

## **Audit of Total Ear Canal Ablation-Lateral Bulla Osteotomy Procedures Performed by One Surgeon**

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**Subject/area of practice:** Surgery/Dermatology

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**Reasons for Audit:** To determine how complication rate of this procedure, both short and long term, compare with that in recently published literature and to be sure this procedure should be still be offered in-house rather than being referred to a surgical specialist.

**Background** Total Ear Canal Ablation-Lateral Bulla Osteotomy (TECA-LBO) procedures on dogs (and cats) have been performed by this surgeon since 1991 and since that time over 260 procedures have been performed. The surgeon also runs a dermatology service with special interest in ear disease and wishes to provide a complete service whereby cases that are beyond medical treatment can go to surgery without being referred to a specialist surgeon. Indications for TECA-LBO are “end stage otitis”, where there is chronic irreversible change to the ear canal, intractable ear infections particularly as a result of middle ear infection and changes in the vicinity of the tympanic membrane/lower horizontal ear canal, and tumours in the ear canal which cannot be dealt with either by Lateral Wall Resection or Vertical Canal Ablation. Also sometimes, due to financial reasons, a client may prefer surgery to lengthy courses of treatment, requiring several anaesthetics and ear flushings, with no guarantee of success at the outset.

The surgeon first learnt the technique that was published in video format in the “In Practice” series around 1991. This involved the use of an osteotome to separate the ear canal from the bulla and also looking for the facial nerve and pulling it out of the way using penrose drain material. Several years later, due to being unhappy with the complication rate, he changed the technique to one just using surgical scissors and scalpel blade to remove the horizontal ear canal from the bulla and then just using rongeurs to perform the lateral bulla osteotomy, followed by curettage of the medial, ventral and remaining lateral bulla lining. The facial nerve is not deliberately searched for, but the surgeon is careful not to place any sharp instruments in its vicinity or pointing towards it. All cases are given perioperative and post-operative antibiotics, most based on culture and sensitivity testing pre-surgery.

Complications from this surgery can be divided into temporary and long-term.

Temporary complications include, facial nerve deficits, vestibular signs, Horner’s syndrome and post-operative infection and wound dehiscence.

Long term, the two main concerns are permanent facial nerve paralysis and draining tract formation, the latter which can sometimes take years after surgery to develop. (maximum 2.5 years in this practice). Although an animal can usually manage with facial nerve paralysis, clients don’t like it and draining tract formation can be debilitating, painful and sometimes worse than the original ear problem and requires further surgery that can be more difficult than original procedure.

It was the surgeon’s view that the incidence of both permanent facial nerve paralysis and draining tract formation was about 3% for each, but these were just estimates and not based on proper audit.

Since Nov 2011 the practice changed its practice management system making clinical audit of these procedures possible.

## **Aims & Objectives:**

To determine both the short and long term complication rate for this procedure in the hands of one surgeon. To compare the complication rate with the most recently published data for operations carried out either by specialist surgeons or their interns. To be sure that this surgeon can still offer as good a prognosis as possible for clients seeking this procedure – many pet forums discuss this procedure and the recommendations in most of them is to seek information on the number of procedures carried out and the complication rate, as it appears the complication rate can be high in the hands of inexperienced surgeons.

## **Design:**

Using the practice management system (RxWorks), a search was made for animals to which the 4 different procedure codes for unilateral or bilateral TECA-LBO in dog or cat had been applied, between Nov 2011 and December 2017. Once the list of animals had been made, the clinical records for each animal were examined, paying particular attention to any record of either temporary short term or long term complications of the surgery. In total, 42 animals were found to have had either a unilateral or bilateral TECA.

The results will be split into Dogs and Cats and into unilateral or Bilateral with complication rates (short or long term) for each plus the total complication rate based on the number of ears operated on.

One flaw in the audit will be that the long term complication of draining tracts may be yet to appear in animals operated on in the last 2.5 years.

## **Results:**

### **Cats**

**Unilateral:** 5 cases (one in conjunction with ventral bulla osteotomy)

### **Short Term Complications:**

Facial Nerve Paralysis 60% (3 cases all less than 3 weeks).

**Long Term Complications:** 0%

## Dogs

**Unilateral:** 24 cases

### Short Term Complications:

|                          |  |
|--------------------------|--|
| Facial Nerve Paralysis   | 8% (2 cases, all less than 4 weeks).   |
| Vestibular Symptoms      | 4% (one case- 5 months post op and 12 months post-op and both times clearing with antibiotics and symptom free last 5 years. |
| Post –op wound infection | 25% ( 5 cases, 4 very mild, only one requiring further surgery to insert drain)  |
| Pinnal Necrosis          | 4% (1 case requiring further surgery to debride and suture small area of pinnal necrosis at base of pinna)                   |

### Long Term Complications

|                        |    |
|------------------------|----|
| Facial Nerve Paralysis | 0% |
| Draining Tracts        | 0% |

**Bilateral:** 13 cases (26 ears)

### Short Term Complications

|                         |  |
|-------------------------|--|
| Facial Nerve Paralysis  | 0%   |
| Post-op wound infection | 4% ( 1 case, very mild, clearing with antibiotics)             |
| Wound dehiscence        | 4% (one case, 3cm of wound opened up and allowed to granulate) |

