Subtotal Ear Canal Ablation in 18 Dogs and One Cat With Minimal Distal Ear Canal Pathology

A modified technique for performing total ear canal ablations is described. This technique requires less dissection than the standard technique and maintains a portion of the distal vertical ear canal. Subtotal ear canal ablations were performed in 18 dogs and one cat for the treatment of otitis externa or masses of the horizontal ear canal. Animals with otitis externa had minimal involvement of the distal ear canal. Dermatological problems associated with the remaining ear canal and pinnae occurred in eight animals and resolved with medical management. Normal ear carriage was maintained in all animals with erect ears. Further investigation is required before the procedure can be recommended as a treatment for otitis externa not caused by masses or anatomical abnormalities of the horizontal ear canal in dogs with pendulous ears. J Am Anim Hosp Assoc 2006;42:371-380.

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Introduction

Total ear canal ablation (TECA) with lateral bulla osteotomy is widely accepted as a viable treatment option for dogs and cats with end-stage otitis externa or masses confined to the ear canal. As described, the procedure involves a circumferential incision around the funnel-shaped auricular cavity (i.e., *cavum conchae*) and through the auricular cartilage at the base of the pinna. A vertical incision is made through the skin overlying the vertical ear canal. The vertical and horizontal ear canals are dissected free of the soft tissues to the level of the tympanic bulla, and a bulla osteotomy is performed. Following completion of a TECA and lateral bulla osteotomy, the tissues are closed in a T-shaped or inverted L-shaped suture line.

A modification of this technique for dogs with erect ears has been described in the Japanese literature. The purpose of this technique is to avoid a change in ear carriage associated with excision of the medial portion of the auricular cartilage. An inverted L-shaped skin incision is made over the vertical canal, just ventral to the auricular cavity, to facilitate exposure. The annular cartilage of the vertical canal is transected at this point, followed by routine dissection and removal of the remaining vertical and horizontal canals. The horizontal portion of the L-shaped skin incision is sutured to the remaining transected end of the vertical canal. The distal portion of the vertical canal is thus preserved, resulting in a stoma just ventral to, and communicating with, the external orifice. In the original study, this procedure was performed in three dogs with chronic otitis externa/media, and no apparent problems were reported at 1-year follow-up examinations.

A more recent report evaluated the cosmetic outcome of a modified TECA technique in six cats. Erect ear carriage was maintained by creating a ventrally-based advancement flap after circumferential incision around the external acoustic meatus and removal of the entire vertical and horizontal ear canal.
The purpose of this report is to describe a subtotal ear canal ablation technique that was used for the treatment of otitis externa/media or masses of the horizontal external ear canal in dogs and cats. The procedure was initially performed as a method to maintain erect ear carriage, and then it was expanded to include a subset of dogs with pendulous ears. In each case, the medial surface of the pinna and the distal auricular cavity were originally disease-free or minimally affected by the underlying disease process.

Materials and Methods

The medical records of dogs and cats undergoing subtotal ear canal ablation at the North Carolina State University’s College of Veterinary Medicine from 1998 to 2004 were reviewed. Subtotal ear canal ablation was defined as resection of the proximal half of the vertical ear canal and the entire horizontal ear canal. Information retrieved from the medical records included species, breed, gender, body weight, age, computed tomographic and otoscopic findings, duration of clinical signs, preoperative medical management, pathological and microbiological diagnoses, postoperative medical management, follow-up times, and postoperative complications. The referring veterinarians and owners of animals that had subtotal ear canal ablations performed were then contacted by telephone.

Surgical Technique

A single vertical incision was made overlying the vertical ear canal, from just ventral to the midpoint of the external orifice to ventral to the horizontal ear canal. With the aid of retractors, the central portion of the vertical ear canal was freed from its soft-tissue attachments, using blunt and sharp dissection, and then transected. The proximal portion of the vertical canal and the horizontal canal were then removed, as done for a standard TECA. Following lateral bulla osteotomy and curettage, the transected end of the distal vertical ear canal was grasped and elevated. The medial and lateral vertical ear canal cartilages were apposed with multiple, simple interrupted or cruciate sutures using absorbable 3-0 to 4-0 monofilament material. Care was taken to avoid penetrating the epithelium of the vertical canal with the sutures. Subcutaneous and skin closure was then performed in a routine manner. The result was a shallow, blind-ended auricular cavity, with preservation of the entire circumference of annular cartilage surrounding the external orifice.

