

Rounds

Animal Health
Department

Medical Rounds

"medicine for all"



Caring for Stranded Marine Animals

NATIONAL
MARINE
L I F E
CENTER

Notes

Veterinary Research
Department

Under the microscope

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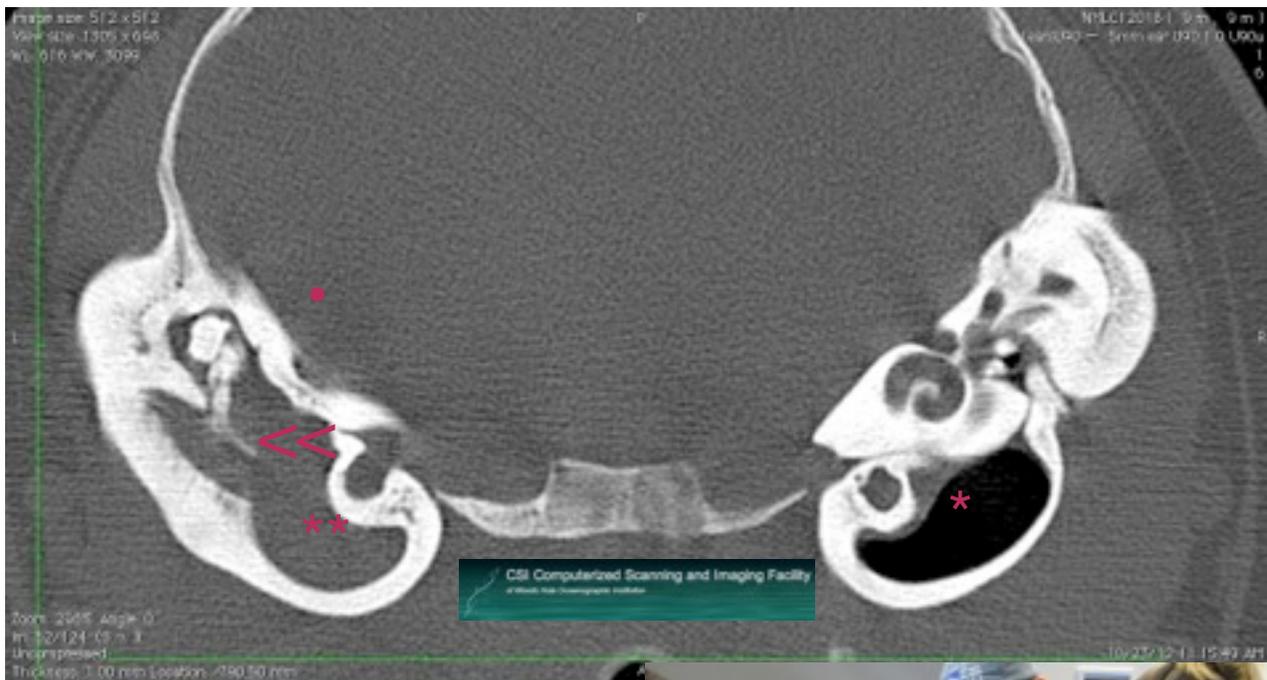
Rounds Notes is a report on the health of animals at the National Marine Life Center from Sea Rogers Williams VMD for the staff, volunteers, and community of the center including professionals involved the captive care of similar species, the views expressed are not necessarily that of NMLC. Information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

Oct 23, 2012

Rounds Notes

5: 16-20 (2012)

