site.[1] These sutures are placed through the skin on the concave surface and cartilage only or full thickness through the pinna. The sutures should be placed parallel to the blood vessels without tension, as described above, to avoid damaging the blood supply. Finally, bandage the ear to the head.

Both the incisional and punch biopsy techniques eliminate fluid, obliterate dead space and appose the skin of the concave surface and the cartilage. Therefore, these techniques result in less recurrence and fewer complications than the nonsurgical drainage techniques.

Laser technique: The recent introduction of laser surgery to veterinary medicine has created another method of aural hematoma management. However, the learning curve and cost of equipment has precluded its widespread usage. If a hospital utilizes laser surgery, a veterinarian would take these steps to treat an aural hematoma.

Use a CO_2 laser to make one 1-cm incision in the skin for drainage and lavage. Then make multiple 1- to 2-mm incisions through the skin and cartilage over the entire hematoma that extend slightly beyond the edge of the hematoma. (Alternatively, small 4- to 6-mm holes can be made over the hematoma, similar to the punch biopsy technique.) These open lesions provide drainage while stimulating the tissues to adhere, and suturing is usually not necessary. These lesions will heal through second intention.[1] A study revealed that Pet owners evaluated laser repair as cosmetically excellent in three of 10 cases, good in five of 10 cases and fair in two of 10 cases.[4] Hematomas resolved in all 10 cases, but two later developed serosanguineous fluid accumulations. One of these cases required only percutaneous drainage, while the other required a second laser procedure.

Figure 4: Punch Biopsy Technique
To begin the punch biopsy make two 1- to 2-cm transverse incisions at the distal and proximal edges of the hematoma. Then use a 4- to 6-mm skin biopsy punch to make several drainage holes in the skin on the concave aspect of the pinna.

Drainage techniques

Needle aspiration or drainage tubes should be used only when the hematoma is small and has been present for less than 24 hours. Because these drainage techniques are associated with a higher recurrence rate and client dissatisfaction, they should usually be reserved for patients who cannot tolerate general anesthesia. Drainage tubes frequently become dislodged when patients go home and continue to shake their heads. Furthermore, when using drains, the hematoma cavity is not eliminated and tissues are not apposed.

If veterinarians encounter a patient who is not an anesthetic candidate, they can place drains with the patient under sedation and local anesthetics by following these steps. Make a small incision in the distal and proximal aspect of the pinna's concave surface overlying the hematoma. Drain the hematoma, remove fibrin and clots, and lavage the cavity with sterile saline. A ¼-in fenestrated Penrose drain is inserted using a mosquito forceps. (Alternatively, there are drainage techniques using teat cannulas instead of Penrose tubing. The cannulas are heavier than drain tubing, and they are more prone to accidental removal by the Pet.) Pull the drain through one of the stab incisions and into the cavity. Then pull the drain so it exits through the second stab incision. Suture the drain ends to the skin at the distal and proximal incision sites. The ear should be bandaged over the head.[3] Remove the drain in five to seven days.

Postoperative care

Bandaging the ear helps prevent Pets from damaging the surgical site either by shaking their heads or trying to scratch the site. Using the bandaging technique described in *Figure 5* on pages 40 and 42 will help ensure postoperative success. It is important to avoid incorporating the normal ear in the bandage, and it is best to leave the hematoma site and ear canal opening exposed. This provides the owner and veterinarian access to the incision for monitoring and daily cleaning. It also allows the ear canal to be medicated if necessary.

The bandage should be checked periodically as the patient awakens from anesthesia to ensure it is not too tight or restricting airflow through the larynx or trachea. If it is possible to insert at least two fingers under the bandage comfortably, it is likely not too tight. The owner should also check the bandage at home at least twice daily to ensure it remains loose and is not too soiled. Instruct owners to return to the hospital to have the bandage changed when it gets soiled or at least every three days.

Bandaging should continue until granulation tissue is present at the surgical sites, drainage is minimal and the patient is no longer shaking his head.[2] Educate the owner about how to keep the incision clean and free of clots and debris. Show owners how to apply diluted chlorhexidine or sterile saline to a gauze sponge and clean the surgical site. Let them know they should clean the site daily or more often, if needed. An Elizabethan collar is essential to prevent the patient from damaging the surgical site or bandage. Sutures can be removed as early as 14 days or can be left in place for 21 days to ensure adequate tissue apposition.

In addition to surgical management, proper medical therapy is vital in managing underlying causes (see *Aural hematomas: Underlying causes*, page 24) and providing adequate pain control for the patient. If there is a concurrent otic infection, proper

Bandaging the Ear

Figure 5A

To bandage the pinna after aural hematoma surgery, begin by cutting four pieces of white porous tape: two 6-in pieces and two 18-in pieces. (Depending on the patient's head size, more tape may be needed.) Starting at the base of the pinna, place a short strip of tape on the medial and lateral margins of the convex surface of the pinna.

