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RADIOLOGY
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CHOLOEPUS.HOFFMANNI

RADIOLOGY REPORT

Patient Information

Patient:	CHOLOEPUS.HOFFMANNI	Patient ID:		Report Number:	
Patient Birth Date:		Age:	14M	Gender:	M
Study Description:	Whole Body .	Accession:		Study Date:	
Species:	Choloepus hoffmanni	Breed:	Two-toed Sloth	Modalities:	CT
Sedation Used:	No	Anesthesia Used:	No		
Facility:		Submitted:		Finalized:	

Annotated Images Requested: No

STAT Request: No

Anatomical Region:

History

Weight loss, inactivity, thinning hair coat.

is a 10 year old female, who arrived at at 4 months of age. She has been losing some weight the past couple of months and is less active, spending more time sleeping in her cubby. Her coat has also changed and especially over her dorsum the hair is thinning and she has quite a few areas of scabbing skin. She was first diagnosed with atherosclerosis in February of 2017, which has progressed since then. Bony proliferation was also identified in 2017 but this has also changed and is now suggestive of hypertrophic osteopathy.

Last year some diet modifications were made and items high in Ca were limited or removed due to concerns of soft tissue mineralization. She receives Romaine lettuce as a primary leafy green, yams, carrots, green beans, cucumber, zucchini, and leaf eater biscuit turned into a gruel with hot water. She also gets grapes, apples and pears as treats.

Relevant bloodwork (run at Idexx):
CBC: HCT 29.2, WBC 13.3 with relative lymphocytosis (I think, we don't have a reference range for a sloth but her lymph count is 6118 which seems high to me)
Chem: Creatinine 1.4, BUN 48, P 7.1, Ca 12.1, iCa 1.42, Na 126, K 6.2, Cl 88, TP 8.8, Troponin 1: <0.2 (considered normal for other species)
PTH: (0.5) (considered normal for other species, 2017 PTH was 0.6)
PTHrP: (0) (considered normal)
T4: 1.5
FreeT4: 1.4
cTSH: 0.01
Cortisol: 0.2
She had a Vit D3 level in 2017 and it came back as 104.

She had an echocardiogram a couple of weeks ago and trivial mitral and tricuspid regurg were found but no other significant abnormalities. It was the first sloth scan for our specialist but she felt the heart seemed to be functioning normally.

Findings

A discontiguous non-contrast cone-beam CT (CBCT) of the head, thorax, and abdomen of a sloth is available for review in DICOM format. The study is comprised of 6 separate exams, each acquired in a bone algorithm, producing 90um-thick axial slices. Exams 1 and 2 are partial images of the head, redundant with exam 6. A scout is not included.

Severe diffuse proliferation of bone is present, characterized by complete obliteration of medullary cavities coupled with dense non-homogeneous periosteal proliferation. This results in thickened, irregular osseous structures comprising the entire axial and visible appendicular skeleton. There is marked diffuse homogeneous mineralization of the arterial vasculature, including the entire aorta and extending even to small peripheral arterioles. The 'fuzzy' appearance of bony surfaces is also enhanced by mineralization of fine arterioles adjacent to the bone. The tracheal rings exhibit marked bony deposition.

There is focal well-defined, severe, irregularly marginated, asymmetrical lysis of the rostral mandible on midline, involving the roots of the mandibular canine teeth. This area of lysis extends to the right ventral (extraoral) mandibular surface and the left lingual (intraoral) mandibular surface. Abnormal widening and irregularity of the zygomatic fissures is seen bilaterally; similar irregular widening is associated with all nutrient foramina and similar osseous canals throughout the body. There is significant lysis associated with the caput and tuberculum of the left 15th rib at its articulation with the thoracic vertebral column.

Gross hydrocephalus, pituitary masses, and other intracranial abnormalities are not apparent but cannot be ruled-out due to poor soft tissue contrast resolution in CBCT and general limitations of CT in brain imaging. The same soft tissue resolution limitations of CBCT preclude assessment of the thyroid/parathyroid region.

The lung parenchyma is normal. No thoracic masses are present. The gallbladder is too small to see clearly, however there is a ~5mm mineralized structure in the right cranial abdomen (image 135/1560) that may represent either a cholelith or a mineralized structure within the lumen of the stomach (dietary vs. foreign). There is an undulating/coiled hyperattenuating structure in the left cranial abdomen (images 3-34/1560), caudal to the liver, suspected to represent either mineralization of either the gastric wall or of a small bowel loop. The stomach chambers are highly distended with gas and ingesta, and the urinary bladder notably distended, as is typically seen in this species. The colon is filled with stool. Other abdominal organs are not seen clearly due to poor soft tissue contrast resolution and lack of IV contrast administration.

