Rock'n and Roll'n to the Right Diagnosis

An EARiginal CPC

by

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Introduction:

Ear infections are a common problem seen in small animals and can be seasonal therefore worse in the spring and summer seasons, or nonseasonal and recurrent with no variation in seasons. However, when these infections are chronic and non-responsive to treatment, it is important to thoroughly assess for an underlying cause. Important rule outs for chronic otitis externa in felines include: ectoparasitic disease, allergic skin disease (non-flea, non-food-induced feline hypersensitivity dermatitis, cutaneous adverse food reaction), and space-occupying aural lesions such as a polyp, neoplasia and otitis media (especially in cases of recurrent bacterial otitis)[11]. Feline inflammatory polyps are the most common mass of the feline ear canal and the second most common cause of nasopharyngeal disease, following lymphoma[3,8]. These polyps are thought to cyclically stem from and lead to chronic otitis externa, otitis media, and even otitis interna, and it is common for cats with inflammatory polyps to initially present with refractory otitis externa[2,8]. Aural inflammatory polyps of the external ear canal will be the focus of this discussion, though a nasopharyngeal path is also possible.

History and Presentation:

Rock is a five-year-old male neutered Maine Coon cat that presented to the Mississippi State University College of Veterinary Medicine Dermatology Service on April 5th, 2021. At the time of presentation, Rock's owners reported that since his adoption from a cattery two and a half years prior, he has had chronic, continuous, and malodorous ear infections in his right ear. Rock was a stud male at the cattery, and his current owners were unsure of the duration of this issue prior to adoption. The purulent discharge was being maintained at home with aloe wipes and MalAcetic ear cleanser, however the discharge persisted.

In addition to at-home maintenance, Rock was examined by his primary care veterinarian multiple times and received several courses of Posatex® (1.0% orbifloxacin, 0.1% mometasone furoate monohydrate and 0.1% posaconazole) topical ointment as well as three rounds of oral pradofloxacin. These treatments were unsuccessful in any long-term relief and Rock's owners noted that minimal improvement was only noticeable for a couple days during administration. In addition to his ear issues, Rock had a history of tapeworms, and proglottids were seen on his perineal area during his physical exam. Otherwise, Rock was reported to be a healthy cat who lives indoors with three other cats and one dog. The other animals in the household had not experienced any dermatologic signs similar to Rock's problem.

Upon presentation, Rock's physical was largely within normal limits. He was bright, alert, and responsive, weighing 18.8 lbs (8.5 kg) with a body condition score of 7/9 (4-5/9 being ideal). His vital parameters were normal with a heart rate of 208 beats per minute, a respiratory rate of 40 breaths per minute, and a temperature of 102.8 degrees Fahrenheit. His mucous membranes were pink, moist, and had a capillary refill time of less than 2 seconds. No murmurs or arrhythmias were heard on auscultation and his lungs were clear of crackles and wheezes. His abdomen was soft and non-painful on palpation, and no abnormalities were noted. His peripheral lymph nodes were of normal size and character.

Diagnostic Approach:

In order to properly assess the patient and both ear canals, otoscopy (manual or video) is imperative to working towards the correct diagnosis in cases of chronic otitis externa. Given the severely purulent and malodorous discharge Rock presented with, cleaning out the ear canal was necessary for appropriate visualization. Otorrhea is the most common clinical sign in cats with aural inflammatory polyps, seen in upwards of 85% of animals with this problem[5]. Prior to

cleaning, an ear cytology was obtained from both ear canals. It is important to collect the sample for cytology and culture, if necessary, before cleansing the ear to ensure that results are accurate. The left ear cytology was within normal limits, while the right ear contained too numerous to count rod bacteria and fewer cocci. A culture swab of the right ear canal was collected in preparation for submission, if necessary, based on cytologic findings and otic exam. The right ear was then flushed with a cleansing and drying solution, and cotton swabs and rolled cotton were used to remove the debris. A manual otoscope was then used to attempt visualization of the tympanic membrane. The tympanic membrane was unable to be visualized due to the presence of an approximately 1cm red, lobulated, smooth in appearance, round mass in the horizontal canal of the right ear. Based on clinical presentation, signalment, and gross characteristics of the mass, it was presumed that the mass was an inflammatory polyp, however other causes of nodules, such as neoplasia, were considered. A CT scan was scheduled to assess the extent of the mass, while also evaluating the tympanic bulla. These assessments were necessary for surgical planning and required sedation with dexmedetomidine and butorphanol[2,7].

