Virtual Otoscopy of the Middle Ear in Canine Otitis Media Disease Model

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Introduction: Virtual otoscopy (VO) can provide information for making a diagnosis and enhancing the level of comprehension of the anatomy of the middle ear for teaching1. VO anatomic reference of the middle ear in normal dogs has recently been investigated2. However, no information about VO images of otitis media in dogs has been described. The aim of this study is to assess the feasibility of the VO imaging in canine otitis media model.

Materials and Methods: Seven clinically healthy beagles were studied including two control dogs (2-3 years old, 6.8-10.3kg). The animals were administrated dexamethasone (IM 1.0mg per animal) 12 hours before inoculation. Under the general anesthesia, the animals were inoculated with the culture solution of coagulase negative Staphylococcus aureus 571 (UOF) into the tympanic bulla bilaterally (total 14 ears) following routine flushing process3. After inoculation, clinical signs including ear pain, scratching, head shaking and cerumen were observed daily for 3 weeks. Radiographic examination and CT scanning were performed before and 15 days after inoculation. Thereafter, 3-dimensional CT images were reconstructed with commercially available software (Rapidia, INFINITT Co., Korea), capable of virtual endoscopy and the radiographs and VO images were evaluated.

Results: Eight out of 10 ears inoculated with pathogen exhibited clinical signs related with otitis externa obviously. No remarkable changes were found on the radiographs. The conventional CT imaging showed fluid density occupying the tympanic bulla compatible with otitis media in two dogs unilaterally. However, the VO image did not yield informative evidence for the precise decision about the middle ear problem. Meanwhile, the internal organs such as the manubrium of the malleus, promontory, cochlea window, eustachian tube and septum bulla was identified on the VO images without disturbance by the fluid filling inside the bulla cavity.

Conclusions: VO images are not more useful than conventional CT imaging for making accurate diagnosis of otitis media in dogs. On the other hand, it is considered that VO images could be feasible to assess the complex structure of middle or internal ear, since the fluid accumulation within the tympanic bulla had no influence on evaluating the bony tissue of the middle ear on the VO image in the canine otitis media model.

References:

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