HE-44

Chronic discospondylitis in a live stranded minke whale (*Balaenoptera acutorostrata*).

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Abstract

On 4th April 2022 a juvenile minke whale (Balaenoptera acutorostrata) live stranded in Gorleston on sea, Norfolk, UK (CSIP reference SW2022/234). The stranding was attended by British Diver's Marine Life Rescue (BDLMR) and due to the age of the animal, location (out of usual habitat), and no sightings of any adult whales in the area, the whale was chemically euthanased under welfare grounds. A postmortem examination was carried out two days later on 6 th April by a team from the UK government funded Cetacean Strandings Investigation Programme (CSIP) and the Royal Veterinary College (RVC) The 3.48 m, 440 kg (approx.) whale was found to have a normal nutritional condition but showed no signs of recent feeding. Its age was estimated at around 3-4 months and therefore was still maternally dependent. Multiple, extensive deformities of the vertebral column were observed. The animal was found to have severe discitis (inflammation of intervertebral discs) and associated spondylitis (inflammation and reactive changes to surrounding vertebra) with exostosis (new bone formation). Ankylosis (fused vertebrae) was observed in 5 sites from the thorax to the tail. CT scanning of the vertebral column (ex-situ) showed partial displacement (subluxation) of one thoracic vertebra, and complete displacement (luxation) of a distal tail vertebra, resulting in deviation of the tail. Discospondylitis is often associated with bacterial infection but due to the blood supply to the discs only being present in young animals, bacterial discospondylitis will only develop in neonates and young juveniles. Bacteriology was carried out on 8 samples taken from vertebrae and sub-lumbar lymph nodes, Esherichia coli and Clostridium perfringens was cultured from all 8 sites. Esherichia coli was also cultured in 5 additional samples of key tissues (liver, spleen, lung, brain, and bladder) Metagenomics of 3 discs detected Photobacterium angustum and ruled out Brucella sp. Histopathology revealed extensive necrosis and chronic active inflammation of intervertebral discs. Escherichia coli has been cited as a key pathogen in bacterial discospondylitis in in other taxa and is likely to be the cause in this case. Even If the initial bacterial infection had cleared up, the long-term damage to the vertebral column would have had a lasting impact on the whale's quality of life. The fact that this whale was still maternally dependant is the likely reason it had been able to maintain a normal nutritional condition, despite the severity of its deformities, the impact it would have had on mobility and the severe pain it most likely experienced. As the disease progressed, the young minke likely separated from the mother and subsequently live stranded. Discospondylitis is rarely reported in cetaceans with most recorded cases having come from museum specimens. This animal is the first recorded case of discospondylitis in a minke whale in the UK, since the inception of the Cetacean Strandings Investigation Programme in 1990.

Plate 1. The Minke whale (Strandings reference SW2022/234) awaits its necropsy at the ZSL facility.

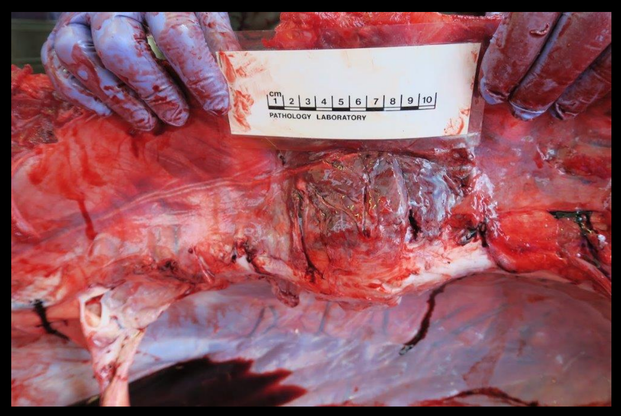


Plate 2. Gross examination showed marked osseous proliferation and ankylosis of the vertebral column .