Figure 5B

Position the longer pieces of tape on the concave surface of the pinna so they contact the tape on the convex surface. This allows the pinna to be "sandwiched" between the tape, creating a secure environment.

Figure 5D

Bring the straps of tape around the head and neck so they terminate just ventral to the ear canal of the affected ear. Trim any excess tape so it does not cover the ear canal.

Figure 5E

Apply cast padding or a roll of gauze loosely around the Pet's head, enveloping the tape strands to keep the ear in place.

Figure 5C

Place a roll of gauze or a bundle of roll cotton on top of the Pet's head and lay the affected ear over the top of the gauze roll or roll cotton.

Figure 5F

Finish the bandaging by loosely applying flexible wrap and an external layer of cohesive bandage. This figure shows how easy it is for the team and owner to apply medicine into the ear canal while leaving the wrap in place. Note that the other ear is not enclosed in the wrap.

antibiotic usage is dictated by culture and sensitivity testing of the otic exudate. If bacterial culture is not medically necessary, an oral antibiotic with a broad-spectrum against common skin bacteria should be empirically chosen. Appropriate choices for dogs include amoxicillin-clavulanic acid at 12.5 mg/kg twice daily, cephalexin at 22 to 35 mg/kg two to three times daily or enrofloxacin at 5 to 20 mg/kg once daily. For cats, 10 to 20 mg/kg of amoxicillin-clavulanic acid twice daily or 5 mg/kg of enrofloxacin once a day are appropriate.

There are some anecdotal case reports of aural hematomas responding to the use of oral prednisone. The basis for this therapy is the thought that some hematomas, especially in Pets without clinical otitis, may be due to an immune mediated disease process. The outcome achieved by the use of oral prednisone has not been scientifically compared to surgical correction, so its use should be reserved for cases without any apparent underlying disease *and* only when the owner has declined surgical correction.

Pain control

Veterinarians should choose appropriate pain medications based on the patient's health status and blood work results. Some of the best choices for dogs include oral nonsteroidal anti-inflammatory drugs (NSAIDs) such as etodolac at 10 to 15 mg/kg once a day or carprofen at 2.2 mg/kg twice daily. Opioids can also be used in conjunction with an NSAID to provide multimodal pain relief. Appropriate oral opioid options for dogs and cats include butorphanol at 0.5 to 1 mg/kg three to four times daily or tramadol at 1 to 4 mg/kg two or three times daily.

Patients may also need tranquilizers to keep them calm and help them tolerate the

bandage and Elizabethan collar. Base the use of tranquilizers on physical examination parameters and blood work results. Diphenhydramine at 2.2 mg/kg two or three times daily (not to exceed 50 mg per dose) or acepromazine at 0.55 to 2.2 mg/kg once or twice daily will provide adequate sedation for dogs, especially when used in conjunction with an opioid.

Complications

The most common complications of aural hematomas are cosmetic alterations from delayed healing, recurrence from not properly addressing the underlying causes or not applying adequate sutures, or pinna damage from inappropriate suture placement. If sutures are placed perpendicular to the long axis of the pinna rather than parallel with it and the ascending branches of the great auricular artery are ligated, necrosis of the pinna can occur.

Client education

Communication with clients about the causes of aural hematomas and the importance of postoperative management helps avoid misunderstandings, especially if complications occur. Clients need to know about the importance of appropriately treating the underlying causes. Explain that if the underlying causes are not treated, the ear may not heal properly and the hematoma may recur.

It is also important for veterinarians to explain that the Pet's ear may have some cosmetic changes, such as thickening or wrinkling, even after surgical correction. Owners also must understand that it is possible for a hematoma to form in the opposite pinna as a result of underlying disease or head shaking. It is also possible for the hematoma to recur if the underlying disease is not addressed. A hematoma could also recur in the surgically corrected pinna if the skin and cartilage were not properly tacked or in areas that were not previously affected.

Incision and bandage care are also vital to a successful outcome. The bandage needs to be kept clean and dry at all times. If it becomes wet, damaged or too tight, clients should be instructed to bring their Pet in immediately so the veterinarian can change it. Also teach clients that their Pet should wear the Elizabethan collar at all times until the incision has completely healed.

Recheck visits are essential to ensure that the Pet's ear is healing and underlying causes are being successfully managed. Educate clients to bring their Pet in immediately if they notice any signs of infection, excessive bleeding or discomfort. If surgery was completed appropriately, the surgical site is well cared for and all underlying conditions are successfully treated, the pinna should heal in two to three weeks.

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