### Long Term Complications

|                        |  |
|------------------------|--|
| Facial Nerve Paralysis | 0%   |
| Draining Tracts        | 8% (2 cases, both requiring re-curettage of bulla and no further trouble in 5 year follow –up) |

## **Summary of Post –Operative Complications**

Total number of TECAs performed = 55

### **Complications Within First 12 Months of Surgery**

1. Post-operative infection 6 = 11% (all of them mild)
2. Wound dehiscence 1 = 2%
3. Mild pinna necrosis 1 = 2%
4. Transient facial nerve paralysis 9 %
5. Vestibular Symptoms 3.64 %

### **Complications Occuring over 12 Months of Surgery**

1. Permanent Facial Nerve Paralysis 0 =0%
2. Draining tracts/swelling requiring re-curettage of bulla 2= 4%
3. Vestibular signs 0 = 0%

## **Discussion**

### **Post-operative Infection/Wound Dehiscence**

Firstly, the incidence of post-operative infection of 11% may appear high, but this is not to be unexpected given the nature of the surgery, removing an already infected piece of tissue which is impossible to surgically prepare adequately and many cases are already suffering with middle ear infection. All cases received post-operative antibiotics, often based on previous culture and sensitivity. Three of the cases developed a pseudomonas infection postoperatively which required treatment with systemic gentamicin. Many of these cases were suffering with pseudomonas infection susceptible **only** to gentamicin. However due to the toxicity of this drug systemically, none of those cases were put on this antibiotic post-operatively unless infection developed. In many cases it didn't. Rates of perioperative infection/minor incisional complications quoted in recent literature range from 5.3% (1) to 16.3% (2) to 32.5% (3) So these results fall in the lower half of the published complication rates.

### **Temporary Facial Nerve Paralysis**

Incidence of 9 % compares very favourably with the literature with incidence of 48.9% (1) However, those 48.95% were split into paresis (27.1%) and paralysis (21.8%). Doyle et al (2) quote an incidence of facial nerve deficits (paresis?) of 11.6% and paralysis of 4.65%. Coleman and Smeek (3) quote an incidence of facial nerve deficits of between 33.3 and 40%. The apparently low incidence of facial nerve deficits may be due to that fact that the surgeon only recorded facial nerve *paralysis* in the clinical notes. Even so, these results would appear to be very good.

In the 5 cats operated on, 3 (60%) developed temporary facial nerve paralysis. This compares with 56% rate in a paper by Bacon et al 2003 (4). This is not statistically significant.

### **Vestibular Symptoms**

Two cases of vestibular symptoms (3.64%) occurred, both of which did not develop immediately after surgery. One case developed after 10 days of surgery at the same time as development of facial nerve paralysis and both signs were temporary, clearing with antibiotics. The other case, strangely, had two separate bouts of vestibular symptoms, 5 months and 1 year after surgery, both responding to antibiotics and never returning (4 year follow-up). Spivack's paper divides vestibular signs into ipsilateral head tilt with a reported incidence of 11.3% and horizontal nystagmus with an incidence of 4.5%. These results therefore compare very favourably with the literature.

### **Permanent Facial Nerve Paralysis**

With an incidence of 0%, these results compare extremely favourably with the literature. Incidences quoted range from 8.2% in dogs and 33.3% in cats (1). Once again, this paper quotes for facial nerve deficits, not just paralysis. The audited cases could possibly be suffering some very mild facial nerve deficits, but they are undetectable. These results would therefore appear to be excellent.

### **Draining Tracts**

This is considered the most serious of all the possible long term complications of TECA-LBO surgery. Draining tracts can take up to several years to develop, although in this surgeon's experience the longest ever it has taken is 2.5 years. Incidences of this complication quoted in the literature range from 2.3% (2) to 10% (5).

The incidence of 4% doesn't compare badly with the literature, in both cases, a second surgery has resolved the problem (5 year follow up on both).

### **Conclusion**

In conclusion, after carrying out an Audit of post-operative complications on 55 TECA-LBOs carried out over the last 6 years it would appear this surgeon's complication rate compares well with that published in the literature and for permanent facial nerve paralysis, extremely well. It is also worth noting that the figures quoted in the literature are for surgical cases performed by board-certified surgical specialists or interns.

Further improvement of the figures for immediate post-operative infection and wound dehiscence may possibly be made by reviewing pre-operative and **intra-operative** bacterial culture and sensitivity testing. Improvements to the draining tracts incidence could possibly be made by refining further the surgical technique as described by Smecke and Inpanbutr (6)

## References

1. Spivack et al JAAHA 49:3 2013 160-168 Postoperative Complications Following TECA-LBO in the Dog and Cat
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3. Coleman KA and Smeake DD Veterinary Surgery 2016 Jul;45(5):659-63 Complication Rates After Bilateral versus Unilateral Total Ear Canal Ablation with Lateral Bulla Osteotomy for End-Stage Inflammatory Ear Disease in Dogs: 79 Ears.
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5. Mason LK1, Harvey CE, Orsher RJ. Vet Surg. 1988 Sep-Oct;17(5):263-8. Total ear canal ablation combined with lateral bulla osteotomy for end-stage otitis in dogs. Results in 30 dogs.
6. Smeeke DD and Inpanbutr N Compendium on Continuing Education for the Practicing Veterinarian 27(5) May 2005 377-385 Lateral Approach to Subtotal Bulla Osteotomy in Dogs: Pertinent Anatomy and Procedural Details.