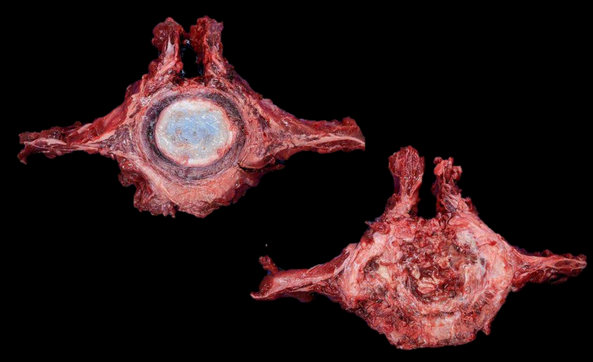
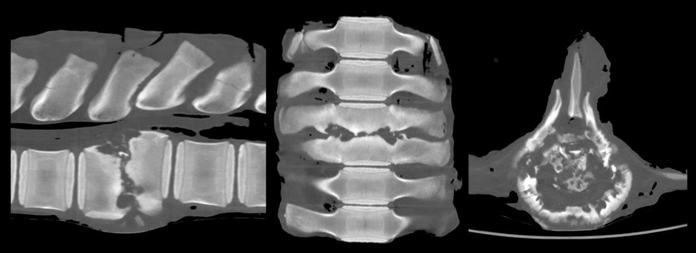
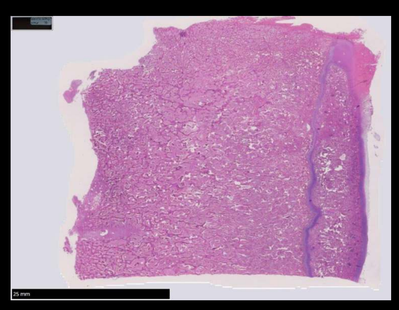


Plate 3. Gross comparison of normal (top) and abnormal (bottom) Vertebrae, showing chronic destruction of end plates.



Plates 4.CT scan showing displacement of thoracic vertebrae, one of multiple sites affected.



Plates 5&6

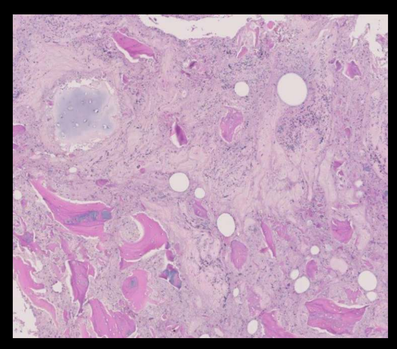


Plate 7

Methods

Details of all known UK strandings are recorded by the CSIP under contract to UK government (Defra and Welsh government). In many cases a full necropsy is also carried out using a standardised protocol (*Kuiken and Garcia Hartmann 1991, Deaville and Jepson et al 2011*) to learn more about causes of mortality in UK waters. In suitable cases, samples have bacteriological analysis carried out. Additionally, as in this case, other methods (CT, metagenomics) may also be employed to establish a cause of death and the associated pathology

Acknowledgements

The collaborative Cetacean Strandings Investigation Programme (www.ukstrandings.org) is jointly funded by the UK Department for Environment, Food and Rural Affairs (Defra), Welsh Assembly Government and Scottish Government. Joint Nature Conservation Committee manage the contract on behalf of funders.

References

Kompanje EJO (1999) Considerations on the comparative pathology of the vertebrae in Mysticeti and Odontoceti; evidence for the occurrence of discarthrosis, zygarthrosis, infectious spondylitis and spondyloarthritis. Zool Med Leiden 73:99–130

Key mIcrobiological findings

Site
•Lung, liver, spleen, brain, bladder
•Vertebrae and discs x 7
perfringens
•Sub-lumbar lymph nodes
perfringens

Site
•3 discs (pooled)

Culture
Escherichia coli
Escherichia coli & Clostridium

Escherichia coli & Clostridium

Metagenomics
Photobacterium angustum

Pathogenesis (conclusion)

- Neonatal bacterial infection (e.g. *E.coli*)
- Haematogenous spread to vertebrae and/or discs (spondylodiscitis)
- Establishment of chronic infection, possible secondary activation of *Cl. perfringens* spores in anaerobic environment
- Chronic destruction of centra, discs and end plates
- Reactive new bone formation, multifocal ankylosis
- Impaired mobility but supported by dam
- Separation from dam (e.g. weaning, stress etc.)
- Calf is unable to swim adequately and live strands, is euthanised.