Figures 1A-1D—(A) Line drawing showing the location of the skin incision parallel to, and directly over, the vertical ear canal. (B) The vertical canal is dissected free of its attachments and elevated by passing an instrument (Metzenbaum scissors) behind the canal. (C) The canal is transected and the distal portion closed with cruciate sutures placed in the cut edges of the cartilage while avoiding the epithelium. (D) Following closure of the distal canal, the proximal vertical canal and horizontal canal are followed down to the tympanic bulla, as with a standard total ear canal ablation.

Figure 2—Postoperative photograph of an 11-year-old German shepherd dog (case no. 16), showing the location of the skin incision.

Figure 3—Photograph of a 5-year-old basset hound-mix (case no. 6) taken after the distal vertical ear canal has been transected. The pinna is at the top of the photograph. The proximal portion of the vertical ear canal (arrow) and the entire horizontal ear canal will be removed, as done for a standard total ear canal ablation.
<table>
<thead>
<tr>
<th>Case No.</th>
<th>Signalment</th>
<th>Operated Side(s)</th>
<th>Diagnosis</th>
<th>Histopathology</th>
<th>Culture</th>
<th>Follow-up (mo)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7-y, 38-kg, SF rottweiler</td>
<td>Left</td>
<td>Congenital ear canal stenosis</td>
<td>Lymphoplasmacytic and histiocytic inflammation of the horizontal ear canal; cholesterol granuloma within the bulla</td>
<td>No growth</td>
<td>53</td>
<td>No ear problems; occasional mild bilateral wax buildup that was removed with cotton balls.</td>
</tr>
<tr>
<td>2</td>
<td>10-y, 14-kg, CM Scottish terrier</td>
<td>Right</td>
<td>Otitis externa/media</td>
<td>NA</td>
<td>Heavy growth</td>
<td>Staphylococcus intermedius</td>
<td>49</td>
</tr>
<tr>
<td>3</td>
<td>5-y, 33-kg, SF Labrador retriever</td>
<td>Left</td>
<td>Traumatic separation of ear canals</td>
<td>Otitis externa with severe, diffuse, chronic neutrophilic otitis media and severe, diffuse fibrosis</td>
<td>No growth</td>
<td>43</td>
<td>Required cleaning of wax from both ears q 2 wks. Seasonal inguinal and bilateral aural erythema/pruritus.</td>
</tr>
<tr>
<td>4</td>
<td>8-y, 11-kg, CM West Highland white terrier</td>
<td>Left</td>
<td>Craniomandibular osteopathy</td>
<td>Otitis externa/media with myelofibrosis, osteosclerosis, medial vascular fibrosis</td>
<td>No growth</td>
<td>42</td>
<td>Left facial nerve paresis for 3 wks.</td>
</tr>
<tr>
<td>5</td>
<td>7-y, 43-kg, CM German shepherd dog</td>
<td>Bilateral</td>
<td>Otitis externa</td>
<td>NA</td>
<td>Heavy growth</td>
<td>Pseudomonas aeruginosa and Staphylococcus aureus</td>
<td>39</td>
</tr>
<tr>
<td>6</td>
<td>5-y, 25-kg, CM basset hound-mix</td>
<td>Right</td>
<td>Otitis externa</td>
<td>NA</td>
<td>Moderate growth</td>
<td>Pseudomonas aeruginosa</td>
<td>32</td>
</tr>
</tbody>
</table>

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<tr>
<th>Case No.</th>
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<tr>
<td>7</td>
<td>8-y, 53-kg, CM Akita</td>
<td>Right</td>
<td>Plasmacytoma with secondary otitis externa</td>
<td>Plasmacytoma at junction of horizontal and vertical ear canals (clean margins)</td>
<td>Heavy growth <em>Pseudomonas aeruginosa</em></td>
<td>25</td>
<td>Atopy diagnosed 1.5 y later, but no aural involvement occurred.</td>
</tr>
<tr>
<td>8</td>
<td>2-y, 33-kg, CM standard poodle</td>
<td>Left</td>
<td>Chronic otitis externa/media</td>
<td>Chronic, moderate, diffuse otitis externa/media with pyogranulomatous inflammation, fibrosis, and mineralization</td>
<td>Heavy growth <em>Pseudomonas aeruginosa</em></td>
<td>23</td>
<td>Developed bilateral <em>Pseudomonas</em> spp. otitis externa 8 mo postoperatively. Bilateral aural erythema/pruritus occurred 20 mo postoperatively.</td>
</tr>
<tr>
<td>9</td>
<td>10.5-y, 27-kg, CM German shepherd dog</td>
<td>Bilateral</td>
<td>Chronic otitis externa</td>
<td>Chronic, mild left and moderate right diffuse, lymphoplasmacytic ulcerative otitis externa</td>
<td>No growth</td>
<td>14</td>
<td>Several episodes of aural pain and discharge between 1 and 7 mo postoperatively. <em>Staphylococcus intermedius</em> and group G <em>Streptococcus</em> cultured.</td>
</tr>
<tr>
<td>10</td>
<td>6-y, 42-kg, CM German shepherd dog</td>
<td>Left</td>
<td>Otitis externa</td>
<td>NA</td>
<td>Heavy growth <em>Pseudomonas aeruginosa</em>; moderate growth <em>Staphylococcus intermedius</em></td>
<td>12</td>
<td>Requires cleaning of mild wax from ears every 1-2 mo.</td>
</tr>
<tr>
<td>11</td>
<td>3.5-y, 26-kg, SF beagle</td>
<td>Left</td>
<td>Otitis media</td>
<td>Otitis media with chronic, severe, diffuse otitis externa; granulomatous dermatitis; cystic glandular dilatation; neutrophilic adenitis; and diffuse epithelial hyperplasia</td>
<td>Heavy growth <em>Escherichia coli</em></td>
<td>12</td>
<td>Dark, waxy buildup in left ear 1 mo postoperatively, with cocci and yeast identified on cytology.</td>
</tr>
<tr>
<td>12</td>
<td>6-y, 40-kg, CM rottweiler</td>
<td>Left</td>
<td>Otitis externa/media</td>
<td>Otitis externa/media with marked dermal fibroplasias, moderate sebaceous hyperplasia, and apocrine gland dilatation</td>
<td>Moderate growth <em>Staphylococcus intermedius</em>; heavy growth group G <em>Streptococcus</em></td>
<td>11</td>
<td>No left-sided ear problems; intermittent contralateral otitis externa. Euthanized for progressive lymphoma.</td>
</tr>
</tbody>
</table>

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Table (cont’d)