Impressions

1. Marked hyperostosis and osteosclerosis of entire skeleton. Marked metastatic mineralization of entire arterial vasculature and (likely the) gastric wall. Primary consideration is given to severe dysregulation of Ca/P, as seen with hypervitaminosis D, hypervitaminosis A, or fluorosis. Hyperparathyroidism, acromegaly, or genetic mutations causing this degree of calcification of soft tissues are also possible. Hyperostosis has been reported in Xenartha (tamandua) secondary to hypervitaminosis A and/or D (Crawshaw and Oyarzun, JZWM 1996). Hypertrophic osteopathy is not considered an appropriate differential for this animal, given the generalized distribution of osseous changes and the lack of evidence of a thoracic or abdominal mass (neoplasm). Are there other conspecifics in the exhibit or are there genetically related animals with these changes? Could the previous diet or supplements have been abundant in vitamins A, D, or Ca? The Ca, iCa, P, and vit D3 levels in the serum (reported normal) may not reflect the elevation of Ca in the soft tissues. The anemia reported (29.2) is suspected to be secondary to obliteration of medullary bone by cortical bone and is reported with osteosclerosis.
2. Severe lysis of rostral mandible, as described. Rule-out focal osteomyelitis secondary to tooth root infection/abscessation as a co-morbidity, if clinically appropriate.
3. Suspect fracture, L 15th rib at costovertebral junction
3. Possible cholelith vs. mineralized luminal structure in prepyloric gastric chamber

Recommendations

Consider consultation with endocrinology expert experienced in disorders of bone and Ca/P metabolism, however regardless of the etiology, the prognosis for this condition, given its severity is guarded. Skeletal fractures are possible/likely, but more importantly, the loss of vascular elasticity places the animal at risk for ischemia/infarction, arterial hypertension, and potentially sudden death due to hemorrhage resulting from rupture of a mineralized vessel.

Note: The findings, impressions, and recommendations listed are based on the history and clinical information provided. Interpretation should be performed by a licensed veterinarian serving as the primary clinician for the animal. The images in this report may not be reproduced without permission of the Brookfield Zoo/Chicago Zoological Society.

Report on 6/14/2018 8:16:04 PM UTC signed by:

