Functional Magnetic Resonance Imaging in Lacrimal Duct Disorders with Conjunctival Application of a Paramagnetic Contrast Agent

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Purpose: In epiphora, dacryocystography (DCG) is established for localization of underlying dacryostenosis. DCG is of limited value concerning the depiction of periductal structures, and does not provide functional information - e.g. in dysfunction of the canalicular muscle pump or relative stenoses - for reasons of active instillation of the contrast agent. Dacryoszintigraphy provides sufficient functional, but no morphological information about lacrimal drainage. Therefore, high resolution magnetic resonance imaging (MRI) of the lacrimal drainage system with Gadolinium-Dimeglumine (Gd-DTPA) eyedrops was evaluated.

Subjects and Methods: 27 lacrimal drainage systems (LDS) in 23 patients with persistent epiphora were examined in a 1.5 T superconductive system using a receive-only surface coil (diameter 4 cm). Images in transverse and coronal plane were obtained with T1-weighted and T2-weighted spinecho sequences before and after conjunctival and intravenous application of Gd-DTPA. Matrix size of 256² pixels and field of view of 60 mm results in an in-plane resolution of 0.23 mm. For conjunctival application, we used an aseptic preparation of 1:100 diluted Gd-DTPA (0.5 mmol/ml).

Results: Stenoses and obstructions, respectively, were found in 23/27 LDS. Stenoses were localized to the canalicular (n=3), saccular (n=5) and ductal (n=12) level. Saccular mucocele, dacryolithiasis, papilloma of the sac, periductal pathology following surgical manipulation of the maxillary sinus and after dacryocystorhinostomy was clearly depicted.

Conclusion: High resolution MRI with conjunctival application of a paramagnetic contrast agent provides additional, functional information in dacryostenosis, especially of the canalici and after dacryocystorhinostomy. Excellent soft tissue contrast of MRI allows depiction of periductal pathology following surgery or trauma. Rare masses of the lacrimal sac, as papilloma, and dacryolithiasis are reliably detected.

Key words: MRI, lacrimal drainage system, stenosis, epiphora

Literature: