Headache and Refractive Errors in Children

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ABSTRACT

Purpose: To investigate the association between uncorrected or miscorrected refractive errors in children and headache, and to determine whether correction of refractive errors contributes to headache resolution.

Methods: Results of ophthalmic examination, including refractive error, were recorded at initial visit for headache. If resolution of headache on subsequent visits was not documented, a telephone call was placed to their caregivers to inquire whether headache had resolved.

Results: Of the 158 patients, 75.3% had normal or unchanged eye examinations, including refractions. Follow-up data were available for 110 patients. Among those, 32 received new or changed spectacle correction and 78 did not require a change in refraction. Headaches improved in 76.4% of all patients, whether with (71.9%) or without (78.2%) a change in refractive correction. The difference between these two groups was not statistically significant (P = .38).

Conclusions: Headaches in children usually do not appear to be caused by ophthalmic disease, including refractive error. The prognosis for improvement is favorable, regardless of whether refractive correction is required.


INTRODUCTION

Headache is a common complaint in children. It is estimated to occur at some point in childhood in approximately 50% of the population, with greater than 2% complaining of frequent episodic headache.1 Among the 196 headache types included in the second edition of the International Classifications of Headache Disorders (ICHD-2), 113 are known to occur in children.2 Among those, acute glaucoma, ocular inflammatory disorders, heterotropia or heterophoria, and refractive error represent potential ophthalmologic bases.3 Children commonly present to a pediatric ophthalmologist for evaluation of headache because parents and primary care physicians often suspect an underlying ophthalmologic problem.4,6 Headache can even be a presenting sign of elevated intracranial pressure from a mass or hydrocephalus, which in some cases can be revealed by ophthalmologic examination.

In particular, we have observed that many such patients have presented to our office with headaches suspected to be caused by refractive errors. We have rarely attributed headache to any significant ophthalmologic disorder, including refractive errors,
in such children. Although other authors have estimated that headaches are uncommonly caused by uncorrected or miscorrected refractive errors, no study has compared headache resolution in children receiving versus those not receiving refractive correction. Our goal was to investigate this question among our patients.

PATIENTS AND METHODS

This study conformed to the requirements of the U.S. Health Insurance Portability and Accountability Act. After approval was granted by the Institutional Review Board at Albany Medical Center, we conducted a chart review of pediatric patients seen with a diagnosis of headache (ICD-9 784.0) in our private practice between January 2002 and January 2011. Patients aged 13 years and older were excluded. Every child underwent standard ophthalmologic assessment, including visual acuity, pupils, external or slit-lamp examination, motility, dilated fundus examination, and cycloplegic retinoscopy. On follow-up visits, older children underwent manifest refraction when appropriate. Information was obtained from charts regarding patients’ age, gender, headache characteristics, medical and ocular history, family history of migraine, examination findings, prescribed treatment, and future course of headache. If patients did not have a follow-up appointment, or if headache was not mentioned during follow-up visits, their caregivers were contacted by telephone. These telephone calls were made at the time of the study, which ranged from 6 months to 12 years after their initial presentation. If they were unable to be reached initially, a second and then a third attempt were made to contact the caregivers by telephone.

RESULTS

A total of 158 patients were included in this study. Of these, 78 were male and 80 were female. Ages ranged from 3 to 12 years, with a mean of 8.05 years and a median of 8.08 years. A total of 43 patients (27.2%) had a clinically significant refractive error or had previously been prescribed glasses. Forty-eight patients (30.4%) had ophthalmologic history other than refractive error. Among those, 19 (11.9%) had strabismus, including horizontal and vertical deviations, accommodative esotropia, convergence insufficiency, and Duane’s syndrome. Other diagnoses encountered included amblyopia, nasolacrimal duct obstruction, functional vision loss, allergic conjunctivitis, retinopathy of prematurity, pseudostrabismus, nystagmus, optic disc anomaly, physiologic anisocoria, and ectopia lentis. A family history of migraine was documented in 28 patients (17.7%). Temporal association of headaches with visual tasks, including reading, television, computer, or homework, was noted in a total of 22 patients (13.9%). Visual symptoms, specifically blurred vision or diplopia, were noted in 15 patients (9.5%).