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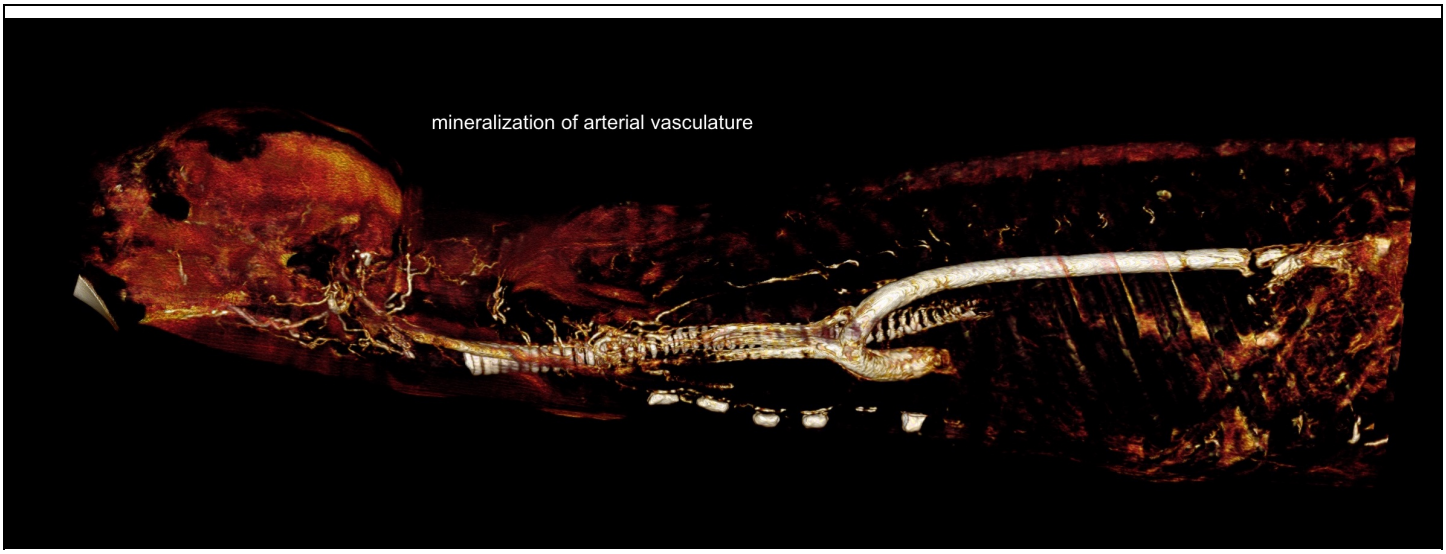
