

Evaluation of High Resolution Vessel Wall Imaging in the Diagnosis of Giant Cell Arteritis in 41 Patients

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Introduction

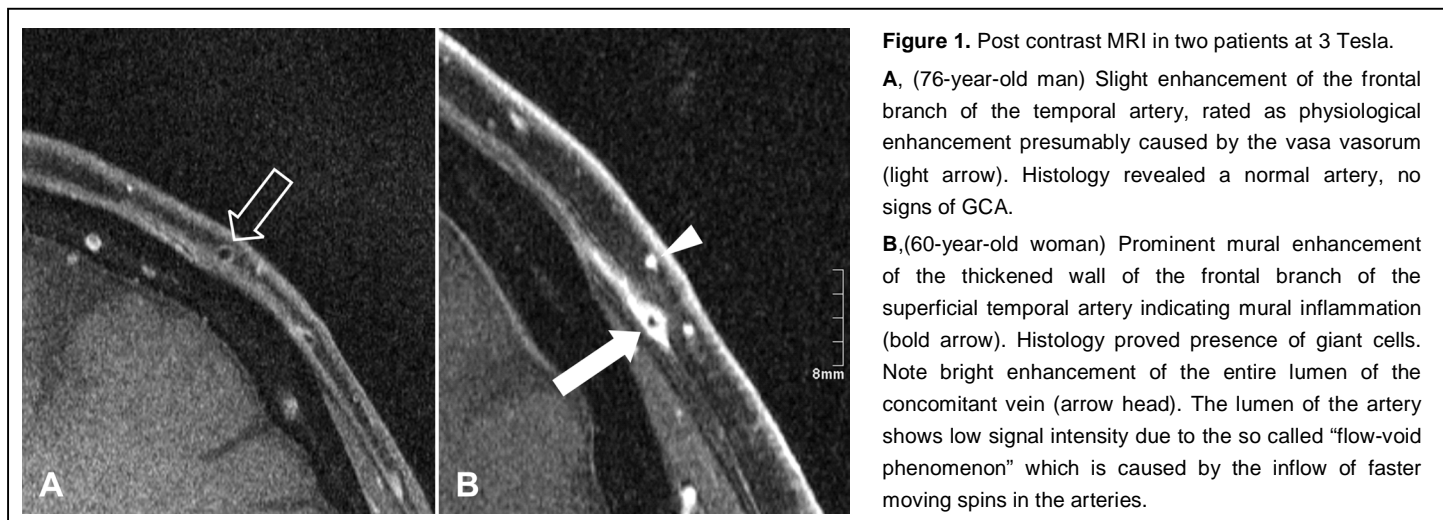
Giant cell arteritis (GCA) is a chronic vasculitis of large and medium sized arteries [1]. Clinical indications include new onset or new type of headache and tenderness of the temporal artery to palpation. In addition, diplopia, amaurosis fugax or sudden blindness may occur. Certainty about the correct diagnosis is needed, especially in view of long term treatment with corticosteroids and its side-effects. Therefore, a biopsy of the temporal artery is regularly performed to examine the presence of giant cells [3]. Recently, we demonstrated the feasibility of high resolution MRI to visualize the temporal artery and its mural inflammatory changes in GCA [4]. In this study, we compare the diagnostic findings of MRI in a large patient pool with the gold standard of GCA diagnosis, the criteria of the American College of Rheumatology (ACR).

Methods

41 consecutive patients (mean 71 years) with clinically suspected GCA underwent high resolution MRI on either a 1.5 T Sonata system or a 3T Trio system (Siemens Medical Systems, Erlangen, Germany) using a dedicated eight element phased-array head-coil. Post contrast (0.1mmol/kg Magnevist, Schering, Germany), multislice T1-weighted spin echo images with an acquired sub-millimeter spatial resolution of 0.2 mm × 0.3 mm (TE/TR = 22 / 500 ms) were evaluated by two radiologists. Signs of mural inflammation such as increased signal intensity from contrast enhancement and thickening of the wall were judged according to a four point ranking scale [4] to diagnosis patients as GCA positive or GCA negative. The MRI diagnosis was then compared to the diagnosis derived from the clinical criteria of the ACR.

Results

In all cases, the temporal artery could be depicted in good diagnostic quality. The lumen of the temporal veins were enhanced brightly while the lumen of the temporal arteries showed low signal intensity due to the so called "flow void phenomenon (Figure 1). The MRI findings were GCA negative in 15 cases and in 26 cases mural inflammatory changes such as thickening and contrast enhancement of the vessel wall or the perivascular tissue indicated the presence of arteritis (Figure 1). Sensitivity and Specificity of MRI were 92% and 81%, respectively as graded by the ACR criteria. The positive predictive value and the negative predictive value of MRI were 89% and 87%, respectively.



Discussion

Mural contrast enhancement on MRI is a well established sign of inflammation and this study conforms the capabilities of high resolution MRI to depict the inflammation of relatively small vessels in GCA. Post contrast high resolution MRI visualized mural inflammatory changes of the temporal artery with good sensitivity and specificity as conformed with the criteria of the ACR. Other studies have shown that the inflammation of the temporal artery shows a segmental distribution [5] which could lead to falsely negative results of biopsies. Therefore, this MR protocol may be used to localize segments with the most intense mural inflammatory changes to determine the best site for biopsy. Potentially, this may reduce the number of falsely negative biopsy specimen. Also, high resolution MRI may be used to monitor the activity of mural inflammatory changes under long term corticosteroid therapy [6]. In summary, this technique might be useful for non-invasively deriving the correct diagnosis, evaluating severity of the disease, and performing follow up examinations.

References

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