

**Rounds**  **Notes**

Animal Health Department  
Medical Rounds  
*"medicine for all"*

NATIONAL MARINE LIFE CENTER  
Caring for Stranded Marine Animals

Veterinary Research Department  
Under the microscope  
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Rounds Notes is a report on the health of animals at the National Marine Life Center from Sea Rogers Williams VMD for the staff, volunteers, and community of the center including professionals involved the captive care of similar species, the views expressed are not necessarily that of NMLC. Information in Rounds Notes should be considered confidential and used solely to benefit the health of aquatic animals everywhere.

August 21, 2013      Special Surgery Edition      Rounds Notes      19: 70-73 (2013)

**Headlines News: Malleus has malleus removed**  
**special thanks the specialists for special care and skill**  
**Left-Total Ear Canal Ablation (TECA) with Lateral Bulla Osteotomy (LBO) #2**



Thanks, to the special team at our partner organization Cape Cod Veterinary Specialists in particular Drs. Ed Kochin VMD DACVS along with Michelle Fulks DVM and Virginia Sinnott DVM DACVECC, Jess and Trina Bellinger, Jen McCoy/Boston, and the whole CCVS team who were fantastic again! The NMLC team of myself, Kate Shaffer and Drs. Andy Voorhis got the seal in and out in 3 hours, surgery was 90 min., anesthesia 1.5 hours. Nice work all, thanks again-Rogers remember we're not out of the woods yet . . .

## TECA w/ LBO:

PreOp CBC/CP WNL A: OK for general anesthesia and surgery. Exam and ear flush 8/15/13, Weight 16 kg.

### Anesthesia <sup>8/21/13</sup>

PreOp (Voorhis and Shafter) 8:00 am @ NMLC

midazolam 2cc (code M16) IM

glycopyrrolate 2cc IM

buprex 1cc (code B14) IM

transport to CCVS in crate (Shafter)

induction 8:45 am @ CCVS

HR= 120 bpm, lungs clear

8 cc propofol slow IV dorsal sinus via 2"20g

(Williams)

intubated #7mm (Trina), PPV 8-16 bpm to 20-25 cc H<sub>2</sub>O

maintenance fluids, LRS CRI @ X ml/hr IV

total volume X ml

HR dropped to 30 bpm, color was muddy and the seal was not breathing: marine mammal drive response, administered 1cc glycopyrrolate IV, 2 cc atropine IV dorsal sinus (Williams), HR >160 sinus rhythm, color and SaO<sub>2</sub> improved.

Unable to get jugular or arterial lines; 1.5" 20g IVC into dorsal sinus, sewed into place (Williams).

Anesthesia was turned over to the CCVS team (Sinnott-Folks)

Ventilator or PPV by hand, 3L bag

RR X bpm, tidal volume 8ml/kg

X ml minute ventilation of X L

Maintenance 0.5 % servoflone in

100% oxygen X L/min

CRI Dobutamine

CRI Midazolam

### Monitor

NIBP, EtCO<sub>2</sub>, ECG, SaO<sub>2</sub>

Anesthesia Note: Once the animal was moved into surgery it did much better, low flow servoflone (0.5%), with boluses of midazolam, etCO<sub>2</sub> was greater than 100 at times, SaO<sub>2</sub> as high as 96%, pressures were good.