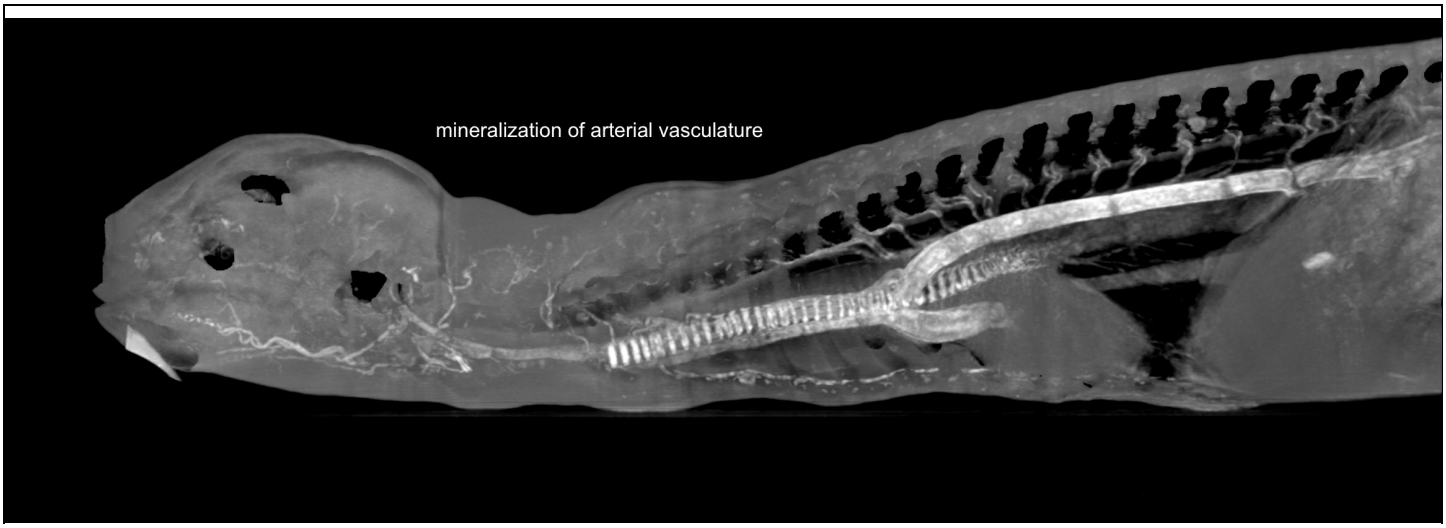