Ophthalmologic examination, including refraction, was either unremarkable or not significantly changed from prior examination in 119 patients (75.3%). New or altered spectacle correction was prescribed in 33 patients (20.9%), and prior spectacles were discontinued in 4 patients (2.5%). These decisions were made with reference to consensus guidelines for spectacle correction in children. The remaining two patients (1.3%) were diagnosed as having convergence insufficiency. Otherwise no new ophthalmologic disorders were identified on examination.

We were able to obtain follow-up information from 110 of 158 patients, either through review of subsequent notes or by telephone. A telephone call was required to obtain this information in 62 patients. Overall, resolution or significant improvement was noted in 84 (76.4%) of these. Migraine was later diagnosed by another physician in 5 patients. Of the 37 children with a change in spectacle correction, follow-up information was available in 32. Of those, 23 (71.9%) noted improvement of headache and 9 (28.1%) did not. Among the remaining 78 patients, 61 (78.2%) noted improvement in headache and 17 (21.8%) did not. Chi-square analysis did not show a statistically significant difference in resolution between those who received a change in spectacle correction when compared to those who did not (P = .38). Of the headache characteristics we documented, we were not able to identify any that were predictive of resolution with refractive correction.

DISCUSSION

The International Headache Society published an extensive review of headache categories in 2004. According to these guidelines, headache attributed to refractive error is recognized as recurrent mild frontal headache, noted in temporal relation to prolonged visual tasks and in the presence of an uncorrected or miscorrected refractive error, which resolves with correction of refractive error.
Several authors have previously suggested that the prevalence of headache caused by “eye strain” from uncorrected or miscorrected refractive errors tends to be overestimated by patients and physicians.\textsuperscript{7-9} A few studies have shown a slight correlation between headache and refractive errors in children. Akinci et al. demonstrated a higher incidence of headache in children with astigmatism, but failed to show any significant difference in those with hyperopia or myopia.\textsuperscript{10} Similarly, Hendricks et al. demonstrated a small but statistically significant correlation between refractive errors and headaches in schoolchildren.\textsuperscript{11}

It has been noted that headache, regardless of the cause, tends to improve with optimal correction of refractive error.\textsuperscript{7} However, no study to our knowledge has compared headache outcomes of those who received correction of refractive errors and those who did not. We acknowledge that children in both groups likely received concurrent medical treatment for headache. We hypothesize that, in most cases, headaches in children tend to resolve regardless of whether their glasses are changed. Our data support this assertion, suggesting that improvement may occur as part of the natural history of headaches in children, rather than as a benefit from correction of a refractive error.

Our experience indicates that most children with headache did not have any ophthalmologic abnormality, refractive or otherwise. Headaches were no more likely to improve in children receiving new glasses prescriptions. It is reassuring that none of those we reviewed were diagnosed as having any severe sight-threatening or otherwise serious medical conditions.

We acknowledge limitations inherent in a small, single-center retrospective study. Decisions whether to prescribe a change in refractive correction were made with reference to consensus guidelines.\textsuperscript{9} It is possible that guidelines for refractive correction should be different for children with headache. Investigating this possibility was beyond the scope of this study. It is difficult to determine to what extent patients were actually wearing their prescribed glasses. We relied on self-reported headache history rather than any formal headache diary. No randomized controls were used; it would be inappropriate to deprive children of appropriate refractive correction. We acknowledge that some patients whose headaches improved following refractive correction may not have improved without this intervention. In 48 cases (approximately one-third), we were unable to contact parents for follow-up. Additionally, some of the headaches occurred up to 10 years previously and it is possible parents were not able to remember details accurately when contacted. On the other hand, significant diagnoses were likely to be remembered.

Ultimately, any child with headache warrants an appropriate and thorough medical evaluation. Primary care physicians may find it more fruitful to investigate more common causes of headache, such as migraine or sinusitis, as well as more serious causes such as brain tumors. On the other hand, a full ophthalmologic evaluation should be available, especially to children with any indication of visual problems.

\section*{REFERENCES}


