

Cross-sectional Imaging for Pre-surgical Planning: A Case Study of Two Keratomas

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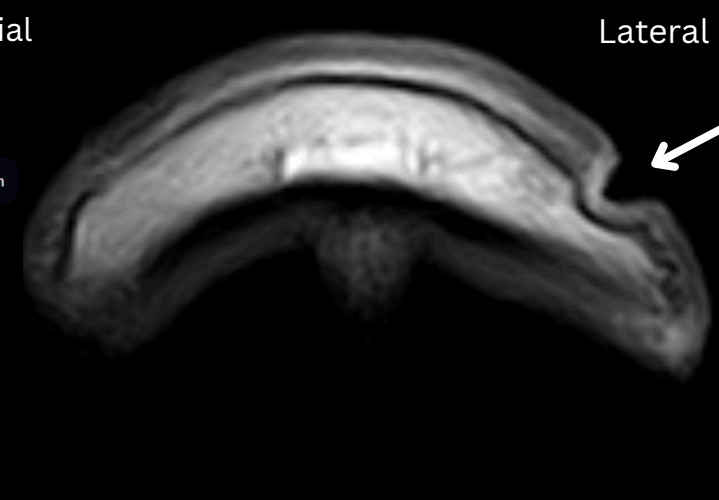
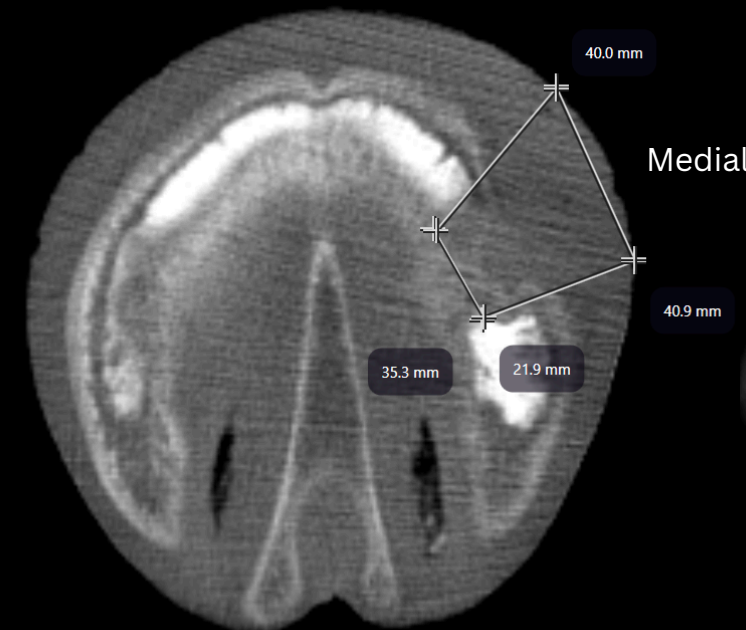
Case 1

- 2 y TB colt
- 3/5 lame RF
- Increased digital pulses
- Positive to hoof testers over medial sole
- Blocked to abaxial nerve block
- Radiographs: osteolytic changes medial margin of P3
- CT: large, lobular subsolar/hoof wall mass, medial quarter causing bone resorption of medial palmar P3 consistent with keratoma