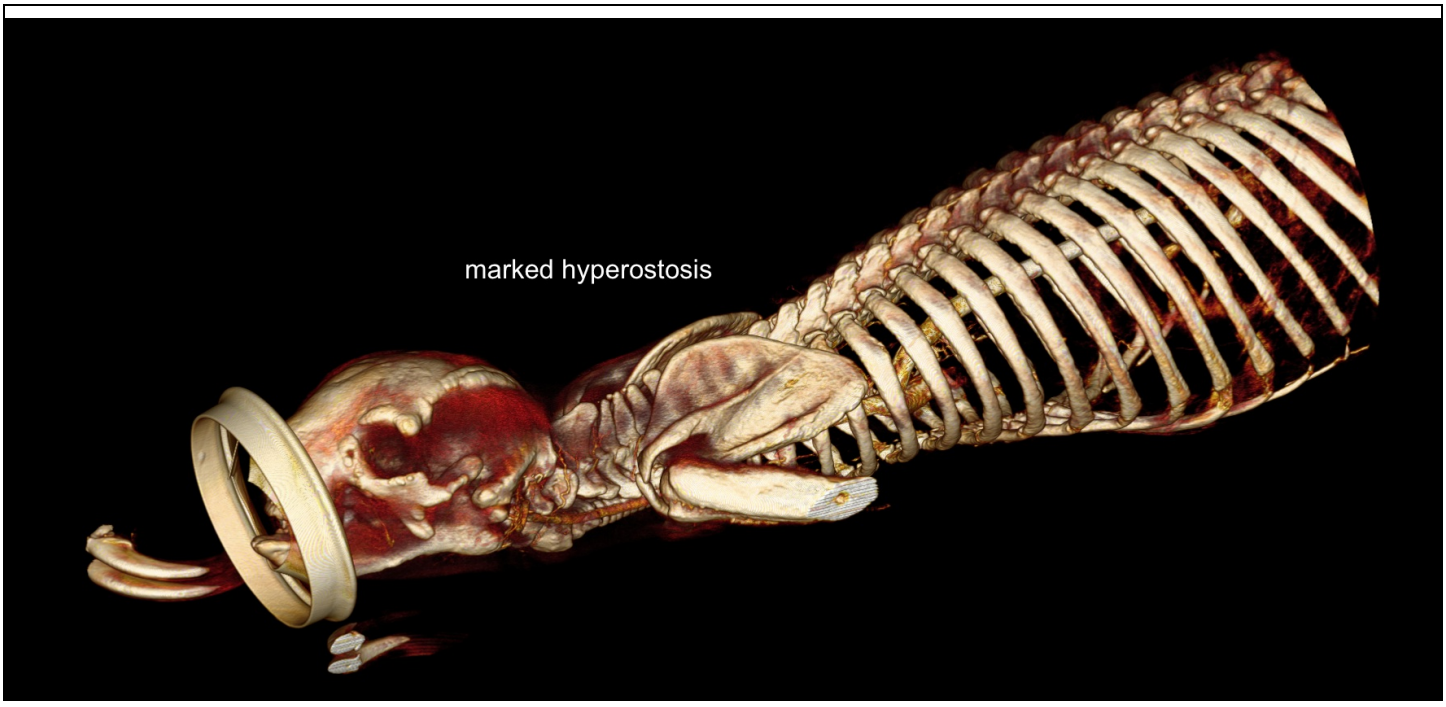
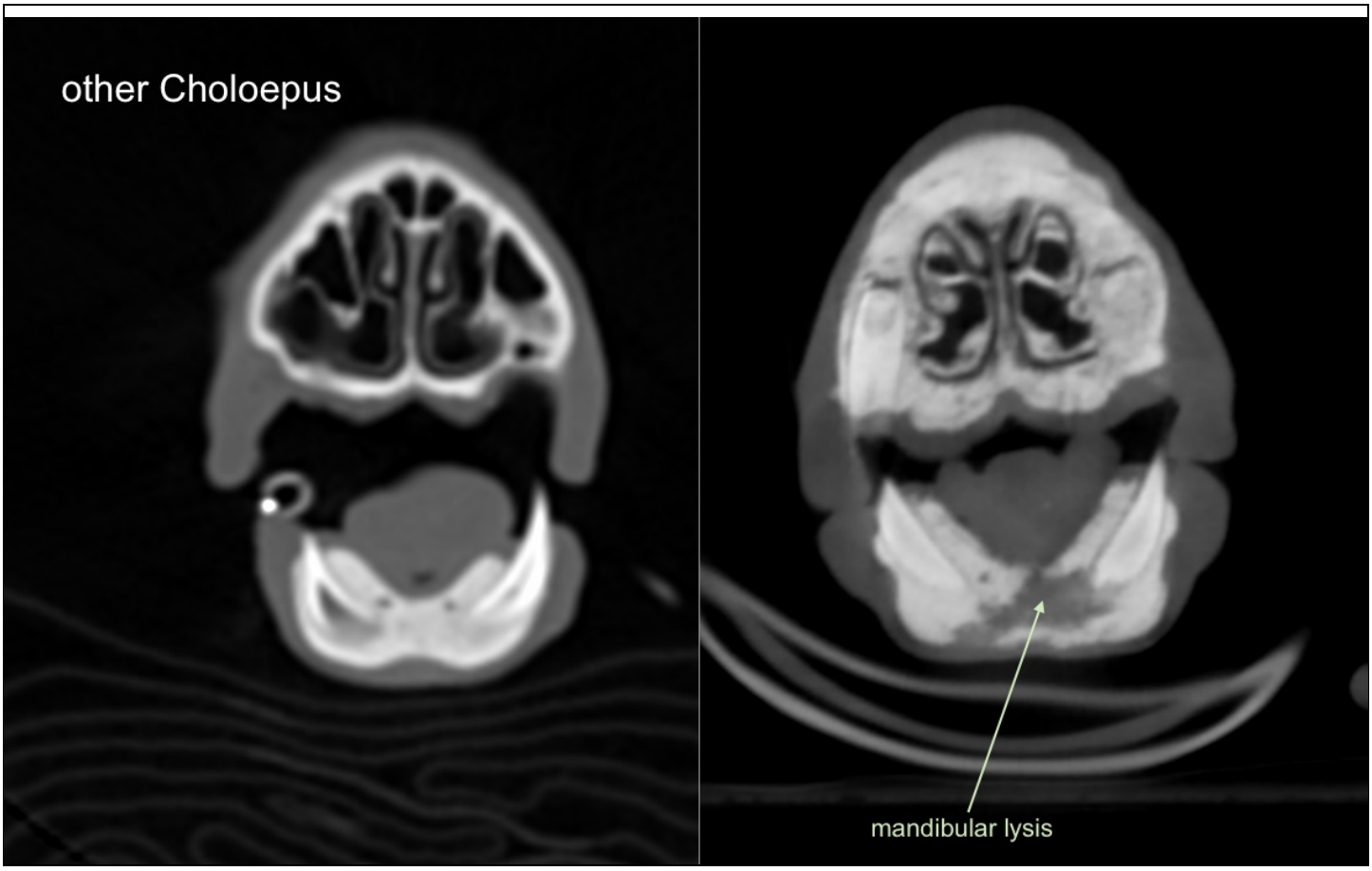
