



Does The Number Of MRI Findings In IIH Correlate With Pulsatile Tinnitus: A Quantitative Analysis



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Abstract

Objective: Pulsatile tinnitus (PT) is a common symptom in idiopathic intracranial hypertension (IIH). It occurs in some, but not all patients with IIH. It has been shown that no single structural feature commonly found in IIH on MRI is significantly different between those with and without PT. The purpose of this study is to determine if there is a difference in the total number of abnormal MRI findings commonly found in IIH in those with and without PT.

Methods: A retrospective age-matched cohort study of patients with documented IIH (diagnosed by neuro-ophthalmologist) and MRI of the head was performed. Patients' MRIs were assessed for 16 variables known to be associated with IIH (eg. pituitary displacement/empty sella, optic nerve tortuosity, transverse sinus stenosis, inferior cerebellar tonsils, arachnoid granulations, slit-like ventricles, etc.) by two blinded neuroradiologists. The total number of positive findings in each patient's imaging was recorded, and an independent samples T-test was used to assess the difference in means between the PT+ and PT- cohorts.

Results: 40 patients met inclusion criteria, (20 with PT, 20 without PT). There was no significant difference in the number of positive MRI findings associated with IIH between the PT+ and PT- cohorts, 6.28 and 6.68 respectively.(p=.572)

Conclusions: The presence of pulsatile tinnitus is not correlated with the total number of intracranial abnormalities assessed on MRI. PT occurrence could be related to more systemic and less anatomic factors.

Introduction

- Idiopathic Intracranial Hypertension (IIH) is a condition of increased intracranial pressure with no identifiable cause, structural or otherwise1
Pulsatile Tinnitus (PT) is an auditory sensation described as a "whooshing" sound that is in time with the heartbeat2
Many but not all patients with IIH get PT, but the correlation between these two phenomena is unclear, with some previous work suggesting that PT is not related to IIH severity alone6.
Others have posited that the number of abnormal MRI findings in may also be a marker of IIH severity3.
This study seeks to analyze the radiographic findings correlated with IIH and PT to elucidate whether greater numbers of imaging findings are observed in patients with both IIH and PT compared with this with IIH alone.

Table 1. MRI Abnormalities Included In Cohort Analysis

Table with 2 columns of MRI abnormalities: Posterior displacement of the pituitary stalk, Meningoceles of the skull base, Slit-like ventricles, etc.

Methods

- Patients diagnosed with IIH between 2009 and 2021 were identified from outpatient records of the neuro-ophthalmology service based on Modified Dandy Criteria
Review of the MRI studies was conducted to identify any of 16 findings suggestive of IIH (Table 1)
Continuous variable cutoffs were established according to guidance from the literature.
The number of positive findings for each patient was recorded and stratified in correlation with independent T-test samples to assess the difference in the average number of abnormal findings between the PT+ and PT-IIH patient cohorts. Small and large groupings were compared using Chi-Square analysis.

Table 2. Number of Abnormal Findings Observed in Cohort

Table with 3 columns: # of findings, PT-, PT+. Shows counts for 1 to 16 findings.

P = 0.572

Table 3. Stratified Average Significant Abnormal MRI Findings in Cohort

Table with 4 columns: # of Findings, PT-, PT+, P Value. Shows stratified data for 1-3, 4-6, 7-9, 10-12, 13-16 findings.

Table 4. Low Versus High Number of Abnormal Findings in Cohort

Table with 3 columns: # of Findings, PT -, PT +. Shows counts for <8 and >8 findings.

P= 0.0932

Results

- 40 patients met inclusion criteria, (20 with PT, 20 without PT)
The scale of number of findings in listed in Table 2.
There was no significant difference in the number of positive MRI findings associated with IIH between the PT+ and PT- cohorts, 6.28 and 6.68 respectively.(p=.572)
When grouped into cohorts of 3 findings, there were no significant differences between any cohorts, except between the 10 to 12 findings range which showed a p-value of 0.041. (Table 3)
When grouped into low (<8) and high (>8), there were no significant differences between the cohorts (Table 4).

Discussion

- These data indicate that the number of abnormal MRI findings associated with IIH does not differ between patients with and without PT.
This is contrast to Barkatullah et. al. suggests that the number of findings may be a marker of IIH severity3.
Such information, combined with prior work by our group would indicate that the presence of PT is unrelated to the quantity or quality of radiographic findings in this patient population.

Conclusions

- There are no statistically significant differences in the number of abnormal MRI findings of PT+ IIH patients in comparison to their PT- counterparts.
Furthermore, it can be understood that the presence of PT is not correlated with the total number of intracranial abnormalities assessed on MRI.
This study supports the mounting evidence to suggest that the presence of PT is not related to IIH severity.
In patients with IIH, the presence of PT may be explained by an entirely separate pathophysiology.

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