What does convergence insufficiency look like to the strabismologist?

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Introduction: Convergence insufficiency (CI) is described as the inability to bring both eyes together on a near target. Scheiman and Goldsman have reported an incidence of 6.3% of all school-aged children and 15.7% of adults are diagnosed with CI(2,3).

The Convergence Insufficiency Treatment Trial (CITT) defined CI as a binocular vision disorder characterized by exophoria greater at near than at distance, a reduced near point of convergence, and reduced positive fusional vergence (convergence amplitudes) at near. This definition of CI is not universally accepted, as no large cohort studies have been conducted to define the disease (5).

Purpose: The purpose of this retrospective chart review is to delineate what convergence insufficiency looks like to a strabismologist. By classifying the entity, determining the most prevalent symptoms and findings of the disease, a standard will be set for further research into the disease patterns and treatment parameters.

Methods

Study Design: 7 year retrospective chart review study to determine factors influencing the diagnosis of CI.

Study Group: This study reviewed a total of 827 charts with a diagnosis of convergence insufficiency from 6 different fellowship trained pediatric ophthalmologists.

Inclusion Criteria: • New Diagnosis of CI • Chart initially accessible • No prior diagnosis or treatment of CI

Exclusion Criteria: • Prior history of surgery for strabismus • History of prior treatments for CI or orthoptic therapy • History of any other disease that would cause misalignment of the eyes (i.e. intracranial tumor, CN damage, myasthenia gravis, etc.)

Data Collection and Statistical Analysis

Data Collection: Individual patient information was extracted from medical charts and entered into an excel database. Collected data included: • Demographic data (gender, race, age at diagnosis) • Past medical and family history • Relevant symptoms • Visual acuity • Near point convergence • Strabismus measurements • Fusional amplitudes • Treatment plans

Statistical Analysis: Descriptive statistics were calculated by our biostatistician at Jefferson hospital with the use of R Project for Statistical Computing.

Results: From the 827 charts reviewed, a total of 387 patients fit our inclusion and exclusion criteria. Patients ages ranged from 3 years old to 90 years old. 72.1% were under the age of 18. 18.9% of our patients were asymptomatic at initial presentation. 54.3% were female and 45.2% were male. 94% had best corrected visual acuity greater at near than at distance. The majority of our patients had either plano or hyperopic corrective lenses.

Convergence insufficiency treatment parameters.

Future Directions: • Evaluating the group of “asymptomatic” patients to see what exam presentations they had to determine the diagnosis of CI and determining if symptoms are related to the severity of the disease. • Looking more closely at the esotropic and exotropic patients to determine how they could have these strabismus measurements and still be considered to have convergence insufficiency. • Further clarifying this disease entity based on the fusional amplitudes.

Conclusion: Our study suggests that CI can present in ways that are not expected. • Symptoms: A large number of our patients were asymptomatic at presentation. • The presence or absence of strabismus may not play a role in the diagnosis of CI. • Up to 8% of patients who have been diagnosed with CI were described by some strabismologists as esotropic or exotropic. • 25% of patients had a NPC of 1 cm. • Fusional amplitudes may play a role in diagnosis of CI, data has been collected, results pending.

References

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