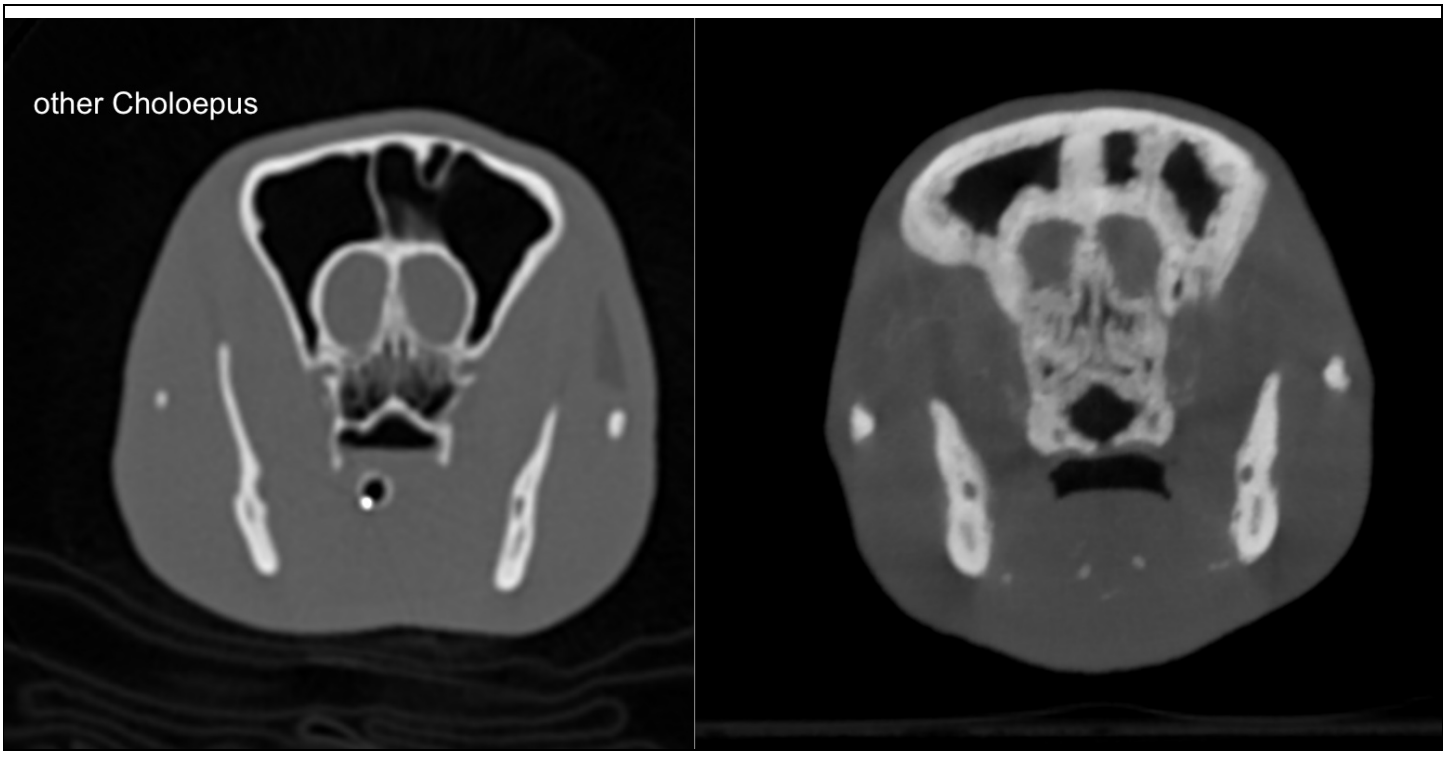
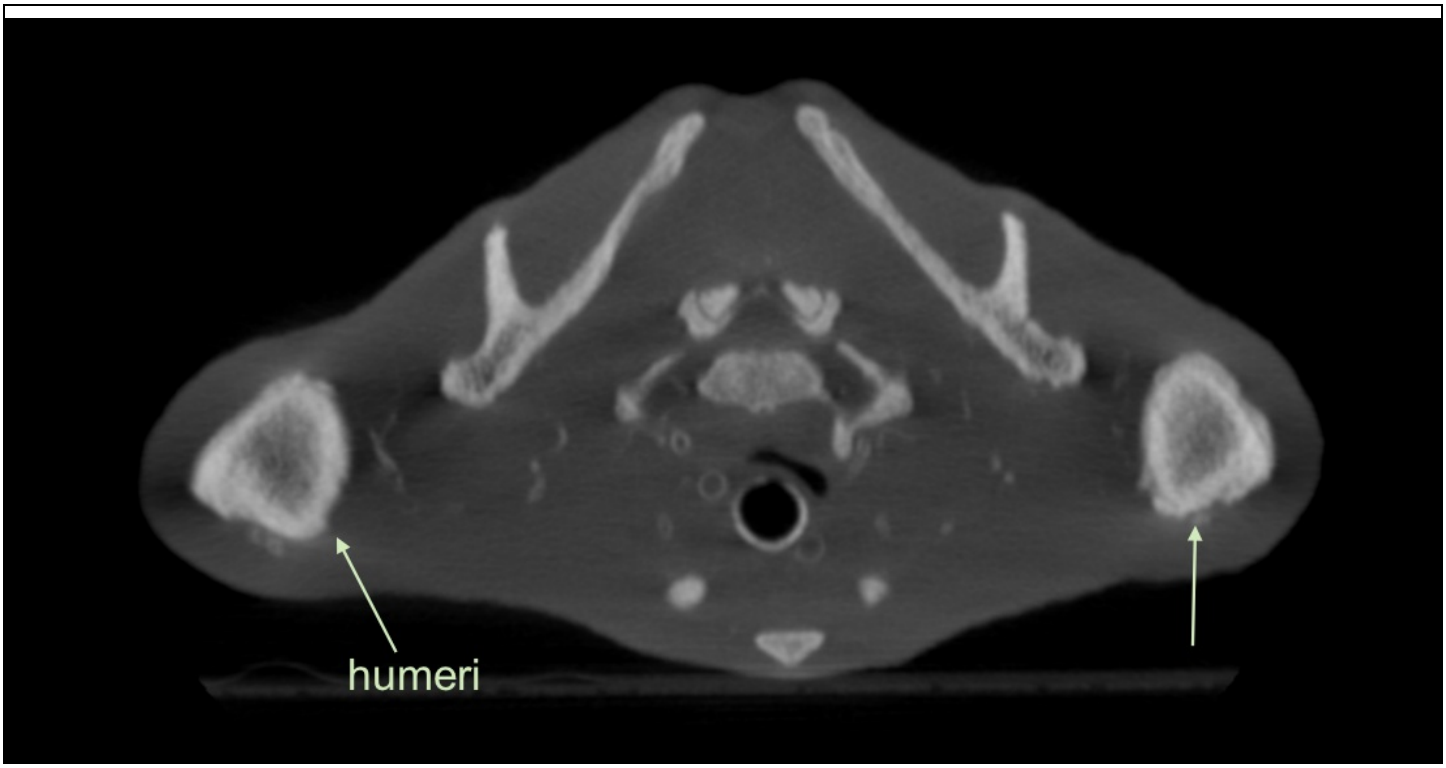



