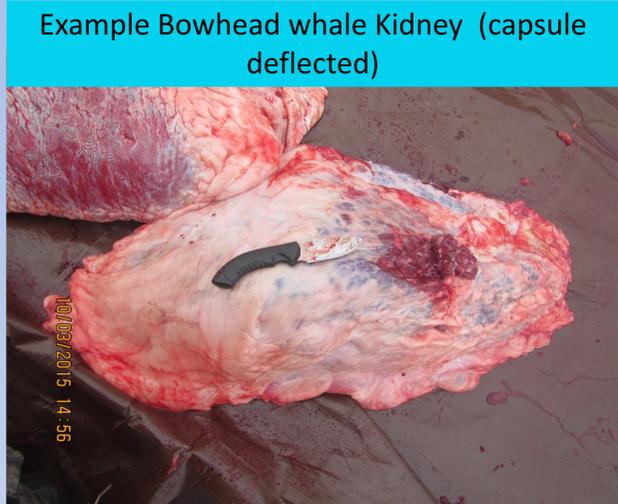


Calcium oxalate urolithiasis in a bowhead whale: A case report

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Background: The North Slope Borough, Department of Wildlife Management has a long-standing harvest and health monitoring program in place for landed subsistence harvested bowhead whales. Health assessments are done jointly by Inupiaq whaling crews, NSB DWM veterinarians and/or wildlife biologists during the harvest and butchering process. The expertise and knowledge of whaling captains, whaling captain's wives and the community has been essential to place "normal, abnormal and/or new findings" into a long-term traditional ecological knowledge context. Subsistence harvest health monitoring in combination with ongoing large cetacean stranding response, are essential tools to better understand natural causes of morbidity and mortality, to detect emerging issues and threats, and provide health baseline information.



Summary: Nephrolithiasis has been reported in toothed whales but not in baleen whales. In fall 2014, nephroliths (~ 20) of varying sizes ranging from < 1- 4.1 mm in diameter were observed in the multi-lobulated kidney of a subsistence harvested immature female bowhead whale (TBL 10.6 m). The stones were calyceal in location. No urine was collected during butchering as the bladder was empty.]

Methods: Stone analysis was performed by optical crystallography and polarized light microscopy and confirmed by infrared spectroscopy (Stone Analysis Laboratory, University of California, Davis, California, USA.). Bacterial culture and antimicrobial sensitivity were performed by standard bacteriologic methods.

Results: No bacteria were isolated. The nephroliths were composed of 100 % calcium oxalate (CaOx). In other marine mammals i.e. cetaceans, otters, manatee uroliths composition has included: *uric acid, ammonium urate, calcium carbonate, carbonate apatite, and struvite*, but not calcium oxalate. This is the first report of calcium oxalate nephrolithiasis in a baleen whale.



- **Prevalence of Pathological Conditions of the Urinary system in Bowhead Whales?**
 - Very rare overall [NSB DWM unpubl.data 1982-2015) : kidney worm (n=1); neurogenic bladder (n=1); blast induced hematuria (n=1), renal cysts (n=1), kidney stones (n=1)
 - Prevalence of urinary crystals in bowhead whales:
 - 2015: 0% (0/6) refrigerated urine specimen
 - 1983: 50% (2/4) frozen urine specimens (Medway 1980/1983)
- **What Risk factors lead to calcium stone formation in other Species ?**
 - Urine super saturation is essential for stone formation
 - Complex etiology that can lead to urinary supersaturation i.e. genetics, metabolism, fluid intake, dietary habits, infectious causes etc.

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