Clinical Data for 19 Animals Treated With Subtotal Ear Canal Ablation

<table>
<thead>
<tr>
<th>Case No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>12-y, 24-kg, SF German shepherd-mix</td>
<td>Bilateral</td>
<td>Chronic otitis externa</td>
<td>Chronic, severe, diffuse, histiocytic nodular otitis externa; histiocytic, neutrophilic, ceruminous adenitis and osseous metaplasia</td>
<td>No growth</td>
<td>10</td>
<td>No ear problems.</td>
</tr>
<tr>
<td>14</td>
<td>2.5-y, 40-kg, CM bullmastiff</td>
<td>Left</td>
<td>Otitis externa/media</td>
<td>Otitis externa/media; bulla: fibrosis with chronic lymphoplasmacytic and neutrophilic inflammation</td>
<td>Heavy growth <em>Pseudomonas aeruginosa</em></td>
<td>9</td>
<td>Developed left <em>Malassezia</em> spp. otitis externa 3 mo postoperatively.</td>
</tr>
<tr>
<td>15</td>
<td>5-y, 11-kg, CM pug</td>
<td>Bilateral</td>
<td>Otitis externa/media</td>
<td>Left chronic lymphoplasmacytic otitis media; right moderate hyperkeratosis of bulla epithelium</td>
<td>Light growth <em>Staphylococcus intermedius</em></td>
<td>5</td>
<td>No external ear problems. Left head tilt and diminished palpable reflex (present preoperatively) persisted. Developed ataxia, anisocoria, circling to right, facial twitch, and cervical pain 5 mo postoperatively. Diagnosed with encephalitis/meningitis; developed aspiration pneumonia and was euthanized.</td>
</tr>
<tr>
<td>16</td>
<td>11-y, 34-kg, CM German shepherd dog</td>
<td>Left</td>
<td>Right otitis media; left otitis externa</td>
<td>Right otitis media; left chronic, hyperplastic, neutrophilic, and lymphohistiocytic otitis externa with extensive fibrosis</td>
<td>Light growth <em>Staphylococcus intermedius</em></td>
<td>4</td>
<td>Bilateral facial nerve paresis for 3 d; preoperative head tilt and ataxia resolved within 2 wks; right ear pruritus with minimal waxy debris developed 3 mo postoperatively.</td>
</tr>
<tr>
<td>17</td>
<td>9-y, 9-kg, SF pug</td>
<td>Right</td>
<td>Otitis externa/media</td>
<td>Ulcerative fibronecrotic otitis externa/media</td>
<td>No growth</td>
<td>4</td>
<td>No ear problems; right corneal ulcer developed secondary to facial nerve paralysis; palpebral reflex returned 2 mo postoperatively.</td>
</tr>
</tbody>
</table>

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Table (cont’d)
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<tr>
<td>18</td>
<td>8.5-y, 31-kg, SF German shepherd dog</td>
<td>Bilateral</td>
<td>Otitis externa/media</td>
<td>NA</td>
<td>Heavy growth <em>Pseudomonas aeruginosa</em>; moderate growth group G <em>Streptococcus</em></td>
<td>3</td>
<td>Left head tilt with horizontal nystagmus and left facial nerve paralysis developed postoperatively; nystagmus resolved in 3 d. Head tilt diminished but still present at 3 mo; facial paralysis resolved over 3 mo; developed bilateral <em>Malassezia</em> spp. otitis externa 2 mo postoperatively.</td>
</tr>
<tr>
<td>19</td>
<td>10-y, 7-kg, SF domestic shorthair cat</td>
<td>Left</td>
<td>Ceruminous gland adenoma with otitis externa</td>
<td>Ceruminous gland adenoma at tympanic membrane with chronic, diffuse lymphoplasmacytic otitis externa, sebaceous hyperplasia, and lamina propria fibrosis</td>
<td>Heavy growth <em>Staphylococcus intermedius</em></td>
<td>8</td>
<td>No ear problems.</td>
</tr>
</tbody>
</table>

* SF=spayed female; CM=castrated male; erect-eared breeds=cases nos. 2, 4, 5, 7, 9, 10, 13, 16, 18, 19
† Case nos. 1 and 16 also had ventral bulla osteotomies (case no. 1, ipsilateral; case no. 16, contralateral); case no. 11 also had a total ear canal ablation on the contralateral (right) side.
‡ NA=not available
Subtotal ear canal ablation was performed in 19 animals (24 ears). Nine dogs and one cat had erect ears (14 operated ears). A specific goal in animals with erect ears was to maintain ear carriage. The procedure was also performed in nine dogs with pendulous ears (10 operated ears) that had no or minimal involvement of the distal vertical ear canal. Numerous breeds were represented, including the German shepherd dog (n=5), rottweiler (n=2), pug (n=2), and one each of a German shepherd-mix, Scottish terrier, Labrador retriever, West Highland white terrier, basset hound-mix, Akita, standard poodle, beagle, bullmastiff, and domestic shorthair cat [see Table]. Twelve of the animals were castrated males, and seven were spayed females. Mean body weight of the 18 dogs was 30 kg (range 9 to 53 kg). Median age at the time of surgery was 7 years (range 2 to 12 years).