mineralization of arterial vasculature


marked hyperostosis


other Choloepus
mandibular lysis


other Choloepus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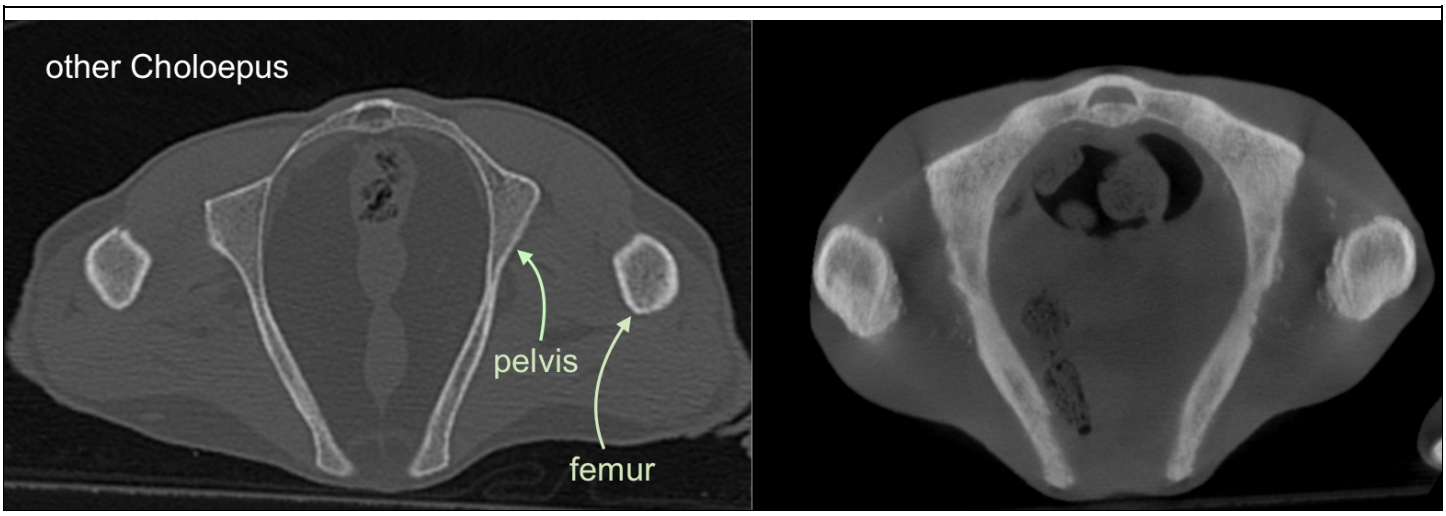
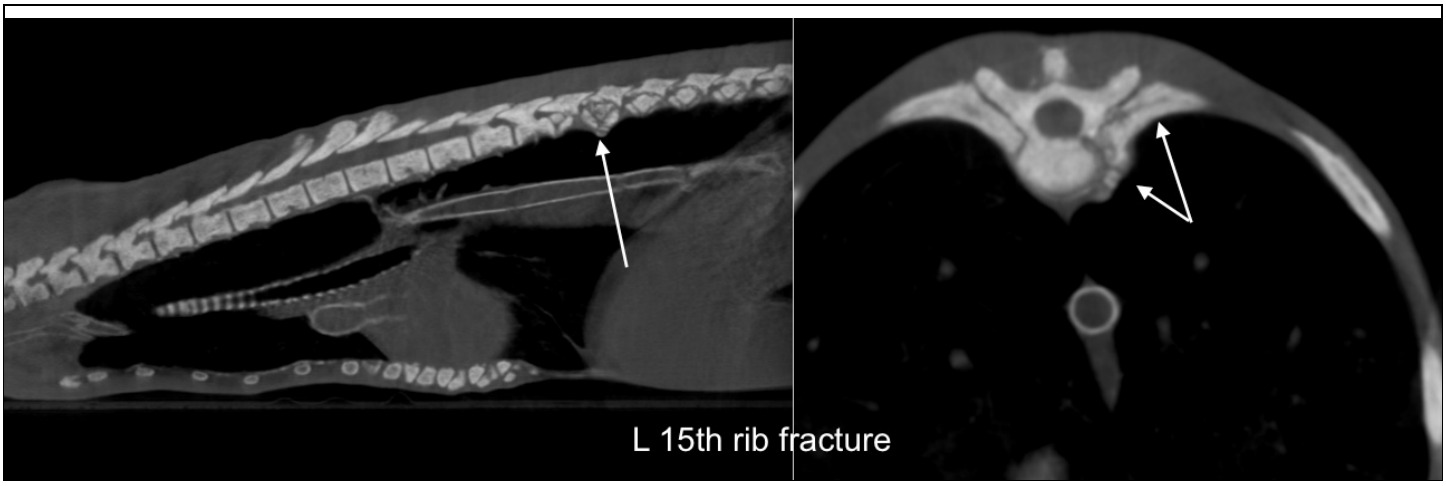