CT is the diagnostic modality of choice for suspected inflammatory polyps. Though radiographs can be utilized if necessary, bulla changes and middle ear involvement only have a true-positive rate of 75% with radiographs alone[8]. The CT scan reported that the right tympanic bulla was expanded and thickened, which supported the chronicity Rock's owners had described[8]. A soft tissue attenuating, smooth, ovoid structure measuring 3.8 x 5.5 x 4.8cm was noted within the right horizontal ear canal, in agreement with our otoscopic exam. Additionally, fluid attenuating material could be seen filling the right horizontal ear canal. The radiologist's differentials included a cholesteastoma (keratinized squamous cell cyst) and inflammatory polyps, without ruling out neoplasia. CT scan interpretation also diagnosed Rock with right otitis

externa and otitis media. Given Rock's age and duration of disease, inflammatory polyp remained to be the main differential and surgery was elected later that week[2,3,7,8,9].

Pathophysiology:

The etiology of inflammatory polyps remains unknown[3,7,8]. However, there have been multiple theories proposed over the years, ranging from a congenital abnormality of branchial arch remnants to viral or bacterial origin[7,8]. These theories are largely just that – theories. It is unclear whether the polyps are the chicken or the egg, so to speak, in terms of inflammation and polyp development[3]. The inflammation present is indisputable, and polyps are characteristically described histologically as fibrovascular tissue covered by an epithelial layer of stratified squamous or pseudostratified ciliated columnar cells, accompanied by a mixed inflammatory infiltrate[1,3,4,7,8]. There is anecdotal evidence pointing to some breed predilections, and in one retrospective study Maine Coons appeared to be overrepresented at 37% of the subjects (n = 23/62), along with Domestic Short Hair cats (48%, n = 30/62)[5]. The author of this study did admit that there would need to be more research to determine if this were a bias within the study or a true predilection. No sex correlations have been demonstrated, and while cases have been reported in anywhere from four months to fifteen years of age, these polyps tend to occur in cats younger than two years[2,7,8]. Given Rock's long history of ear infections, it is likely that he falls into this less than two-year-old group as well.

It is also yet to be determined where exactly these inflammatory polyps originate from, though the middle ear or the eustachian tube are speculated[2,7,8]. The polyps are pedunculated, with their stalks anchored. Due to the similarities in the epithelium of both locations, in combination with the mass inflammation throughout the area at the time of histopathology, it is difficult to determine the exact origin of each polyp. In Rock's case, it was noted during surgery

that the polyp stalk was entering into the eustachian tube, but the direction of growth is impossible to determine.

Treatment and Management:

Given the severity and chronicity of Rock's case, it was necessary to complete a total ear canal ablation and lateral bulla osteotomy (TECA-LBO). TECA-LBOs are recommended when otitis externa is severe, as it excises all diseased tissue[9]. On April 7th, 2021, Rock underwent general anesthesia for a right total ear canal ablation and lateral bulla osteotomy. Auriculopalpebral and oculomotor local nerve blocks were completed, and the right ear was sterilely prepped with the patient in left lateral recumbency. A circumferential incision was made starting at the tragus and encircling the external opening of the vertical ear canal. Throughout the procedure, monopolar electrocautery was utilized to maintain hemostasis while suction, gauze, and swabs maintained visualization. The subcutaneous tissue was dissected around the ear canal using a combination of monopolar cautery, small Metzenbaum scissors, and a #15 scalpel blade. When the proximal ear canal was freely movable, it was retracted and manipulated using Allis tissue forceps. A ring retractor was placed in the surgical site to improve visualization. Further dissection was performed until the level of the external acoustic meatus was reached. An aural mass was found inside the horizontal canal, invading into the Eustachian tube. Blunt dissection with Jeweler's forceps was used to separate the mass from surrounding tissues. Blunt dissection continued until the mass and remainder of the ear canal was removed and submitted for histology. Love-Kerrison Rongeurs and a Burr were used to remove the ventrolateral aspect of the bulla to better expose the middle ear. Remaining epithelium was removed via curettage. The tympanic bulla and remaining tissue were copiously lavaged. A culture swab was taken and was submitted for aerobic and anaerobic culture and sensitivity. A local bupivacaine block (Nocita)

