

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.

May 3, 2014

Rounds Notes

13: 79-80 (2014)

Up on a Soap Box: (special edition)

Problems with Premies

One of the biggest problems



with premature births is often associated with the failure of passive transfer, i.e. the transfer of maternal antibodies which provide significant advantages of immunity via the colostrum (or first milk). Clostridium is considered to be almost essential to

the normal growth of puppies (Dr. S. Johnson-Small Animal Reproduction and Pediatrics class notes, 1994). The problem is, that in most species studied, the intestines only absorb antibodies during a specific and limited window. In dogs colostrum must be ingested within 12 or perhaps up to 24 hours after birth. The period of opportunity in seals is unknown, but likely to be similar. Clostridium or serum given orally after this period is of no immune benefit. Plasma can be given by transfusions or even SQ or IP (based on a study in cats, Levy et al, 2001). However, this places the seal in a category of having received a transfusion with all of the risks as well as the benefits that entails, and requires a donor. All of this has implications for our NOAA rehabilitation permit, and release implications, as the recipient would be exposed to possible pathogens via the transfusion as well as antibodies.

Human hospitals and most veterinary schools have a NICU, the neonatal intensive care unit, but we have to remember that the NMLC is not a specialty 24- hour hospital and that all advances of modern medical care may not be appropriate for wild animals destined to be returned to the wild.

There is a survival of the fittest issue here as well. One-third of all canine pups born alive (33%) die by weaning age (Johnson), weaning percentage for harbor seals may be similar. One study has less than 40% of all harbor seals born surviving 6 months (Hanson, et al, 2013), and another with up to 27% neonatal mortality (Leahy, 2010). Supporting individuals destined to die in the wild may not be ultimately helping the population, as these seal pups might not 'have the

NMLC: Case Definition Pre-mature birth

(risks of sepsis with failure of passive transfer, risks of death with hypothermia, hypoglycemia, infections, and fading-seal-syndrome)

harbor seals with any 3 of the following criteria will be considered pre-mature:

- 1) lanugo coat
- 2) birth before April 7th
- 3) weight < 8 kg
- 4) fleshy umbilicus
- 5) bilirubin > 6 mg/dl
- 6) globulin < 2.5 mg/dl
- 7) total protein /solids < 5 mg/dl
- 8) evidence of surfactant failure
- 9) hypoglycemia (glu <60 mg/dl)

right stuff' genetically speaking to keep the species strong as a whole. The counter point argument to this is that we do not know why this pup was abandoned. With the massive amount of human influence on the coast line and near shore waters of the United States, human and domestic animal presence on our beaches, and the motorized traffic in the water, how can we be sure that the pup-mother separation was not caused or influenced by humans, and if so I believe we would have a primary obligation to support this little pup. We must however provide rehabilitation support with regards to the maternal co-patient, i.e. the wild population. Plasma transfer from a non-maternal source could expose individuals to pathogens that they would not naturally have been exposed, and could be considered a violation of, or at least effect quarantine of the animal during its rehabilitation.

That leaves us back to First Principals. One: Do No Harm, and Two: Prevent Suffering. While there has been a lot of discussion on the Harbor seal and Grey seal populations on the Cape, and the issue has raised the ire of fisherman and the fishing industry, there is no doubt that humans can and have caused significant declines in the seal population. We should intervene on behalf of the seals in cases of human impact, and there is an argument to be made that all seals in US waters are effected by human activity and thus the entire population and every individual can be assessed as affected. We should not 'over-support' the natural mortality and ebb and flow of the population. All things die, and through a process of natural selection the population is kept strong. However, the rate of change and human impact on the earth is substantial and evolution is poorly suited to deal with the dramatic and rapid changes that occur daily. We have entered a phase of the earth's history called the anthropocene, and entered the age of the Sixth Extinction (Kolbert, 2014) which effects all species of wild animals. It is no longer appropriate to sit back and have "nature take it's course" as human activity has so altered the events on earth that to do so places all wild animals at a rigged game where they can not win, and places wild animals and their environment at a severe disadvantage. The triple treat of anthropomorphic contaminate loading causing immuno-suppression, endocrine disorders, and reproductive abnormalities has been studied (Bogomolni et. al, 2010) as evidence of indirect or less-obvious human interaction that effects wild seal health and strandings. Our responsibility to the animals we do choose to rehabilitate includes protection from exposure to terrestrial pathogens, and not to release animals that have the potential to bring harm to their native population and the environment.

Prevent Suffering. Most neonatal deaths in the wild are associated with one or more of the following: hypothermia, hypoglycemia, starvation, dehydration, predation, and infection. There are steps we can take to mitigate each of these. We can provide a protected and appropriate thermal and hygienic environment for each pup. We can provide hydration and nutrition, even if that requires frequent oral gavage of formula. We can provide prophylactic and therapeutic antimicrobials and deworming medications when needed, and general supportive care. We must however take protective measures to ensure that the rehabilitation environment does not magnify pathogens or act as a fomite. Quarantine, isolation, and sanitation principals are critical to this aspect of phocid rehabilitation. Another key component is minimizing of movement of seals during rehabilitation. Rehabilitation and subsequent release, should take place close to the area of stranding to reduce the artificial movement of animals and pathogens in the wild, and thus the wild population is better serviced by multiple regional rehabilitation centers, the ranks of which the NMLC is proud to enter with our recent Standing Agreement with NOAA Fisheries. - Dr. Sea Rogers Williams