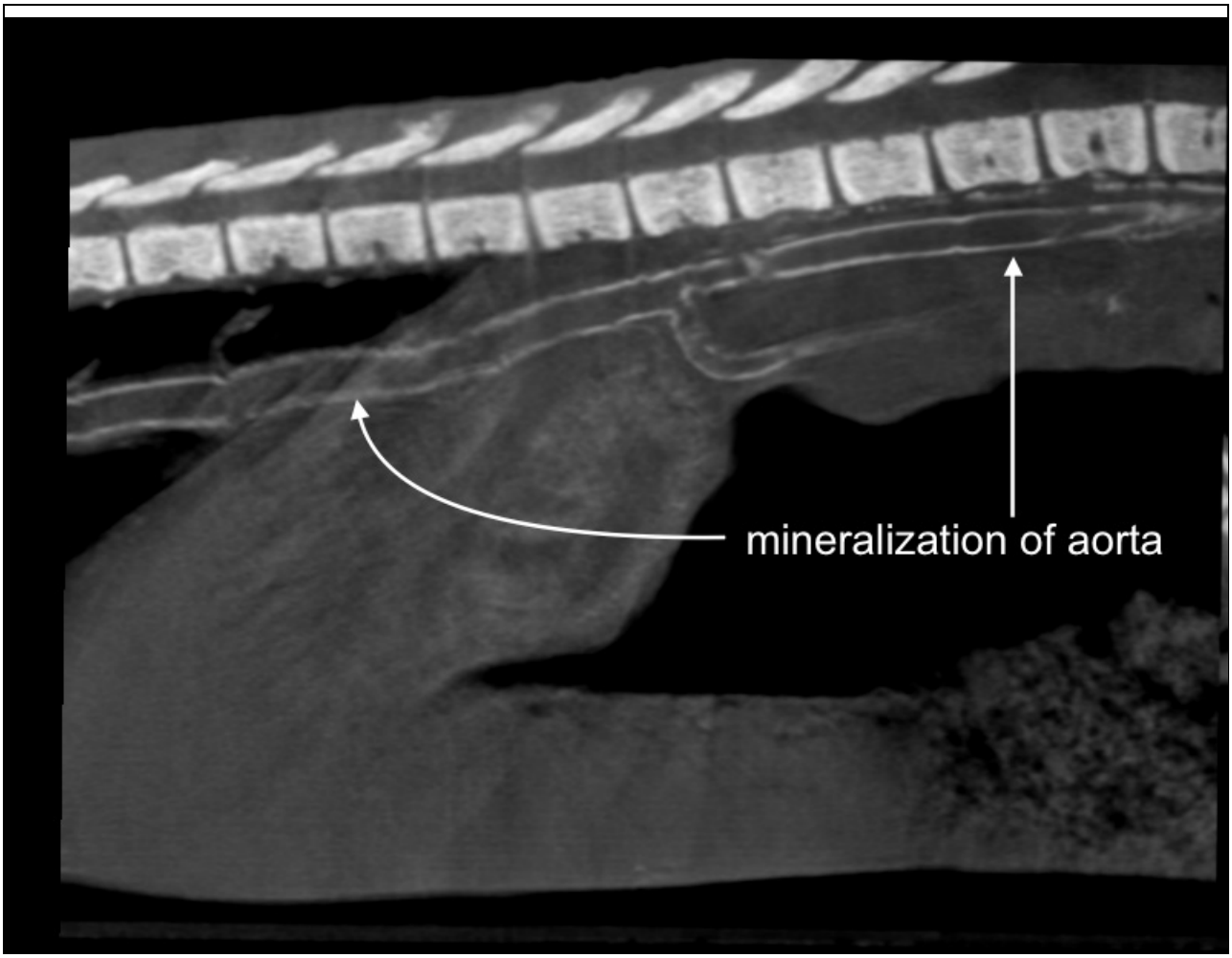
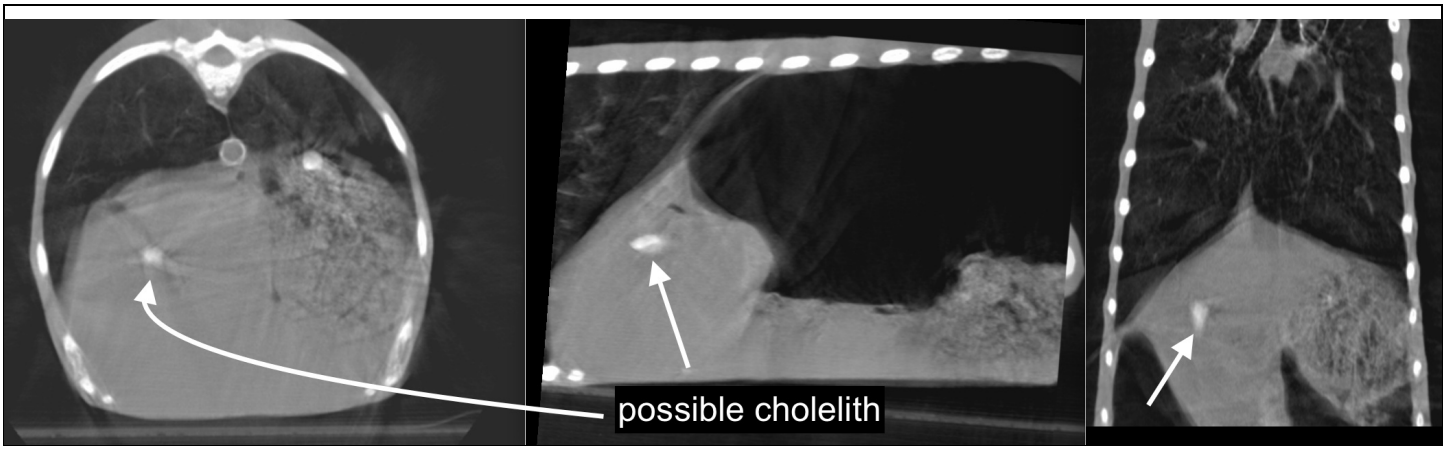
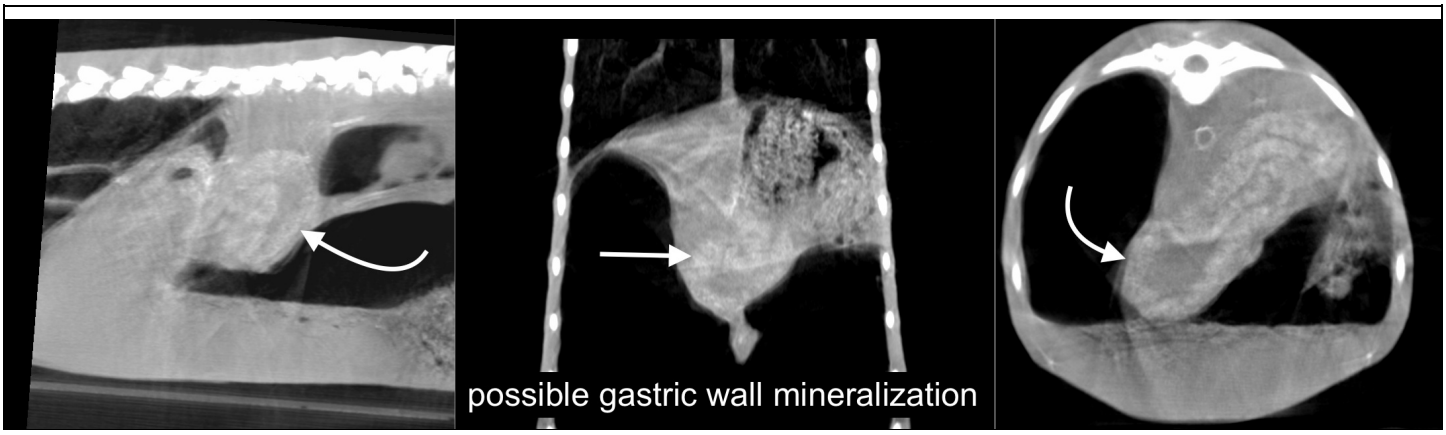

other Choloepus
pelvis
femur


L 15th rib fracture


mineralization of aorta


possible cholelith


possible gastric wall mineralization