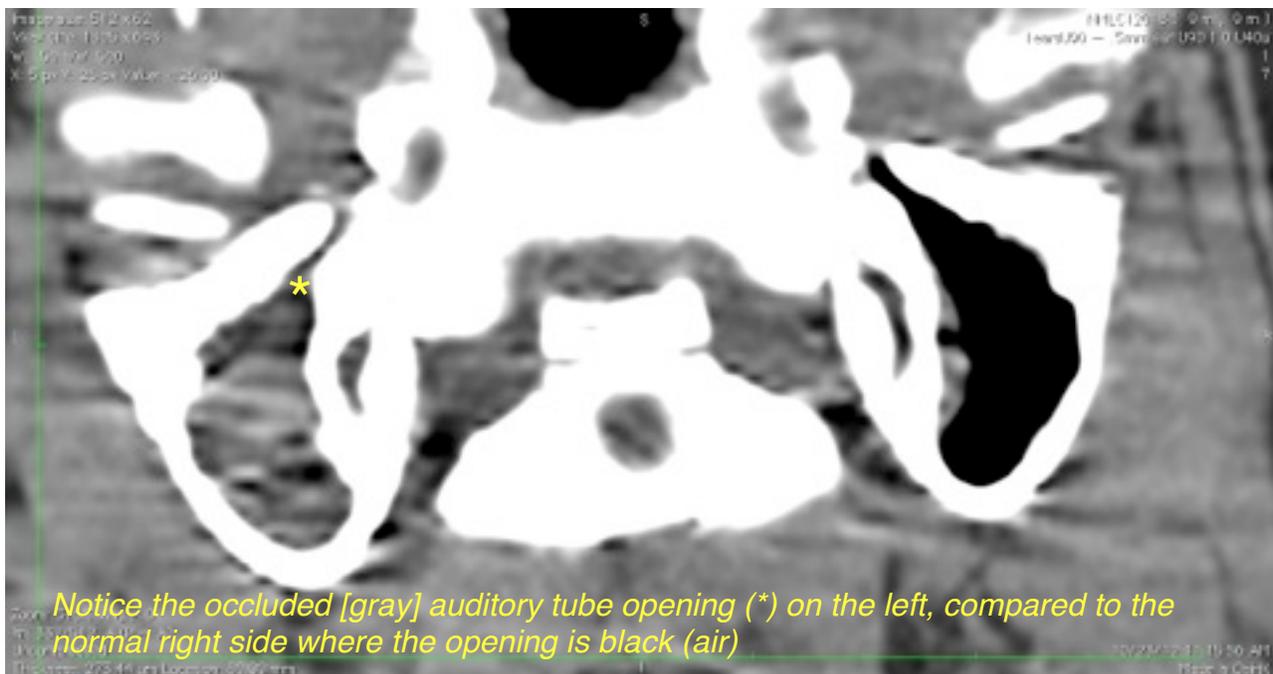
Headlines News: Lefty Seal Inflammatory Agenda Uncovered left sided otitis media in a young male harbor seal confirmed with CT



CT image of the skull with the normal air filled tympanic bulla on the right (*), and the caseous material in the left (**) with a ruptured ear drum (<<). Notice how close the middle ear is to the brain (•). Radiographs are unable to discern the thickness of the bulla, disease of the bone or often even the presence of fluid or pus in the middle ear of seals,



Townsend was evaluated by CT at Dr. Ketten's WHOI CSI lab for suspected otitis media, after a discharge appeared shortly after arrival at the NMLC. The cytology was clearly purulent, but contrast radiography of the external ear (canalography) failed to clearly demonstrate the integrity of the left ear drum (tympanic membrane). Due to the high frequency of otitis media, and not simple otitis externa, the risks of sedation were felt justified to clearly evaluate the bulla. And risks there were. Shortly after inducing anesthesia with propofol [2 blouses of 40 mg IV dorsal sinus] (pre-op: 2mg atropine IM, 5 mg midazolam IM, 15 min prior to induction) the seal experienced a sinus arrhythmia and bradycardia (HR from 130 to 45 bpm). This was a Marine Mammal Dive Event. This was corrected with 1 mg atropine IM, and the heart rate responded to a normal sinus rhythm around 120-140 bpm. It was then I noticed the seal experienced an upper airway occlusion secondary to the soft pallet and redundant soft tissue around the larynx. The seal was intubated and given high flow rates of 100% oxygen and assisted with positive



pressure ventilation (PPV). Without further complications a second and definitive scan of the head was accomplished. The seal further recovered from the ultra-short anesthetic, which last a full 10-15 minutes and was supported by mask O2 until kenneled and returned to the center. The procedure lasted 1 hour.

The scans clearly show occlusion of the left external ear canal and dense material in the left tympanic bulla. Suspicious areas were evaluated of the tympanic temporal bone, but advanced osteomyelitis was not present, which is good news.

So what are our options ? they are limited . . .

