A Blinded, Case-Control Trial Assessing the Value of Heavily T2-Weighted MR in the Diagnosis of Trigeminal Neuralgia

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Methods

We performed a blinded, case-matched control trial evaluating SSFP sequences in consecutive patients suffering unilateral TNVC with operatively proven vascular compression of the trigeminal nerve against healthy controls matched on age, sex, and laterality of the pathologic neurovascular complex. Inter-rater reliability was compared between 2 blinded, expert reviewers. Predictive ability of MRI was assessed apropos of accuracy, discrimination, and clinical utility.

Introduction

High-resolution magnetic resonance imaging (MRI) may be a useful adjunct in identifying trigeminal neuralgia due to vascular compression (TNVC). To date, however, no study has analyzed the incidence and features of vascular compression against a control cohort. The purpose of this study was to evaluate the reliability and predictive ability of steady state free precession (SSFP) MRI sequences for the diagnosis of symptomatic vascular compression and response to operative intervention in patients suffering TNVC.

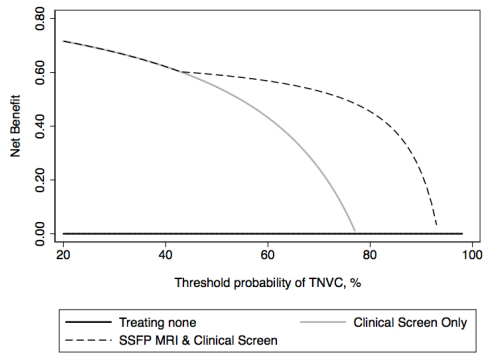
Results

Forty-four patients were available for analysis; 22 consecutive TN patients and 22 matched controls. Inter-rater reliability ranged from fair to excellent for vessel compression (kappa 0.40), location (0.81), type (0.72), and multiplicity (0.31). Vascular compression on MRI sequences did not differ significantly between cases and controls (75 vs. 82%, p=0.30); neither did location, type, and number of compressive vessels. Notably, MR did demonstrate accurate (Brier 0.15) and good discriminatory ability for clinical response following MVD (AUC 0.81, 95% CI 0.6-1.0). Decision-curve analysis demonstrated a net reduction of 5 cases per 100 evaluated with MRI above a decision threshold of 50%.

Conclusions

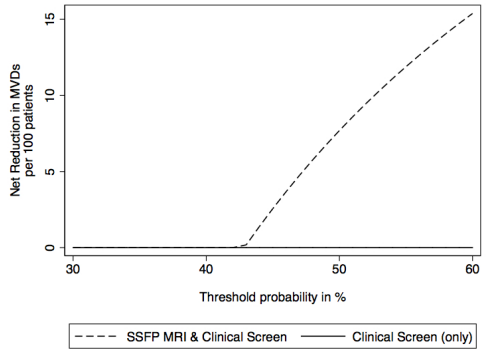
The results of this study refute recent literature supporting the use of high resolution MR for TGNVC diagnosis. Instead, the utility of SSFP MRI may lie in stratifying the likelihood of response in those with characteristic symptomatology.

Fig 1. Net benefit of MRI



Graph depicts that the net benefit of MRI exceeds proceeding with MVD in all with a positive clinical screen alone beginnning at a probability threshold of 43%.

Fig 2. Net reduction of unsuccessful operations with use of MRI



Net reduction of 5 unsuccessful operations per 100 patients undergoing MVD above a decision threshold of 50%

Learning Objectives

Listeners should be able to apply heavily T2-weighted to the evaluation and stratification of patients most likely to respond to operative intervention in those with characteristic symptomatology of TN due to vascular compression.