was performed circumferentially around the external ear canal. The deep and subcutaneous tissues were closed with 4-0 PDS in a simple continuous pattern. The skin was apposed using 4-0 Nylon in a simple interrupted pattern. Minimal draining was noted for a couple of days after surgery, however long-term management of the external ear is not necessary following this procedure. Lifelong management may become relevant depending on the post-operative complications and their duration, both of which will be discussed in the next section. In hospital, Rock's pain was managed using intravenous methadone. When he was discharged the following day (April 8th, 2021), Rock was kept comfortable at home with oral robenacoxib (Onsior) every 24 hours for three days and buccal buprenorphine every 8 hours for five days. Optixcare ocular lubricant was also sent home with Rock to maintain the moisture in his right eye until his facial and sympathetic nerves recovered.

Discussion:

The only cure for an inflammatory polyp is to completely remove it surgically[3,7]. Even once removed, there is a correlated rate of recurrence depending on the removal method selected. Due to the high risk for complications, TECA-LBO procedures are typically completed by experienced and specialized surgeons in times of severe chronicity[9]. Cats are subject to a higher risk for complications (mainly nerve damage) due to the anatomical superficiality of the nerves within the feline ear canal[7]. For this reason, many surgeons have begun to recommend ventral bulla osteotomies (VBO) when the epithelial integrity of the external ear canal has not been compromised and there is evidence of middle ear pathology[8]. VBO still has risk of complications such as Horner's syndrome, vestibular disease, deafness, wound drainage, hemorrhage, facial or hypoglossal nerve damage, and recurrence of disease, but is believed to be less painful than a total ear canal ablation and preserves the function of the external ear canal[7]. The high prevalence

of Horner's syndrome in cats that underwent either form of bulla osteotomy is likely attributed to direct damage to the postganglionic sympathetic fibers where they course through the tympanic cavity. The disease process makes visualization of these fibers difficult, so careful curettage is crucial[10].

The traction-avulsion method is an alternative option to the more invasive bulla osteotomies and is commonly utilized in general practice due to it being quicker and less expensive[1]. The polyp is grasped with forceps, applying gentle traction until the mass is released from the ear, and then thoroughly lavaging the site with warm saline[3,8]. Rate of polyp recurrence is highest with the traction-avulsion method, and aural polyps removed by traction are more likely to recur in comparison to their nasopharyngeal counterparts (approximately 50% to 11% respectively)[1,3,7,8]. This disparity is due to the depth of aural inflammatory polyps and lack of visualization, leading to part of the stalk often being left behind. When the traction-avulsion method is utilized in combination with a tapering dose of prednisolone following removal, recurrence rates drastically decreased, becoming almost similar to the rates attributed to VBO procedures[1,2]. One study showed that traction avulsion plus prednisolone had a 0% recurrence rate, whereas 64% of cats in the same study that did not receive a steroid did experience recurrence[2]. Horner's syndrome is still a potential complication when selecting traction-avulsion removal but is more likely to be a transient issue[1]. Per-endoscopic trans-tympanic traction has shown to be an effective technique as well, with low recurrence rates (13.5%) and fewer neurologic complications (8%)[4]. Within this study, both VBO and simple traction had neurologic complications upwards of 40%, and simple traction demonstrated a 57% recurrence rate (VBO polyp recurrence ranged from 0-33%)[4]. Regardless of removal method, Horner's syndrome is

incredibly common and seen in most cats[3]. One study put the occurrence as high as 94% (n = 22/23) in cats receiving traction plus bulla osteotomy, but with recurrence as low as 0-4%[6].

Due to the high commonality of Horner's syndrome and possibly facial nerve paralysis during these procedures, managing the symptoms becomes important. Owner's must be prepped to handle the worst, which could be applying lubricating ointment to their pet's eye(s) multiple times per day. Since the complications are seen so often, client communication and expectation setting is essential to the happiness of everyone involved.

Case Outcome:

Rock recovered from surgery well, though he did exhibit signs of right sided nerve damage including Horner's syndrome (miotic pupil, elevated third eyelid, enopthalmos, and ptosis) and facial drooping. A higher incidence of Horner's syndrome and facial nerve damage has been seen in cats following TECA and LBO. Horner syndrome is expected to appear in 42% and facial nerve damage in 56–78% of cats after this procedure specifically[7]. If these complications will resolve, they usually do so by six months. If neurologic deficits are still present at six months post-operatively, they are likely permanent.

