

The Incidence and Clinical Characteristics of Adult-Onset Convergence Insufficiency

Rafif Ghadban, MD,¹ Jennifer M. Martinez, MD,² Nancy N. Diehl, BS,³ Brian G. Mohny, MD¹

Objective: The purpose of this study was to describe the clinical characteristics and natural history of convergence insufficiency (CI) in a population-based cohort of adults.

Design: Retrospectively reviewed population-based cohort.

Participants: Adult (age ≥ 19 years) residents of Olmsted County, Minnesota.

Methods: The medical records of all adults diagnosed with CI over a 20-year period were reviewed retrospectively.

Main Outcome Measures: Clinical characteristics and outcomes for adult-onset CI.

Results: A total of 118 adults (annual incidence, 8.44 per 100 000 patients older than 19 years) were diagnosed with CI during the 20-year period, constituting 15.7% of all forms of adult-onset strabismus observed in this population. The median age at diagnosis was 68.5 years (range, 21.7–97.1 years), and 68 (57.6%) were female. The mean initial exodeviation at near was 14.1 prism diopters (PD; range, 1–30 PD) and 1.7 PD (range, 0–10 PD) at distance. The Kaplan-Meier rate of exotropia increasing over time by 7 PD or more at near was 4.2% at 5 years, 13.5% at 10 years, and 24.4% at 20 years. Approximately 88% were managed with prisms, whereas less than 5% underwent surgical correction.

Conclusions: Adult-onset CI included approximately 1 in 6 adults who were newly diagnosed with strabismus in this 20-year cohort. There was a significant increase in incidence with increasing age. Nearly one-fourth had an increase of their near exodeviation of at least 7 PD by 20 years after their diagnosis, and most patients were managed conservatively. *Ophthalmology* 2015;■:1–4 © 2015 by the American Academy of Ophthalmology.

Convergence insufficiency (CI) is a common disorder of ocular alignment among both children and adults, characterized by an exophoria at near fixation and reports of horizontal diplopia and eye strain with prolonged reading.^{1,2} Convergence insufficiency is diagnosed on the findings of a remote near point of convergence and decreased fusional convergence at near fixation.³ Patients with CI usually exhibit an exophoria at near and normal alignment at distance; however, they can also be orthophoric and occasionally even esophoric.³ There is a considerable variability in the reported prevalence of CI, with most estimates ranging from 2.25% to 8.3% among pediatric and young adult populations.^{4–6} The purpose of this study was to describe the clinical characteristics of CI in a population-based cohort of adult patients 19 years of age or older and diagnosed over a 20-year period using a medical record retrieval system.

Methods

The medical records of all patients 19 years of age or older who were newly diagnosed with CI as residents of Olmsted County, Minnesota, from January 1, 1985, through December 31, 2004, were reviewed. Institutional review board approval was obtained for this study. Patients were identified based on resources of the Rochester Epidemiology Project, a medical record linkage system designed to capture data on any patient–physician encounter in Olmsted County, Minnesota.⁷ The population of this county is relatively isolated from other urban areas, and virtually all

medical care is provided to its residents by Mayo Clinic, Olmsted Medical Group, and their affiliated hospitals. Patients not residing in Olmsted County at the time of their diagnosis were excluded from the study.

Potential cases of new-onset adult strabismus were ascertained by searching the Rochester Epidemiology Project database for International Classification of Diseases, 9th Edition, codes for strabismus and other disorders of binocular eye movements. A trained data abstractor (J.M.M.) reviewed all medical records for subjects with at least 1 of the diagnostic codes for strabismus entered during the 20-year period. The data abstractor used predetermined inclusion criteria to confirm a diagnosis of new-onset strabismus and to classify subjects by the type of strabismus. The diagnosis of CI was based on the following criteria: (1) symptoms of double-vision while reading with an exophoria or exotropia at near fixation test and an absence of double-vision at distance or (2) an exophoria or exotropia of 10 prism diopters (PD) or more at near on prism alternate cover test (PACT) with orthophoria or small (<10 PD) phoria at distance. The entire medical record of each patient was reviewed carefully for other ocular or medical conditions.

To determine the incidence of adult-onset CI in Olmsted County, annual age- and gender-specific incidence rates were constructed using the age- and gender-specific United States white population figures obtained from the United States Census. The 95% confidence intervals for the rates were calculated assuming Poisson error distribution. The rate of progression was estimated using the Kaplan-Meier method. The threshold for change in the angle of exotropia over time was chosen to be 7 PD to minimize any test–retest variability.⁸

Results

A total of 118 patients older than 19 years were newly diagnosed with CI in Olmsted County, Minnesota, during the 20-year study period, corresponding to an annual age- and gender-adjusted incidence of 8.44 (95% confidence interval, 6.90–9.99) per 100 000 residents older than 19 years or a prevalence of 1.38%. Table 1 shows the historical and initial clinical characteristics of the 118 study patients. The median age at diagnosis was 68.5 years (range, 21.7–97.1 years), with a distribution by decade shown in Figure 1. Sixty-eight (57.6%) were women ($P = 0.95$). The mean initial deviation was 14.1 PD of exophoria or intermittent exotropia at near (range, 1–30 PD) and 1.7 PD at distance (range, 0–10 PD), with 6 patients having an esophoria for distance. None of the patients had information regarding near point of accommodation. Thirty-eight patients had hyperopia and 45 patients had myopia. Several of the more common ocular and systemic comorbidities were reviewed and are shown in Tables 2 and 3, respectively. Other ocular disorders found in this population were age-related macular degeneration in 17% and glaucoma in 8%. The most prevalent associated systemic conditions included hypertension in 23% and coronary artery disease, hyperlipidemia, and cancer in approximately 10% each.

