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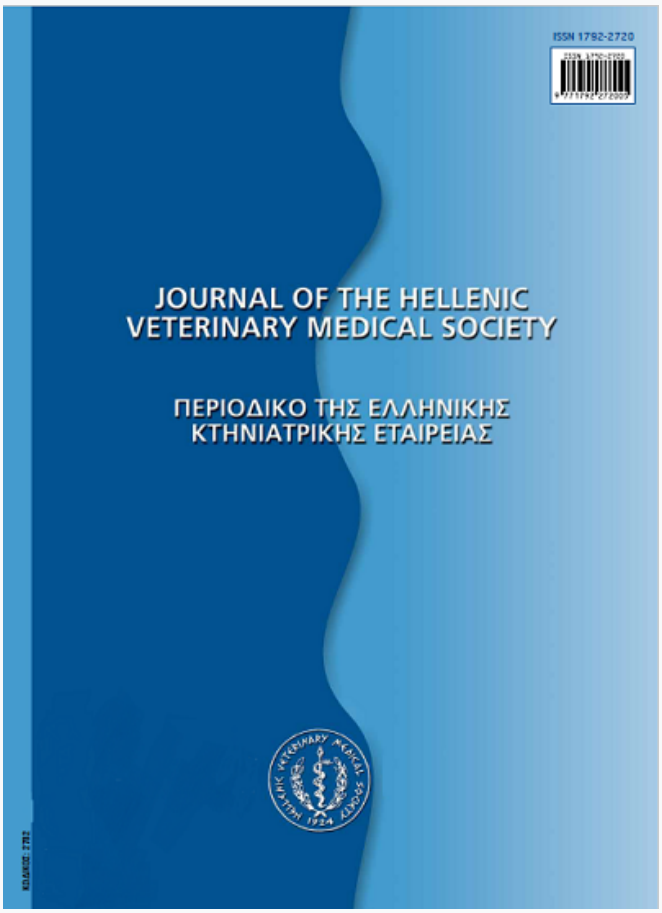

Το κερατόμα μπορεί να αντιμετωπιστεί με επιτυχία με την απλή χειρουργική επέμβαση στην οπλή: Η εκτομή της οπλής ως απλός τρόπος για την αφαίρεση του κερατόματος σε ένα άλογο

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Case Report
Κλινικό περιστατικό

Keratoma Can Be Treated Successfully With Simple Hoof Surgery: Hoof resection as a simple way to remove keratoma in a horse

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ABSTRACT. Keratoma is a very rare condition, but if occurs often results in lameness in a horse. Despite its rarity, it is one of the most common reasons to perform foot surgery, because the surgery is the only effective treatment. In this case report diagnosis was based on radiographs of the foot and histopathological findings. There was a repeated debridement of the keratoma performed in the patient. After all the keratoma was removed the mare showed no more lameness.

Keywords: *hoof, horse, neoplasm*

CASE HISTORY

Introduction

Keratoma is considered a benign tumor that originates from epidermal cells of the coronary band (Hamir et al, 1992; Christman, 2008; Getman et al, 2011). Some authors consider it more as a hyperplastic process (hyperplasia of the keratin producing cells) than neoplastic process (Honnas, 1997). It can happen in any breed, sex or age of a horse (Christman, 2008). The cause of keratoma remains unknown, but previous trauma or subsolar, chronic infection is taken into consideration (Honnas, 1997; Christman, 2008; Getman et al, 2011). The tumor can be either well organized or diffused mass throughout parts of the hoof. The shape is usually crescent-like, well circumscribed, size may differ from few mm to even 5 cm (Christman, 2008). Until the point that the growing mass causes too much pressure on the surrounding structures, (similar to the pressure caused by hoof abscess) usually there is no sign of lameness. When pressure on surrounding structures is big enough we can observe grade III-IV/V lameness (Christman, 2008). During a clinical examination there could be no visible signs (except elevated

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digital pulse), or, depends on the location of the mass, there is bulging place underneath the coronary band. Radiographs are useful diagnostic tool, which also help to determine the mass location (Honnas, 1997; Getman et al, 2011). The treatment is hoof wall or sole resection followed by surgical removal of the keratoma (Hamir et al, 1992; Christman,2008; Getman et al, 2011). The recurrence depends on whether all the keratoma mass was removed, if not, sooner or later the mass will grow back (Hamir et al, 1992; Christman, 2008; Getman et al, 2011). The recovery time depends on the size of resection, the smallest it is, the shorter time the patient needs for the complete recovery.

Case history

A 10 year old tennessee walking mare was presented for lameness exam in the hospital. The mare was grade IV/V lame in the right hind. There was no positive reaction to the hoof testers. Since the lameness has started the horse was stall-rested for a week, until the owner brought it for hospital examination.