All animals were diagnosed with otitis externa with minimal or no involvement of the distal vertical ear canal based on otoscopic, pathological, and/or microbiological evaluations [see Table]. Computed tomography (CT) revealed partial or complete filling of the horizontal ear canal with soft-tissue density in the 18 cases in which it was performed. Eleven of these 18 cases (23 ears) also had evidence of horizontal canal mineralization. An additional 11 animals had evidence of middle ear involvement on CT. One dog (case no. 7) and one cat (case no. 19) had benign masses within the horizontal ear canal (i.e., plasmacytoma and ceruminous adenoma, respectively). Three dogs had additional diagnoses, such as congenital ear canal stenosis based on intraoperative and CT findings (case no. 1), traumatic ear canal separation based on intraoperative findings and a history of head trauma (case no. 3), and cranio-mandibular osteopathy based on CT and histopathological results (case no. 4). Other diseases previously diagnosed and treated in the affected animals included hypothyroidism (case nos. 2, 12), occipital hemangiopericytoma (case no. 1), and keratoconjunctivitis sicca and lymphosarcoma (case no. 12).

For those animals with clinical signs (n=18), the median duration was 3.5 years (range 1 month to 10 years). Clinical signs were consistent with otitis externa and included aural erythema, pain, pruritus, purulent discharge, and head shaking. Case no. 2 also had a draining tract cranioventral to the right ear canal. Prior treatments were numerous, varied, and frequently consisted of topical and oral antibiotics, antifungal medications, and corticosteroids; topical aural cleaning solutions; and hypoallergenic diets.

Intraoperative bacterial cultures were positive in 13 of 19 cases (when bilateral surgery was performed, samples were combined in the laboratory). Bacteria identified
included \textit{Pseudomonas aeruginosa} (n=7), \textit{Staphylococcus intermedius} or \textit{aureus} (n=6), group \textit{G Streptococcus} (n=2), and \textit{Escherichia coli} (n=1).

\section*{Surgical Technique}

Slight modifications of the surgical procedure were needed in three cases. In case no. 1 (congenital ear canal stenosis), the bulla osteotomy was performed via a ventral approach rather than a lateral one, because the horizontal ear canal tapered to a blind end medially. Continuing with the lateral approach would have jeopardized the facial nerve. Case no. 3 did not require suture closure of the distal vertical ear canal, as it was already closed secondary to traumatic separation from the horizontal canal. Exposure of the tympanic bulla was improved by creating a “T” at the proximal extent of the skin incision in the cat (case no. 19) that underwent the procedure. The mean duration of surgery was 1.6 hours (range 0.75 to 3 hours). The longest procedure (3 hours [case no. 1]) required more time to reposition and perform a ventral bulla osteotomy.

\section*{Other Treatments and Follow-up}

All animals received perioperative analgesic therapy consisting of topical fentanyl patches, local nerve blocks with 0.25\% bupivacaine, and intravenous narcotics. In addition, animals were discharged on oral or subcutaneous antibiotics (n=17), oral nonsteroidal anti-inflammatory drugs (n=10), and eye lubricants (n=7). Median time to follow-up was 12 months (mean 21 months; range 3 to 53 months) [see Table]. Telephone contact was made with the owners of 15 animals and with the referring veterinarians of 18 animals. Fourteen of the 15 owners contacted were pleased with the outcome.

\section*{Postoperative Complications}

Temporary facial nerve paresis or paralysis (duration range 3 days to 3 months) developed in five dogs and was treated with eye lubricants (n=5) and a temporary tarsorrhaphy (n=1). Case no. 18 also developed a head tilt to the same side (i.e., left) and horizontal nystagmus following bilateral subtotal ear canal ablations. The nystagmus resolved in 3 days, the palpebral reflex returned after 3 months, and the head tilt improved but was still present 3 months postoperatively. One dog with chronic otitis had a left head tilt and diminished left palpebral reflex (case no. 15) at initial presentation. Loss of bone on the medial aspect of the left bulla was noted on CT. Neurological signs persisted for 5 months following surgery, at which time the dog became ataxic, was diagnosed with encephalitis/meningitis and aspiration pneumonia, and was euthanized.