The Kaplan-Meier rate of the exotropia increasing over time by 7 PD or more at near was 4.2% at 5 years, 13.5% at 10 years, and 24.4% at 20 years. Management data were unavailable for 13 of the 118 patients. Ninety-two (88%) of the 105 patients were treated with prism spectacles, 9 (9%) were treated with convergence exercises, 4 (3.84%) underwent eye muscle surgery, and 3 (2.8%) elected to occlude 1 eye. The patients were followed up for a mean of 9.3 years (range, 0–23.6 years). Three of the 4 patients who were managed with surgery had resection of a single medial rectus, 2 of whom required prism correction after surgery to eliminate their diplopia. The fourth patient underwent 1 lateral rectus recession and had a final deviation of 2 PD of esophoria for both distance and near with no diplopia.

Discussion

Adult-onset CI was diagnosed in 118 patients and constituted approximately 1 in 6 adults who were newly diagnosed with strabismus in this 20-year cohort.⁹ Females in the seventh decade of life were most prevalent. Although

Table 1. Historical and Initial Clinical Characteristics of 118 patients 19 Years of Age or Older Diagnosed in Olmsted County, Minnesota, from 1985 through 2004

Median age at diagnosis (yrs)	68
Range	21.7–97.1
Gender, no. patients (%)	
Male	50 (42.4)
Female	68 (57.6)
Exotropic deviation at distance (PD)	1.7
Range	0–10
Exotropic deviation at near (PD)	14.1
Range	10–30
Refractive error, no. patients (%)	
Hyperopia	38 (32.2)
Myopia	45 (38.1)
Diplopia at presentation, no. patients (%)	37 (31.4)

PD = prism diopters.

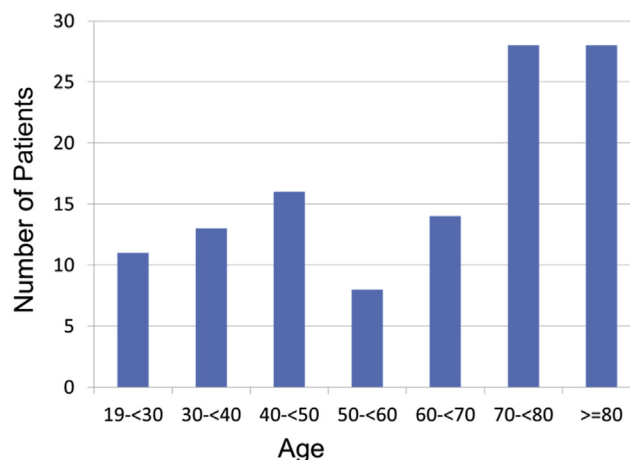


Figure 1. Bar graph showing the age at diagnosis for 118 adult patients diagnosed with convergence insufficiency in Olmsted County, Minnesota, from 1985 through 2004.

progression of the angle was common, with the rate being highest among patients older than 70 years, most patients in this cohort were managed conservatively with prisms and convergence exercises, and only 4 patients were managed surgically.

There is a considerable variability in the reported prevalence of CI. The prevalence of CI in this study was calculated to be 1.38%. The estimates of prevalence based on population studies, mostly from pediatric or young adult populations, range from 2.25% to 8.3%.^{4–6} In studies that used standardized definitions of CI, investigators have reported a prevalence of 4.2% to 6% in school and pediatric clinic settings.^{5,10,11} However, there are no known prevalence reports of CI among adult populations with which to compare the findings of the current study.

The difficulty with near convergence among elderly patients, however, has been reported,^{12–14} supporting the findings of this study in which the incidence increased with increasing age. Oguro et al¹³ assessed the convergence and vertical gaze of 113 healthy individuals and found that convergence is reduced with increasing age, affecting approximately 70% of individuals in their eighties. This worsening with age may be the result of the effects of presbyopia on the accommodative convergence component of convergence.¹⁴ Wearing a bifocal prescription for the first time may cause CI as a result of relieving the previously sustained accommodative effort. However, Pickwell¹² found that the percentage of individuals in an

Table 2. Observed Ocular Comorbidities among 118 Patients with Convergence Insufficiency

Ocular Diagnosis	No. of Patients (%)
Age-related macular degeneration	20 (17.0)
Glaucoma	8 (6.8)
Epiretinal membrane	5 (4.2)
Corneal dystrophy	3 (2.5)
Retinal detachment	2 (1.7)
Scleral buckle	2 (1.7)

Download English Version:

<https://daneshyari.com/en/article/6201438>

Download Persian Version:

<https://daneshyari.com/article/6201438>

[Daneshyari.com](https://daneshyari.com)