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Response to Letter to the Editor by Dr. Tamas Karosi Re: "Correlation of Computed Tomography with Histopathology in Otosclerosis", Quesnel et al. *Otol Neurotol* 2013; 34(1):22-28

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To the Editor:

We appreciate Dr. Tamas Karosi's letter and would like to address some of his concerns and comments. We acknowledge the recent manuscript by Karosi et. al (1), in which high resolution computed tomography (HRCT) findings were compared to histopathology of stapedectomy specimens (i.e. stapes footplates). The current study differs because the entire otic capsule was able to be evaluated in these post-mortem temporal bone specimens. Evaluation of the otic capsule is important because otosclerotic foci may be missed with evaluation of the surgically removed footplate only. Additionally, evaluation of the entire temporal bone specimen allows identification of peri-cochlear or retrofenestral otosclerosis, which is clinically important as peri-cochlear foci may cause sensorineural hearing loss.

We agree that HRCT may be used in the diagnostic evaluation of otosclerosis, including evaluation of differential diagnoses, and planning or counseling prior to surgical treatment. Although there is no standard medical treatment for otosclerosis, some practitioners may employ fluoride (2) or bisphosphonates in cases of progressive sensorineural hearing loss due to otosclerosis (3, 4, 5). In this instance, HRCT may be employed to confirm retrofenestral otosclerosis before considering medical treatment.

During this study, there were multiple examples of histologically inactive foci that could be seen on HRCT, as depicted in Figure 1. of the manuscript. Thus, it is *not* clear that the diagnostic value of HRCT is significantly reduced in cases with inactive otosclerotic foci.

We disagree that *post mortem* histopathologic findings are of limited value in clinical practice. Since the complete otic capsule cannot be examined histopathologically during life, *post mortem* evaluation provides important information about otosclerosis and other

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diseases of the temporal bone. These findings can be translated into clinical practice (6). The temporal bone specimens in this study underwent HRCT scanning *prior* to decalcification with ethylenediamine tetracetic acid (EDTA) and embedding in celloidin, and thus do not affect the HRCT findings. Fixation in formalin with 1% acetic acid and embedding in celloidin results in the best morphology of the temporal bone (7). Autolysis is minimized by rapid fixation of the tissues after death, and is not caused by EDTA or related to the age of archived temporal bone specimens.

The goal of this study was to compare HRCT findings to pathology directly, rather than to audiologic data. Areas of both active and inactive otosclerosis may co-exist in the same specimen (8), thus complicating the categorization of these specimens. In the future, it would be worthwhile to specifically compare histologic activity to HRCT imaging characteristics for each focus of otosclerosis, as the availability of pathology and HRCT for the same specimen will finally enable this direct comparison.

There are multiple HRCT grading systems available (1, 9, 10, 11, 12), each valuable and designed with different purposes, with no single widely accepted system. We used a simplified approach with three zones. For this study, it was important to characterize findings anterior to the oval window, around the cochlea, and in the round window niche separately; we did not see the need for additional subdivisions with these three zones, especially given the small sample size.

We do not believe that the finding of 80% overall sensitivity of HRCT for the diagnosis of otosclerosis in this study is “so small that it excludes further clinical applications in the future.” Inclusion of all available specimens (including one histologic otosclerosis specimen as noted in the discussion) and comparison to temporal bone pathology may account for the reduced sensitivity as compared to other studies comparing CT to audiologic, clinical, and stapes footplate only specimens. Additionally the small sample size in this study should be considered when interpreting these results.

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