Eleven of 19 animals (13 of 24 ears) treated with subtotal ear canal ablation had no dermatological problems associated with the remaining vertical ear canal and pinna [see Table]. The owners of two of these animals (case nos. 1, 10; both had unilateral surgery) intermittently cleaned wax from the ears, although the animals had no clinical signs of otitis. Three dogs were subsequently diagnosed with atopy, and two others developed otitis externa in the contralateral ear. None of these latter five dogs developed any ear-related clinical signs on the side in which subtotal ear canal ablation was performed.

Four of 19 animals (five of 24 ears) treated with subtotal ear canal ablation had minor and transient dermatological problems associated with the remaining vertical ear canal and pinna [see Table]. Case no. 3 (left-sided ablation) developed seasonal, inguinal and bilateral aural erythema and pruritus that required sporadic treatment with topical medications. Case no. 5 (bilateral ablation) had a temporary, left-sided incisional infection and intermittent, seasonal right-sided erythema and pruritus that responded to several days of topical therapy. Case no. 6 (right-sided ablation) developed generalized pruritus of the interdigital area, rump, and pinnae 2 years postoperatively, which responded to topical therapy and did not recur. This same dog also developed contralateral (i.e., left-sided) otitis externa 14 months after the right ear was operated. Case no. 11 (left-sided subtotal ablation, right-sided TECA) developed cocci and yeast in the left auricular cavity 1 month postoperatively, which responded to topical therapy and did not recur.

Four of 19 animals (six of 24 ears) treated with subtotal ear canal ablation had protracted dermatological problems associated with the remaining vertical ear canal and pinna that required intermittent or long-term therapy [see Table]. Four of the six ears were erect, and two were pendulous. Case no. 8 (left-sided ablation) developed bilateral otitis externa from \textit{Pseudomonas} sp. 8 months postoperatively that resolved after 1 month of topical and systemic therapy. This same animal had an episode of bilateral aural erythema and pruritus 20 months postoperatively that resolved after 3 days of topical therapy. Case no. 9 (bilateral ablation) developed multiple episodes of bilateral bacterial otitis externa starting 1 month postoperatively that persisted for 6 months. Treatment consisted of topical otic cleaning solutions, oral antibiotics, and nonsteroidal anti-inflammatory drugs. Clinical signs resolved once the dog was started on a hypoallergenic diet and a twice-weekly topical antibiotic/antifungal/corticosteroid ointment. Case no. 14 (left-sided ablation) developed left-sided otitis externa from \textit{Malassezia} spp. 3 months postoperatively, which resolved following 2 weeks of topical and systemic therapy. Case no. 18 (bilateral ablation) developed bilateral otitis externa from \textit{Malassezia} spp. 2 months postoperatively, which required 1 month of topical and systemic therapy, as well as a hypoallergenic diet.