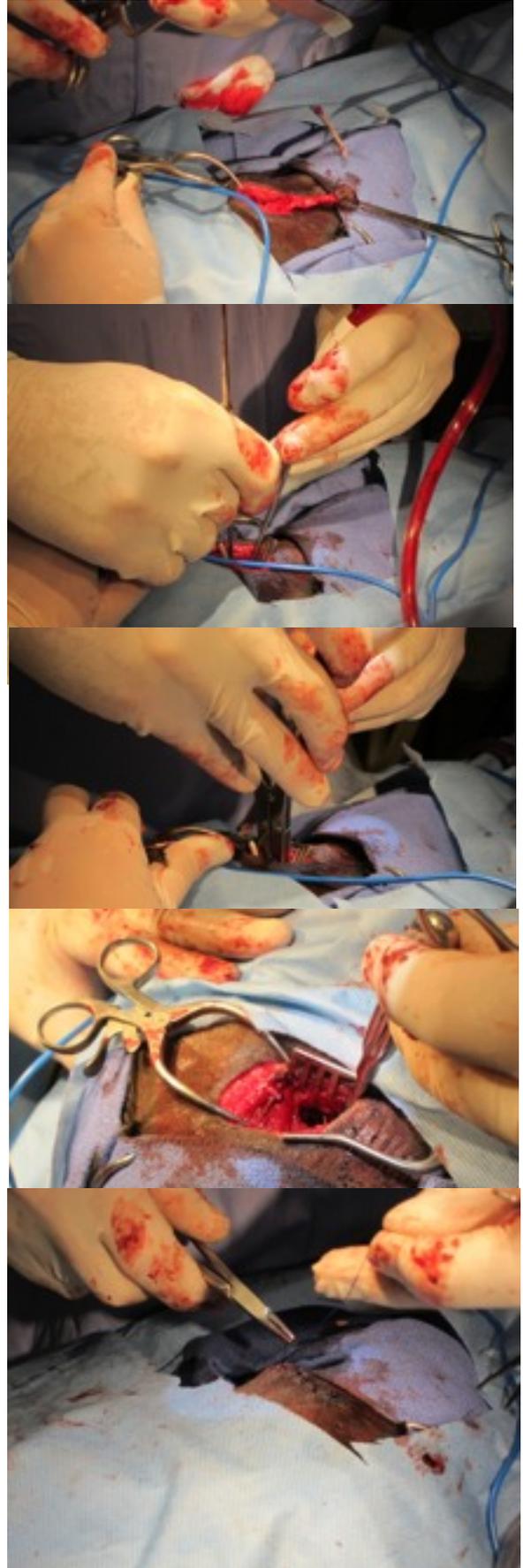


**Surgery** (Kochin with Williams assistance)

9:15-10:30 am

Left sided TECA with LBO.

- 1) Tear-drop incision around the external auditory meatus.
- 2) Sharp dissection and electro-cautery to control minor hemorrhage in the skin and blubber layer to the cartilage of the external ear canal.
- 3) Dissection along the external ear canal not straying from the cartilage of the canal. Sharp point iris scissors were used.
- 4) Small Gelpi retractors were carefully placed superficially and maintained with caudal traction to follow the canal.
- 5) The canal was dissected deep (around 4 cm), held with Alice Forceps to assist manipulation, Minor vessels and muscle tissue supplying the canal were identified and removed.
- 6) Digital palpation and a blunt elevator were used to determine the distance to the skull and orient the canal.
- 7) Once the canal was dissected to the level of the ossious auditory meatus (OAM), dissection and separation of the cartilage from the bone started dorsally and worked caudal and ventral. The external ear canal was excised with scissors.
- 8) The lateral bulla wall is directed ventrally and caudally and was exposed with a small periosteal elevator. An Addison elevator was used to determine the ventral bulla and placed at this level with ventral retraction. Suction was used to clear the field of blood, hemorrhage is mild to moderate until the entire mucoperiostium was removed (in 2 large pieces).
- 9) Rongures were used to chip away at the lateral wall and protuberance defining the OAM, shards of the bone were removed from the ventral protuberance of OAM.
- 10) A small Weitlander retractor was used to assist with exposure of the lateral bulla wall. Double action Ruskin rongures followed by two sizes of Lempert rongures and Kerr laminectomy rongures were used to break off fragments of the lateral bulla wall, and then to smooth and elarge the osteotomy.
- 11) Some bone fragments removed from the lateral aspect of the bulla were thick and slightly grey.
- 12) Once the bulla was carefully exposed, sterile Q-tips were used to mark the location of the OAM, care was taken as the medial wall of the bulla contains the canal of the internal carotid artery. The mucoperiostium was



then removed and the bulla explored with the improved exposure now that the lateral wall was removed. The ossicle chain was identified and the incus removed. Once we were satisfied the tympanic bulla was cleaned of remaining mucoperiostium, the final edges of the osteotomy were refined with the Kerr.

13) Flushed the bulla, with copious amounts of warm 0.9% saline, suction, and final inspection.

14) close in 3 layers 2-0 PDS

- 1) deep connective tissue 2 x simple interrupted
- 2) subcutaneous tissues SC
- 3) subcuticular SC
- 4) skin with alternating cruciate sutures and modified vertical mattress sutures (near, far, far, near) to provide apposition and tension relief.

**Surgical Notes:** This procedure was completed without power tools, however this may not be possible in larger seals as the bone of the tympanic bulla is very dense and at the near limit of remove with ronguers.

### Recovery:

Recovery was prolonged, likely due to the length of the anesthesia. During recovery 2 doses of flumazenil were given 0.01 mg/kg IV, a third was given during the second marine mammal dive reflex.

After apparent recovery and extubation the seal was placed in a plastic dog crate for transport, was not noted not to be breathing. The seal was pulled from the carrier and returned to the pre-surgical treatment table and intubated with 100% and PPV. HR was in the 30's. 2 cc atropine was given IV and the HR returned to > 120 bpm before the epinephrine could arrive. 8cc of doxipram was also given IV, and spontaneous respiration returned in 10-15 min., the seal was extubated again, allowed to recover and then placed back into the carrier for transport. Once the seal arrive back at the center he was placed in dry holding, given 0.2 mg/kg meloxicam SQ. At 2pm the seal was still heavily sedated, RR= 40 bpm, HR=120 bpm, and slightly rousable. A fourth dose of flumazenil 1.6 cc 0.01 mg/kg was given IV.

### Post Op Plan:

- Buprenx 0.5-1 cc IM BID 3 days
- Meloxicam 0.3 cc SQ/IM SID 7 days
- enrofloxacin 5 mg/kg SID (PO or IM)
- (pending culture results)

### Pending Samples:

- Mycoplasma culture to IDEXX
- Aerobic bacterial culture to IDEXX
- Histopathology to Northwest Zoo Path (external ear canal, mucoperiostium, bone from the lateral bulla wall)



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