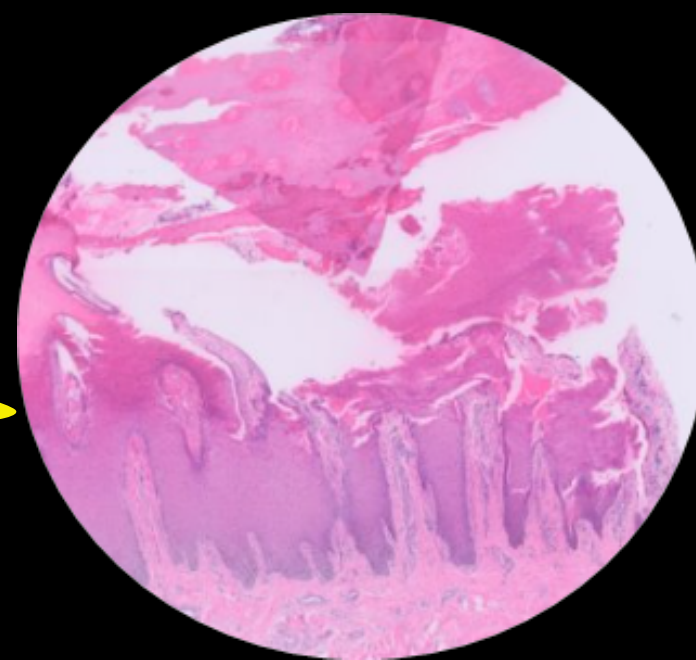
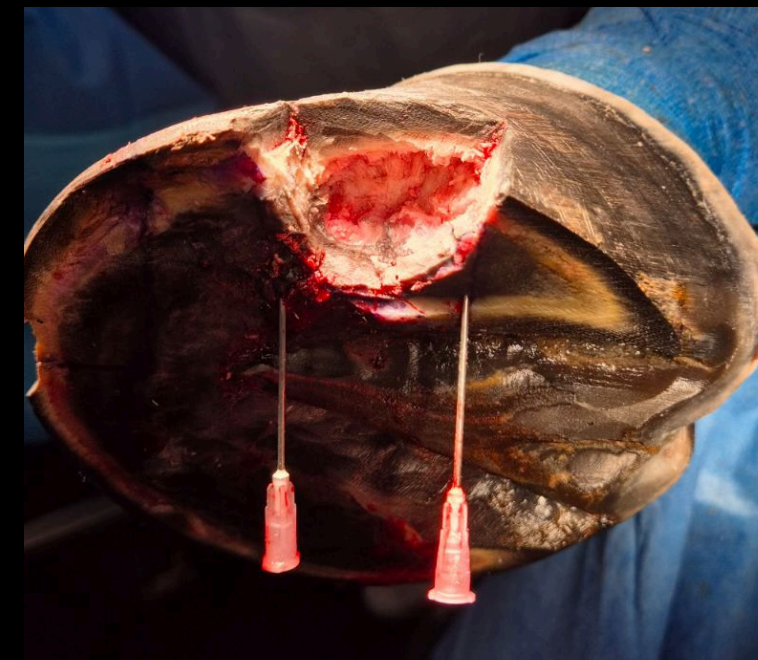
Case 2

- 18 y Clydesdale X mare
- 3/5 lame LF
- Positive to hoof testers lateral sole
- Blocked to lateral PD block.
- Radiographs: solar margin lysis lateral aspect of P3.
- Standing low field MRI: poorly differentiated soft tissue mass creating a cone-shaped defect within the lamellar tissues consistent with keratoma

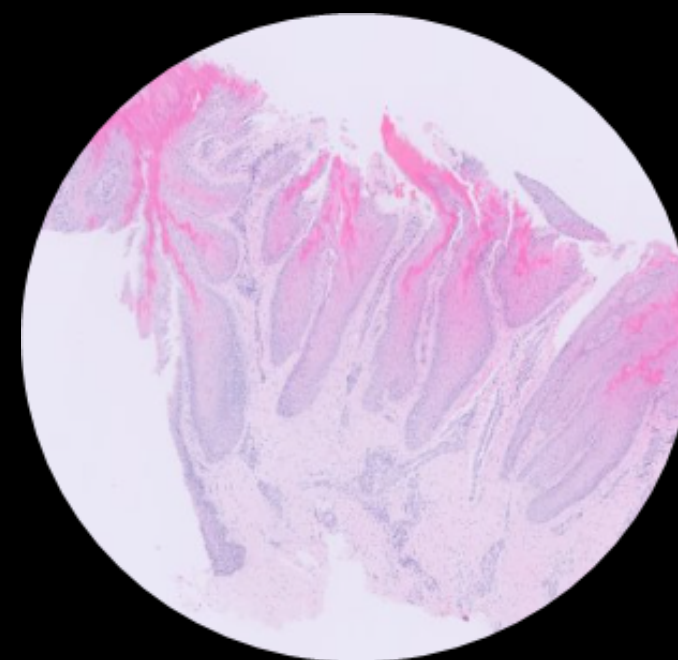


- The CT images were used to "3D map" the region of the keratoma
- Surgical margins were drawn on the hoof wall with a sterile marker prior to the first cut.
- Incision performed: 2.5cm (L) x 3cm (D) x 4cm (W).
- This partial hoof wall resection meant only a hoof cast was needed to stabilise the hoof during recovery.
- A treatment plate was placed 24 hours postoperatively.

