3T MRI demonstrates significant decrease of mural inflammatory changes in giant cell arterits under steroid treatment

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Introduction

Giant cell arteritis (GCA) is a chronic vasculitis of large and medium sized arteries. Clinical indications include new onset or new type of headache and tenderness of the temporal artery to palpation. Diplopia, amaurosis fugax or sudden blindness may occur[1,2]. Biopsy of the temporal artery is considered to the diagnostic gold standard [3]. Recently, high resolution MRI of the superficial cranial arteries has proven feasible for non-invasive diagnosis of mural inflammatory changes and assessment of the cranial involvement pattern in active GCA [4, 5]. Treatment of GCA is based on long term corticosteroid medication. However, relapse of the disease may occur if steroid medication is tapered too early. The purpose of this study was to evaluate mural inflammatory changes of the superficial cranial arteries in giant cell arteritis under long term corticosteroid treatment as depicted by 3 Tesla MRI.

Methods

17 consecutive patients (mean 68 years) with proven GCA underwent repeated high resolution MRI on a 3T Trio system (Siemens Medical Systems, Erlangen, Germany) at initial presetnatation and at follow up after long term steroid mediacation (mean 15,7 months). A dedicated eight element phased-array head-coil was used. Post contrast (0.1mmol/kg Mulithance, ALTANA, Germany), multislice T1-weighted spin echo images with an acquired sub-millimeter spatial resolution of 196µm × 260µm (TR 500, TE 22,) were evaluated. Mural inflammatory changes such as contrast enhancement and thickening were judged according to a four point ranking scale [5] and compared with findings of the initial scan before steroid treatment. MRI diagnosis was compared with laboratory tests such as C-reactive proteine (CRP) and erythrocytes sedimentation rate (ESR) and correlated with the clinical symptoms before and after treatment.

Results

In all cases the temporal artery could be depicted in good diagnostic quality without disturbing susceptibility artifacts at initial presentation and at follow-up visit. Mural inflammation was demonstrated by MRI at initial presentation in all patients. After treatment inflammatory changes had decreased signficantly (Wilcoxon signed rank test: $p<0,001$). Concordantly, CRP decreased from 130,2 mg/l to 70,3 mg/l ($p<0,001$) and ESR from 88,8 mm/h to 24,3mm/h ($p<0,001$). Cohen kappa-coefficient for correlation of MRI results with clinical signs of disease activity was $\kappa = 0,64$ revealing substantial correlation with $p<0,05$.

Discussion

Mural contrast enhancement on MRI is a well established sign of inflammation [6]. This study demonstrates that mural inflammatory changes such as wall thickening and contrast enhancement vanish under long term corticosteroid treatment in giant cell arteritis. High resolution MRI at 3Tesla is well feasible to depict these inflammatory signs in active disease. Lack of mural inflammatory contrast enhancement or decreased thickening of the vessel wall correlated well with the clinical findings of treated disease with near to normal inflammatory clinical and laboratory markers. High resolution MRI may be used to monitor therapy. However, its ability to prove relapse of disease still needs to be proven as none of the patients investigated in this study presented with signs of a relapse.

References

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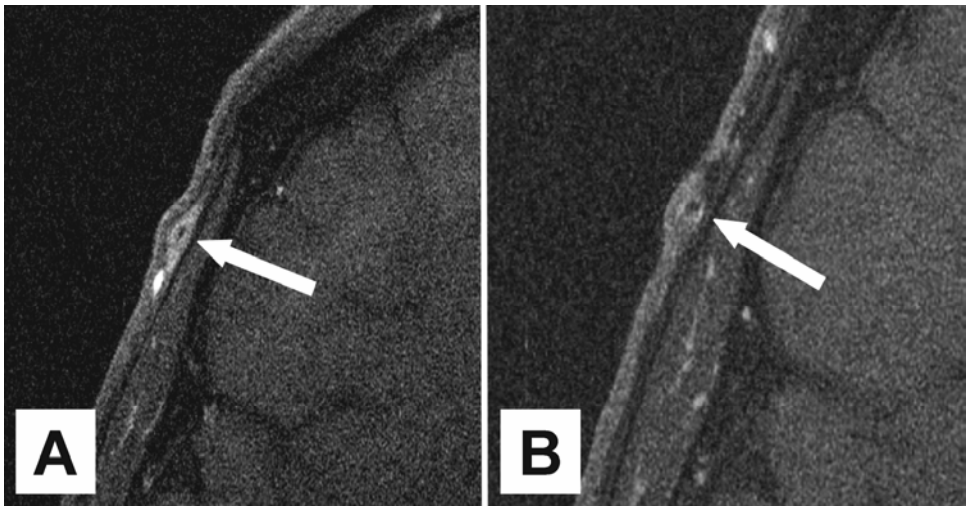

Figure 1 Post contrast MRI of the superficial temporal artery at initiation and after steroid treatment.

A, (65year-old man) Prominent mural enhancement of the thickened wall of the frontal branch of the superficial temporal artery indicating mural inflammation (bold arrow). Histology proved presence of giant cells.

B, Same patient as in (A) after 15 months of steroid treatment. Mural enhancement has vanished. Clinical and laboratory signs of inflammation have ceased accordingly.