- 1) medical management of otitis media
- 2) surgical management of otitis media
- 3) pre-release evaluation
- 4) euthanasia
- 5) placement

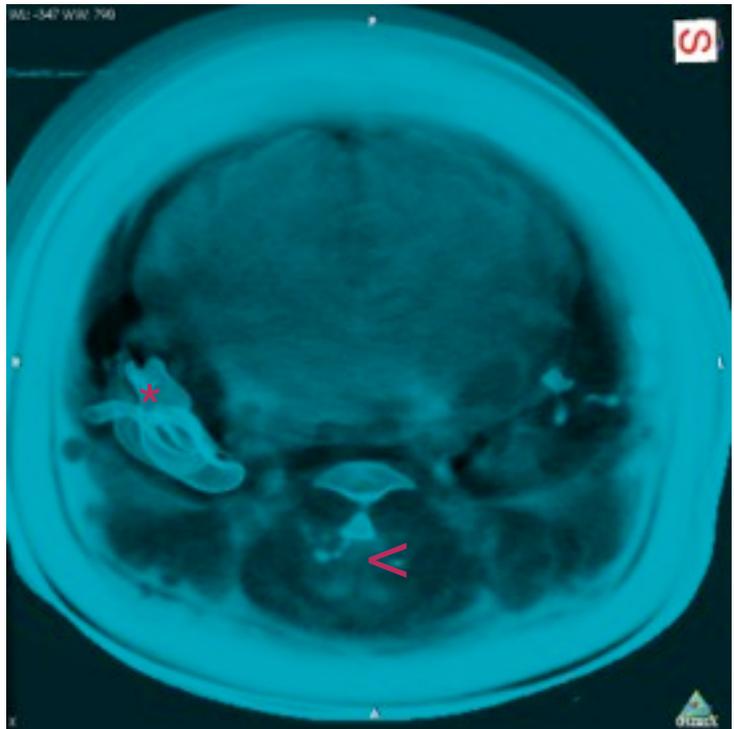
Medical Management: Otitis

Media:

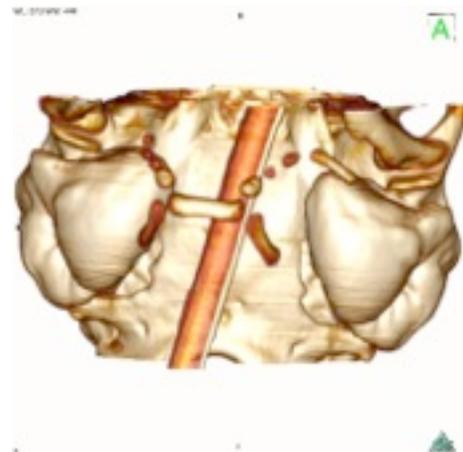
This must involve flushing out the infected material, and this is done through the external ear canal, through the ruptured tympanic membrane, and out the auditory tube, which is very narrow and almost beak shaped in phocids. This can cause further damage to the already ruptured ear drum, and the thick material can often not be broken up, and thus not removed. Back and forth mixing of flushing solutions may try to bring the material back out the external ear canal but this too is often ineffective. We have used; sterile saline, saline with dilute betadine (10:1), saline and 3% hydrogen peroxide (50:50), and warm tap water, as flushing agents, success rates are low. Medical management is accompanied by antibiotics, anti-inflammatories, and pain medications. This may still require ear-flushing under general anesthesia on a weekly or even bi-weekly schedule, although some flushing can be done on awake animals.

Surgical Management: Otitis Media in seals:

A ventral bulla osteotomy can be performed to enter the bulla, remove the contents, flush the cavity, place a drain, and allow healing by second intention. This can remove the infected material in the bulla and protect the tympanic membrane, but may inadvertently disrupt the ossicles causing permanent hearing loss. However, the infection also



Specialized 3D reconstruction showing air in the right bulla () but no air in the left bulla because that air space has been filled with caseous pus, it also shows some air the nasopharynx and a complete oral airway obstruction (<)*



causes direct enzymatic damage and the ossicles which may already have been damaged and/or fused by the disease process itself. The risks include a lengthy anesthesia which carries a high mortality rate, significant risks of hemorrhage during the approach, requires specialized surgical tools to enter the dense bulla of seals, and healing times can be prolonged. This procedure is not appropriate for animals with osteomyelitis which requires aggressive removal of the infected bones of the skull and would be considered a radical procedure in these cases. Even bulla osteotomy many have a success rate as low as 33 % in the first few cases that have ever been tried.

Pre-release:

This seal has an active infection (otitis media) and a ruptured ear drum. Each is a separate condition, and we'll deal with each separately, but the first consideration is to the wild population.

Risks to the Wild Population:

We have no direct evidence that this condition, while infectious, is contagious. I know of at least three cases of otitis media being found in wild animals that either were diagnosed with otitis media upon admission into rehabilitation or were found as dead stranded seals. However, epidemic *Mycoplasma otitis media* is a disease of cattle and other domestic animals, and at UNE we have recently cultured *Mycoplasma phocirhinis* from the mucoperiosteum of the tympanic bulla from seals euthanized for otitis media. The cause and pathogenesis of otitis media in phocids is not understood and a contagious element can not be completely ruled out, even without a clear pattern of communicable disease within the center.

Active Infection:

Seals with active infections are not good candidates for release as further progression can cause continued disease and suffering in the wild. If unchecked otitis media often advances into the bones of the skull (osteomyelitis) and infection travels along the eighth cranial nerve into the brain to cause a fatal per-acute meningoencephalitis. With constant veterinary attention and treatment of flare ups in captivity this whole process can be delayed for 6-8 years, but has a particularly inevitability about it.

Ruptured ear drum:

Seals with a ruptured ear drum may not be suitable candidate for release. Human's with a ruptured ear drum would not be cleared by medical evaluation for SCUBA activity. A seal with a ruptured ear drum and otitis media was released from Alaska with a dive recorder and could dive to 300m, but the animal was only followed for a few weeks post release and the medium and long term success of that animal in the wild is unknown. Air pockets within the caseous

material may be more significant than the integrity of the ear drum itself, if there are sufficient air bubbles that can not be passed into the large and compliant GI track via the auditory tube, nor out of the external ear this could create a squeeze, pressure, and pain on surfacing from depth.

"Equalization of pressure must take place during ascent and descent between ambient water pressure and the external auditory canal, middle ear and paranasal sinuses. Failure of this to occur results at least in pain and in the worst case rupture of the occluded space with disabling and possible lethal consequences." - dive physical instruction to physicians

Euthanasia:

Euthanasia must be considered any time a clear path for wild release is not foreseen during marine mammal rehabilitation. We acknowledge the conflicting ethical considerations of placement and release of an animal that may be hindered in its survival due to a veterinary condition. Wild seals are unlike captive animals and pets. They must hunt for their own food, avoid predators, and travel great distances. Seals do not drink and must establish a blubber reserve of metabolic water, and/or eat daily to acquire calories and water. "Nature, red in tooth and claw" [Alfred Lord Tennyson] is true enough, and the wild will show no pity or mercy to an animal returned without the sufficient skills and conditioning. Wild animals must be athletes and ready to fight for survival at the time of release to give them any type of chance, if this can not be assured then perhaps euthanasia is a kinder solution.

Placement:

As a remote facility for UNE MARC, the path for placement into a zoo or aquarium would be to return the seal that is not released or euthanized to UNE MARC for final determination. The goal of the National Marine Life Center is to rehabilitate injured, sick, and stranded marine mammals for wild release when we can be reasonably assured that no adverse effects to the wild population would ensue. The goal of the program is not to fill all available captive placement slots with injured or diseased seals. We accept the rare opportunity that may come along for cases that may eventually be placed in an approved facility, but pending our own Stranding Agreement, cases sent to the NMLC will be released or euthanized, unless requested by UNE MARC to return the animal to the main facility.

Otitis Media in Seals, Ear Disease in Earless Seals:

Of course phocids have ears, they do not have a large external pinna like sea-lions and so were given the common name "earless seals", but when it comes to otitis media in phocids there is a ring of truth to these words, the disease is occult. The level of organization of the pus in the left ear in this case, and the observation of the discharge within days of transport, means this seal had otitis media while at UNE MARC, and I missed it on my pre-transport exam, and again on the admission exam. Radiographs often fail to show the condition and even a contrast study (canalography) failed to show the disease. In this case, and many others, only a CT (or MRI) can uncover the condition, so how often is this disease missed and seals are released with a silent active infection? That's one of the great mysteries of this condition that we will be studying, but may also prove my maximum, 'any seal with an aural discharge has otitis media until proven otherwise'.

Many thanks to the whole WHOI CSI TEAM:

Dr. Darlene Ketten, Julie Arruda, and Scott Cramer



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