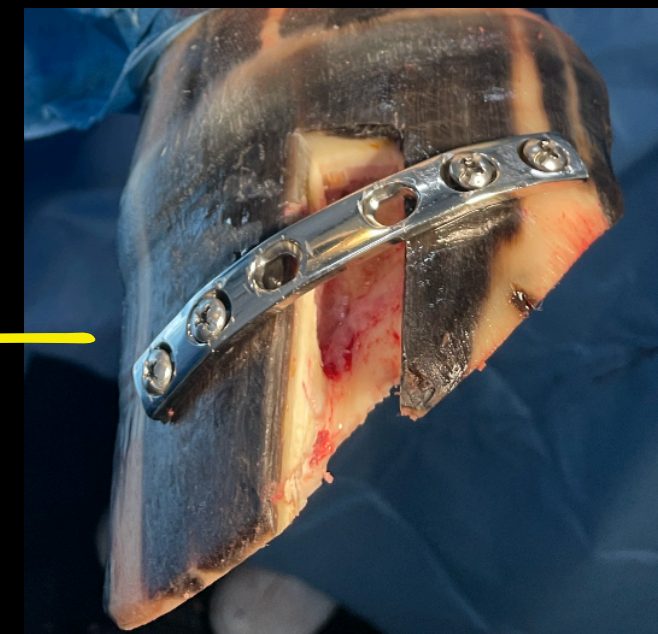
- Pre-surgical MRI revealed a long incision into the dorsolateral hoof wall was necessary
- An incision of 4 cm (L) x 2.5 cm (D) x 2.5 cm (W) was made.
- Given the large defect made in the hoof wall more stability was required
- A bone plate was placed across the defect and then supported with a cast for recovery.
- The hoof cast was removed 24 hours after surgery and a treatment plate fitted



"stratified squamous epithelium and hyperkeratosis, which could suggest a keratoma when interpreted in light of the described clinical and radiographic findings."



"The hoof wall is distorted by a deposit of keratin with compression of the adjacent epithelium. These findings are consistent with a keratoma."



Clinical Relevance

- The diagnosis of equine keratoma can be difficult. The causes of resorptive changes on the margin of P3 are multiple and so a precise diagnosis is vital.
- Cross-sectional imaging achieves two goals: 1) Helps confirm the diagnosis of a Keratoma and 2) Guides pre-surgical planning.
- Pre-surgical planning determines if a Partial hoof wall section (PHR) or Complete hoof wall resection (CHR) is necessary allowing a contingency plan to ensure hoof wall stability.
- Both CT and MRI have been shown to be effective for pre-surgical planning when removing keratomas which helps reduce complications (2). A complete keratoma removal with a PR minimises the risk of postoperative complications such as hoof wall instability reduces the chance of excess granulation tissue formation and aids in quicker healing (1).
- CT provides superior 3D images of bone and 3D reconstruction imaging gives the surgeon an appreciation of the location and extent of the keratoma (4). The hoof wall margins allow for a superior view of the lamellar tubule trajectory within the hoof wall.
- MRI allows for very detailed views of the soft tissues of the distal limb. The ability to outline the keratoma is limited by the fact that the border of the hoof wall is not appreciable. This can restrict the pre-surgical planning to the area of the pedal bone affected by lysis rather than the exact area of the keratoma itself. MRI however is useful to identify other comorbidities occurring within a hoof capsule. In Case 2 collateral ligament desmitis was also identified.
- In conclusion, the use of a cross-sectional imaging modality is strongly recommended prior to en-bloc removal of a keratoma in order to alleviate the risks of post operative complications.

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