



VISION CENTER OF EXCELLENCE (VCE)
WALTER REED NATIONAL MILITARY MEDICAL CENTER
8901 WISCONSIN AVENUE | BETHESDA, MD 20889-5600

VCE and PAO-APPROVED SCRIPT FOR USE BY DIGITAL CREATIVE PRODUCTION
16 June 2015

Podcast 3

THE INCIDENCE OF ADULT-ONSET CONVERGENCE INSUFFICIENCY

Introduction.

This series of podcasts is hosted by the Vision Center of Excellence, a joint program of the Department of Defense and Department of Veterans Affairs.

The podcast series provides concise summaries of issues and reports targeted to Department of Defense and Veterans Affairs vision providers overseeing care for our Service members and Veterans.

Body.

This podcast summarizes an article published in 2015 in *Ophthalmology*, the Journal of the American Academy of Ophthalmology entitled “The incidence and clinical characteristics of adult-onset convergence insufficiency” authored by Dr. Rafif Ghadban and colleagues.

Convergence insufficiency (CI) is a visual dysfunction commonly characterized by exophoria at near fixation, or the tendency of the eyes to turn outward when focusing on objects at close distance. Other symptoms of CI include blurred or double vision, also known as diplopia, and eyestrain associated with prolonged reading. A diagnosis of CI is typically made based on findings of a reduced near point of convergence and decreased fusional convergence at near fixation. The prevalence of convergence insufficiency has been known to widely vary with estimates ranging from 2.25 to 8.3 percent. Nevertheless, previous studies have been limited to pediatric and young adult populations. In the current study, Dr. Ghadban and colleagues report on the incidence and clinical characteristics of CI in a population-based cohort of adults over a 20 year period.

A retrospective medical record review was performed on all patients at least 19 years of age who first received a diagnosis of CI in Olmsted County, Minnesota between January 1, 1985 and December 31, 2004. Non-residents of the county at the time of diagnosis were excluded from the study. A search of the Rochester Epidemiology Project database, which captures patient data on all medical encounters occurring in Olmsted County, was conducted by a trained data abstractor to identify all potential new cases of adult strabismus and other binocular disorders over the study period. The medical records of patients with at least one of the International Classification of Diseases, 9th Edition, or ICD-9 codes, for strabismus were then reviewed and the type of strabismus was classified. A diagnosis of CI was made if the patient met the following criteria: (1) double-vision occurring at near while reading but not at distance and evidence of an outward turning of the eyes, either exophoria or exotropia, at near on a visual fixation test; or (2) exophoria or exotropia of at least 10 prism diopters (PD), at near on a Prism Alternate Cover Test (PACT), but either normal alignment (orthophoria), or only a minimal

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deviation at distance. Additional patient information on other ocular and medical conditions was also obtained from medical records. Annual age- and gender-specific incidence rates were calculated by dividing the number of new cases of adult-onset CI in Olmsted County over the 20 year period by the total age- and gender-specific counts of the white population reported in the United States Census.

Over the 20 year period, there were 118 adult patients newly diagnosed with CI in Olmsted County. After adjusting for age and gender, the estimated incidence was 8.44 new cases of CI per 100,000 residents with a 95 percent confidence interval ranging from 6.9 to 9.99 new cases of CI. The prevalence of CI during this period was 1.38 percent. The rate of exotropia progression over time was estimated to be approximately 4 percent at year 5 of the study; 14 percent at year 10; and 24 percent at year 20. The CI patient population in Olmsted County was skewed towards older age and female gender, as the median age at CI diagnosis was 68.5 years and 57.6 percent of patients were women. Ocular and systemic co-morbidities were relatively common among CI patients. Approximately 32 percent of patients were farsighted (hyperopic), and 38 percent were nearsighted (myopic). Other ocular co-morbidities included age-related macular degeneration, which occurred in 17 percent of CI patients, and glaucoma which occurred in 7 percent of patients. Twenty-three percent of CI patients also had hypertension, while coronary artery disease, cancer and hyperlipidemia were reported in approximately 10 percent of patients for each condition. The management of CI varied in the study population. Prisms were the most common method of treatment, as 88 percent of the 105 patients with available data were treated with prism spectacles. Only 9 percent of patients were prescribed convergence exercises. Approximately 4 percent of CI patients were surgically treated while 3 percent opted for occlusion of the eye.

Previous studies estimating the prevalence of CI have been limited to pediatric and young adult populations. As a result, the current study provides the only known prevalence estimates of CI in an adult sample. In this study, the prevalence of CI in adults 19 years of age or older was 1.38 percent. Although age-specific incidence rates were not provided in the article, the authors reported an increasing trend of CI associated with age. The proportion of co-morbidities in this population was high and likely due to the older age of the study sample. Nevertheless, the relationships between these co-morbid conditions and CI could not be examined in this study because there was no control group to allow for comparisons. Additionally, no patients had information on near point of accommodation, so CI could not be distinguished from accommodative insufficiency. The majority of study participants were treated with prisms as opposed to the more commonly prescribed convergence exercises. The authors suggest that the low rate of prescribed convergence exercises in this population may be due, in part, to difficulties involved with older individuals performing these exercises. The authors note that the generalization of these findings is limited due to the use of a relatively homogeneous study population.

Conclusion.

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This production was brought to you by the Vision Center of Excellence. Our mission is to lead and advocate for programs and initiatives to improve vision health, optimize readiness and enhance quality of life for Service members and Veterans. Working with TRICARE, the Military Health System, other Centers of Excellence and the Veterans Health Administration, the Vision Center of Excellence works to enhance collaboration between Department of Defense and Department of Veterans Affairs vision care providers, provide guidance for clinical practice and facilitate patient-centered support.

1. POINT OF CONTACT.

Devon Oskvig, Ph.D.
E&T Workstream Lead

301-400-1130
oskvig_devon@bah.com

2. APPROVED BY.

Robert Mazzoli, M.D.
Director VCE Training, Education, Simulation & Readiness Directorate

APPENDIX

A: Phonetic Guide.

Phonetic Guide			
1	exophoria	exo·pho·ria	exo-for'e-ah
2	diplopia	di·plo·pia	dī-plo'pe-ah
3	strabismus	stra·bis·mus	strah-biz'mus
4	exotropia	exo·tro·pia	exo-tro'pe-ah
5	orthophoria	or·tho·pho·ria	or''tho-fo're-ah
6	hyperopia	hy·per·o·pia	hi''per-o'pe-ah
7	myopia	my·o·pia	mi''o'pe-ah