\section*{Discussion}

Removal of the entire vertical ear canal can result in altered ear carriage in dogs and cats with erect ears.\textsuperscript{2-8,12-14} Total ear canal ablations have been less commonly performed in cats and have been performed primarily to treat neoplasia rather than chronic otitis.\textsuperscript{9,11,15} In a prior report, ear carriage was maintained in six cats using a ventrally-based advancement flap, but greater dissection was required than with the technique reported here.\textsuperscript{11} Attempts to minimize alteration
in ear carriage in dogs have included 1) resection of the skin caudal to the vertical portion of the T-shaped skin incision, so that the remaining cartilage at the base of the pinna is pulled into a shallow cup following skin closure; 2) using an inverted L-shaped skin incision to achieve cupping of the pinna during closure; 3) placement of a temporary suture between the dorsal pinna and the skin overlaying the zygomatic arch; and 4) retention of the distal vertical ear canal and creation of a stoma just ventral to, and communicating with, the external orifice. Long-term results regarding ear carriage following these techniques have rarely been reported. In the last report describing stoma creation, it was theorized that the stoma would help eliminate recurrence of otitis externa by improving aeration and drainage. Several animals in the current report had minor (three dogs with pendulous ears and one with erect ears) to protracted (two dogs with pendulous ears and two with erect ears) dermatological problems of the pinna or auricular cavity following surgery. It was unclear if the creation of a stoma would have reduced these complications. The subtotal ear canal ablation technique reported here resulted in an ear that appeared normal and was similar to a previously reported modification of the lateral ear canal resection technique. While many owners of animals with erect ears are not concerned about ear carriage, ear-droop following standard TECA and methods to prevent its occurrence should be discussed prior to surgery. The subtotal ear canal ablation procedure used in this report preserved erect ear carriage and eliminated the dissection through and around the medial aspect of the auricular cartilage that is required for a standard TECA. Although necrosis of the pinna is a rare complication following standard TECA, subtotal ear canal ablation may also reduce this risk. The subjective impression of the surgeons performing this procedure is that subtotal ear canal ablation is easier to perform than a standard TECA, results in less hemorrhage, and may be less painful to the animal postoperatively. Prospective studies are needed to investigate these issues. Because these potential benefits were observed in several dogs with erect ears, the technique was subsequently performed on nine dogs with pendulous ears and minimal to no distal ear canal involvement.

Animals that have masses or gross changes to the vertical ear canal secondary to otitis externa are not candidates for subtotal ear canal ablation. Such dogs include cocker spaniels, because they typically have significant involvement of the distal ear canal and the auricular cavity by the time a TECA is considered. The risk of recurrent disease in the remaining vertical canal is too great to warrant alternative, tissue-sparing surgical techniques. Additionally, dogs with pendulous ears that have otitis externa from a cause other than a horizontal ear canal mass, horizontal ear canal stenosis, or traumatic separation are not good candidates for subtotal ablations because of the potential for otitis recurring within the remaining vertical canal. All of the animals in this report had grossly normal distal vertical ear canals and normal external orifices. In addition, masses were confined to the horizontal ear canal.

Infectious complications associated with this procedure included superficial and transient skin infections involving the remaining auricular cavity (seen in four animals; five of 24 ears, 21%). Another four animals (six of 24 ears, 25%) developed protracted auricular cavity skin infections that eventually resolved with medical management. These results were comparable to the recurrent dermatological problems of the pinna that have been reported in 26% of dogs after standard TECA surgery. Although all superficial infections were corrected with medical management, owners should be warned of the possibility of these complications prior to performing subtotal ear canal ablation, even if there is no involvement of the distal ear canal at the time of surgery. Although the blind pouch (i.e., distal vertical canal) created by the surgery is shallow, it may predispose individual animals to a buildup of wax and/or provide an appropriate environment for the recurrence of superficial infections.

Five (26%) animals without neurological signs at presentation developed transient facial nerve paresis or paralysis. During subtotal ear canal ablation, the soft tissues were retracted away from the horizontal ear canal with Gelpi retractors. Care was taken to ensure the retractors were placed superficially to the facial nerve, as it courses cranially and ventrally to the horizontal ear canal. Although retraction may have contributed to the facial nerve trauma in these cases, the frequency of this complication was similar to that previously reported for the standard TECA technique. The subjective impression of the surgeons performing this procedure is that facial nerve identification and retraction are no more difficult than during a standard TECA; however, in the cat, the skin incision is modified to improve exposure. As with the standard technique, owners should be made aware of the possibility of postoperative neurological complications.

Conclusion

Based on the results of this study, subtotal ear canal resection appears to be an option for dogs and cats with masses or other anatomical abnormalities of the horizontal ear canal. The procedure may also be an option for erect-eared animals with otitis externa that does not affect or minimally involves the distal vertical ear canal. The potential risk of continued or recurrent local infection should be discussed with the owner prior to surgery. Erect ear carriage was maintained with this modification. Further investigation is required before the procedure can be recommended in pendulous-eared dogs as a treatment for otitis externa not caused by masses or anatomical abnormalities of the horizontal ear canal.

References