Rock's culture results showed presence of Bacillus and Pasteurella multocida, both of which were susceptible to the intraoperative cefazolin that he received. No further antibiotic treatment was indicated. Histopathology confirmed that the mass in Rock's ear was definitively an inflammatory polyp thought to have originated from the middle ear, and recurrence is possible due to the extent of the mass and the margins noted by the pathologist.

Rock returned to MSU-CVM on April 20th, 2021, for a sedated suture removal and to assess progress in his facial paralysis. At that time, he was beginning to twitch his right eye

periodically and his owners felt that he was improving. Rock's owners were contacted again on July 7th, 2021, and they report he has significantly improved since his last visit to MSU-CVM. He still has slight drooping of his face, however he is able to blink on his own and they have discontinued use of the lubricating eye ointment. Rock continues to be happy and healthy and is unphased by his surgery! Rock is an important reminder of the need to be complete and thorough in all aspects of the physical exam. This case is also a great lesson in searching for underlying issues in times of chronicity and lack of improvement. Lastly, while this case was ultimately handled at the specialty level, there are options and opportunities for general practice veterinarians in similar situations to provide quality care for their patients, serving as a resource for clients when referral may not be feasible.

References

1. Anderson, D.M., White, R.A.S. and Robinson, R.K. (2000), Management of inflammatory polyps in 37 cats. *Veterinary Record*, 147: 684-687. https://doi.org/10.1136/vr.147.24.684
2. Brame, B., & Cain, C. (2021). Chronic Otitis in Cats: Clinical management of primary, predisposing and perpetuating factors. *Journal of Feline Medicine and Surgery*, 23(5), 433–446. https://doi.org/10.1177/1098612X211007072
3. Donnelly, K.E. & Tillson, D.M.. (2004). Feline inflammatory polyps and ventral bulla osteotomy. *Compendium on Continuing Education for the Practicing Veterinarian*. 26. 446-453.
4. Greci, V., Vernia, E., & Mortellaro, C. M. (2014). Per-endoscopic trans-tympanic traction for the management of feline aural inflammatory polyps: a case review of 37 cats. *Journal of feline medicine and surgery*, *16*(8), 645–650. https://doi.org/10.1177/1098612X13516620
5. Janssens, S. D., Haagsman, A. N., & Ter Haar, G. (2017). Middle ear polyps: results of traction avulsion after a lateral approach to the ear canal in 62 cats (2004-2014). *Journal of feline medicine and surgery*, *19*(8), 803–808. https://doi.org/10.1177/1098612X16660356
6. Kapatkin, A. S., Matthiesen, D. T., Noone, K. E., Church, E. M., Scavelli, T. E., & Patnaik, A. K. (1990). Results of surgery and long-term follow-up in 31 cats with nasopharyngeal polyps. *Journal of the American Animal Hospital Association*, *26*(4), 387–392.
7. Monnet, E. (2012). *Small Animal Soft Tissue Surgery: Section 3 Surgery of the Ear*. Wiley-Blackwell.

8. Muilenburg R.K., Fry T.R, Feline nasopharyngeal polyps, *Veterinary Clinics of North America: Small Animal Practice,* Volume 32, Issue 4, 2002, Pages 839-849, ISSN 0195-5616, https://doi.org/10.1016/S0195-5616(02)00024-4. (https://www.sciencedirect.com/science/article/pii/S0195561602000244)
9. Swanson, E. (March 2020). Aural Surgery [PowerPoint slides]. College of Veterinary Medicine, Mississippi State University.
10. Trevor, P. B., & Martin, R. A. (1993). Tympanic bulla osteotomy for treatment of middle-ear disease in cats: 19 cases (1984-1991). *Journal of the American Veterinary Medical Association*, *202*(1), 123–128.
11. Tyler, S., Swales, N., Foster, A. P., Knowles, T. G., & Barnard, N. (2020). Otoscopy and aural cytological findings in a population of rescue cats and cases in a referral small animal hospital in England and Wales. *Journal of Feline Medicine and Surgery*, 22(2), 161–167. https://doi.org/10.1177/1098612X19834969