that was followed by a hypotensive event (mean blood pressure of 54mmHg). Isoflurane levels were decreased from 2.5% to 1% and fluid volume replacement was given with 20cc hetastarch IV with 20cc Normasol R® IV. These attempts to correct the hypotension were unsuccessful. BP remained between 50-60mmHg. A constant rate infusion (CRI) of dobutamine (2.5mcg/kg/min) IV was started. Following

the initiation of dobutamine, the hypotension slowly and steadily resolved. The dobutamine was continued with crystalloid fluid therapy for the anesthetic duration. At the conclusion of surgery, the rabbit's PCV was 24% and deemed adequate considering the blood loss, fluid support administered, and the rabbit's clinical condition. Therefore, no blood transfusion was given.

The oral mass was resected and the remaining tissue was ablated with a surgical laser to reduce the risk of recurrence. Due to the inability to obtain wide surgical margins, radiation therapy was discussed with the owner, but declined. Crown height reduction and occlusal adjustment of the mandibular premolars and molars were performed with a large round diamond bur on a straight high-speed hand piece. While recovering, a 3.5fr naso-gastric tube was placed in anticipation of the patient being anorexic and hydromorphone 0.29mg (0.1mg/kg) IM was repeated. This was continued every 4 hours for 36 hours. The previously dispensed antibiotic and anti-inflammatory therapies were continued as described above for an additional 10 days.

During recovery, the patient experienced respiratory distress as evidenced by nasal flare, labored breathing and an orthopneic posture. Diagnostic investigation to determine the cause of the respiratory distress was not pursued due to the compromised condition of the patient. The medical team decided to treat her for a presumed *P. multocida* upper respiratory infection. She received supplemental oxygen (fraction of inspired O_2- 40%) delivered in an oxygen incubator with an environmental temperature of 75oF. Nebulization therapy with 0.9% saline was administered for 10 minutes Q8h to help break up the mucoid secretions within the respiratory tract. Trimethoprim-sulfamethoxazole 4.4mg (15mg/kg) PO Q12H was added to the treatment. Due to anorexia, she was administered a high fiber, commercially available, liquid diet for nutritional support through naso-gastric tube at a dose of 50mls Q6H based on her metabolic rate and maintenance requirements. Twenty-four hours following surgery, the patient's respiratory status had significantly improved, but no fecal output was observed. A subcutaneous injection of metoclopramide 0.88mg (0.3mg/kg) IV was given and supplemental feedings were continued Q4H.

By day 3, the patient was eating fresh produce and soft foods. Her fecal production was consistently improving and the supplemental feedings were discontinued. Her PCV remained at 24% but was deemed adequate based on the blood loss, fluid support and the patient's clinical condition. The patient was discharged 4 days following surgery. 7 days post surgery, the patient was doing well with a stable body weight (3.0 kgs) and healing surgical site. The previously prescribed antibiotic and anti-inflammatory medications were continued for an additional 3 days to complete the treatment course.

The owners were educated on the high likelihood of recurrence without the use of radiation therapy. They were advised to recheck with the veterinarian monthly for possible tumor regrowth.

Conclusion: Epulides are the most common benign oral neoplasms reported in dogs. They are very rare in cats. Their occurrence in rabbits is not well documented; there is one paper that references 3 cases of acanthomatous ameloblastomas in rabbits. Unfortunately, little information on the outcome of the reported cases is available. The information described about these tumors is based on the domestic dog.

Three types of epulides are reported: fibromatous, ossifying and acanthomatous. Acanthomatous ameloblastomas are locally aggressive, benign masses of the oral cavity, generally observed in middle-aged to older animals from 7-10 years old. They are firm, irregular, gingival masses arising from the periodontal ligament that may be found on either side of the dental arcade with a predilection for the rostral region of the mandible. Acanthomatous ameloblastomas frequently infiltrate the surrounding bone causing lysis and secondary dental disease. They are identified histopahologically by their spiny shaped cells.

Due to their rapidly growing nature and location within the oral cavity, they are usually large and locally invasive. Owner complaints may include a visible mass, oral bleeding, difficulty eating, halitosis, weight loss, loose teeth, hypersalivation, facial deformity, and occasional nasal discharge.

Due to their extensive nature, wide local excision of soft tissue is necessary. If bony lysis is present, partial mandibulectomy may also be indicated. Local recurrence is reported to be 45% and is common with conservative excision. Radiation therapy is reported to reduce the risk of recurrence if complete surgical excision is not possible. There are no statistics regarding the incidence of recurrence following surgical excision and radiation therapy. Tumor recurrence and dehiscence of surgical closure are the most common complications following oral resection. The clinical stage, size, and bony involvement of the tumor have been identified as a significant prognostic indicator of recurrence. The acanthomatous ameloblastoma in this rabbit is likely to reoccur.

Discussion: Financial limitations were moderately restrictive for an ideal diagnostic regimen and treatment in this case. Thoracic radiographs and a skull CT prior to surgery to rule out metastasis, pneumonia, evaluate the degree of dental malocclusion, and to better plan the surgical approach were recommended. Additionally, following surgical excision, the patient should receive radiation therapy to reduce the risk of tumor recurrence.

Another challenge in this case was the hypovolemia experienced during anesthesia. Dobutamine, a positive inotropic agent, strongly stimulates β-1 receptors for increased myocardial contractility to increase cardiac output with little effect on heart rate and vascular resistance when administered at lower doses. It has been proven to be useful in dogs that have not responded to fluid resuscitation. Rabbits, however, have a naturally high heart rate, and the effects of dobutamine are not well described. Dobutamine has been reported to cause seizures in cats at rates over 5mcg/kg/min.

In this patient, the heart rate was already increased, compensating for the hypovolemia, and use of dobutamine did not come without risks. The clinical staff was equipped with the knowledge of potential adverse effects such as seizures, hypertension, and tachycardia, and was prepared to manage them. Due to the lack of clinical response to other resuscitative measures, dobutamine was administered at a low dose and the patient was monitored closely. Another option that could have improved blood pressure was to reduce the inhalant percentage and provide additional analgesia by adding a CRI of a full mu opioid such as fentanyl. Alternatively, hypertonic saline could have been administered for correction of hypotension and may be considered as an alternative therapy in the future. Despite some of the challenges and limitations in this case, it proved to be interesting and enjoyable due to its rarity in the species. Multiple challenges were presented and overcome with a positive outcome for the patient and client.

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