Clinical findings

The right hind leg was not sensitive to palpation. There were no signs of trauma. There was no swelling, no joint effusion, no abrasion. The pulse in the digital arteries of right hind foot was elevated.

Diagnostic tests

There was abaxial analgesia in the right hind foot performed and after the perineural analgesia the lameness significantly improved. Digital radiographs of the right hind foot were taken. There was visible smoothly demarcated radiolucent defect within the solar margin of P3 which could suggest possible keratoma or an abscess (Fig. 1, Fig. 2).

Treatment

The foot was treated in a conservative way – an Animalintex Poultice Pad was applied followed by foot bandage (3 inch wide elastikon tape wrapped around the place where the pad was placed) and the patient was sent home with more supplies of poultice and elastikon tape to change by an owner every other day. After few days an abscess ruptured at the coronary band. After the poultice treatment the lameness remained. The mare was still grade II/V lame and the owner decided to bring her back

Figure 1-2. Radiographs of the right hind P3 solar margin. Arrows show radiolucent defects within the distal phalanx.

to the hospital. Based on the clinical history and radiographs more invasive treatment was suggested and the sole resection was performed. To determine the exact location of the keratoma more radiographs were taken. As a marker we used barium paste (applied on the hoof wall with a syringe) (Fig. 3), bone curette and 14G 5,08 cm length needle.

The foot surgery was done on a standing horse, the patient was sedated using detomidine hydrochloride (0.05 mL/100kg intravenous; Dormosedan, Pfizer Animal Health) and buthorphanol tartrate (0. 5mg/100kg intravenous; Dolorex, Intervet Inc., Merck Animal Health). As for the local anesthesia abaxial sesamoid nerve block with mepivacaine hydrochloride (5 mL was placed subcutaneous over medial and lateral plantar didgital nerves; Carbocaine-V, Pharmacia & Upjohn Company, Division of Pfizer Inc) was performed. To prevent excessive bleeding a tourniquet was applied to the fetlock (as a tourniquet 2 cm wide and 40 cm long rubber band fastened with 3 inch elastikon tape was used). To resect the sole a hoof knife and scalpel blade were used. Keratoma in the hoof was debrided using bone currettes and scalpel blade. A sample of keratoma (about 1cmx1cmx1cm piece in 10% buffered formalin) was taken and sent to TVMDL (Texas A&M Veterinary Diagnostic Laboratory)

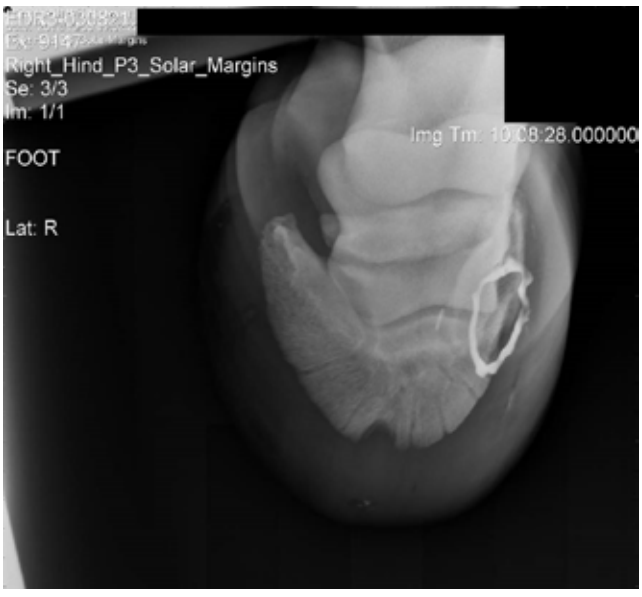

Figure 3. Radiograph of right hind P3 solar margins. Possible keratoma marked with a barium on the hoof wall.

to confirm the diagnosis. The mass extended from the sole dorsal medially to the coronary band so it was hard to reach it through the hole in the sole and there was a high probability that not all the mass was removed. Resection site was treated with metronidazole (Metronidazole Tablets USP, Teva Pharmaceuticals USA, broken in a mortar to a powder) and enrofloxacin powder (Enrofloxacin, Meridian Pharmaceuticals Inc) ratio of both powders 1:1 and hospital plate was applied. After the surgery patient stayed at the hospital and the resection site was treated every day topically with the previously mentioned powder. Before applying the fresh powder the superficial layer of the old one was very gently removed with dry and clean cotton bud. For the pain and inflammation management the mare was given phenylbutazone paste (1g orally once a day; Vetri Bute™, Med-Pharmex Inc, Pomona).

Histopathology

In the meantime results from TVMDL came back as mild focal chronic ulcerative pododermatitis with possible keratoma. On the day 4 post surgery there was evidence of the mass returning. Another sample was taken and sent to TVMDL. This time the laboratory results stated that there is thickened normally differentiating squamous epithelium with prominent stratum corneum which is most compatible with keratoma.

Follow up

For better diagnosis a foot venogram was performed. Keratoma is usually well organized and vascularized mass and the venogram is very distinctive. Higher concentration and growth of blood vessels within the keratoma is visible on radiographs. Our patient's keratoma was diffused, so the hoof vascularization looked normal. This time it was decided to perform hoof wall resection for the better access to the mass. The resection was done on a standing horse. Patient was prepared for the surgery as before: detomidine hydrochloride and buthorphanol tartate were used for sedation

(in the same doses as before), abaxial sesamoid nerve block with mepivacaine hydrochloride was performed and tourniquet was applied. Resection was done using dremel and half round nippers. Keratoma was removed using scalpel blade and bone currettes (Fig. 4 – 6). The surgery site was treated every day with metronidazole and enrofoxacin powder (1:1), followed by gauze and 3 inch wide elastikon tape. Before applying the new bandage the superficial layer of the powder from previous day was very gently removed with clean and dry cotton bud.

Over days that followed the surgery the mare was intermittently lame (grade III/V). As for pain and inflammation management the horse was treated as before - with phenylbutazone paste (1g orally once a day). During changing the bandage we noticed again an evidence of keratoma regrowth and decided to do one more surgery. The regrown mass was removed in the same manner as before. The procedure was done on a standing horse. Because of the size of the hoof wall resection we put clips on both sides of the hoof wall (Fig. 7, Fig. 8).

The surgery site was treated in the same manner as before (using metronidazole and enrofloxacin powder). This time keratoma never grew back and after approximately 8 – 10 weeks of treatment and changing the bandage the resection site filled again with the healthy granulation tissue. Our patient was healthy and returned to recreation.

Figure 4-6. Steps of the hoof wall resection. Dremel tool is used until it reaches the sensitive laminae. Later we used half round nippers and scalpel blade.

DISCUSSION

The only clinical signs in the patient were grade IV/V lameness and elevated digital pulse.

Diagnostic tests

Our diagnosis was based on digital radiographs and histopatholgical findings. To locate the exact place of keratoma we used digital radiographs and markers, as barium paste and some contrast tools such as needles. The radiographs do not allow to determine precisely the location of all the mass. Better choice would be MRI or CT (Getman et al, 2011) although very few hospitals are equipped with such tools. The other side is the cost (radiographs versus MRI or CT) which very often limits the treatment.

Treatment

The only effective treatment for keratoma is complete excision of the mass. The smaller size of

Figure 7. The view of the hoof after hoof wall resection.

Figure 8. Clamps were put over the surgery site for hoof wall stabilization.

hoof wall (partial or complete) or sole resection, the faster recovery we can expect (Christman, 2008; Getman et al, 2011). Post surgical treatment involves antimicriobiotis treatment in the site of resection. We used enfrofloxacin and metronidazole powder, some other clinicians use gauze soaked in betadine solution (Christman, 2008), increasing concentrations of iodine (Honnas, 1997) or fill the defect with amikacin impregnated collagen sponge and amikacin impregnated Polymethylmethacrylate (Getman et al, 2011). In some cases systemic antibiotics were used as well (Christman, 2008; Getman et al, 2011). To support the hoof from breaking either some kind of a shoe (for example an eggbar shoe (Christman, 2008) needs to be applied, or, like in our case, a hospital plate. The bandage should be changed until the surgery site is filled with healthy granulation tissue.

Complications

If the keratoma is not completely removed we can expect fast regrow (Hamir et al, 1992; Honnas, 1997; Christman, 2008; Getman et al, 2011) (few days in case described above). Some other complications involve surgery site infection, excess formation of granulation tissue or defects of the hoof wall such as hoof wall cracks (Boys Smith et al, 2006; Christman, 2008; Getman et al, 2011).

Conclusion

Keratoma can be successfully treated with hoof resection, however if the mass is difficult to access it might take more than one surgery to remove it completely.

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CONFLICT OF INTEREST STATEMENT

Author of this article does not have any conflict of interest.

REFERENCES

Boys Smith SJ., Clegg PD., Hughes I., Singer ER. (2006) Complete and partial hoof wall resection for keratoma removal: post operative complications and final outcome in 26 horses (1994 – 2004). Equine Veterinary Journal; 38:127 – 133

Christman C. (2008) Multiple keratomas in an equine foot. Canadian Veterinary Journal; 49:904–906

Getman LM., Davidson EJ., Ross MW., Leitch M., Richardson DW. (2011) Computed Tomography or Magnetic Resonance Imaging-Assisted Partial Hoof Wall Resection for Keratoma Removal. Veterinary Surgery 40; 708–714

Hamir AN., Kunz C., Evans LH. (1992) Equine keratoma. Journal of Veterinary Diagnostic Investigation; 4:99-100

Honnas CM. (1997) Keratomas of the equine digit. Equine Veterinary Education; 9:203-207