Estimating the Length of the Preclinical Detectable Phase for Open-Angle Glaucoma

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IMPORTANCE: A 50% reduction of glaucoma-related blindness has previously been demonstrated in a population that was screened for open-angle glaucoma. Ongoing screening trials of high-risk populations and forthcoming low-cost screening methods suggest that such screening may become more common in the future. One would then need to estimate a key component of the natural history of chronic disease, the mean preclinical detectable phase (PCDP) . Knowledge of the PCDP is essential for the planning and early evaluation of screening programs and has been estimated for several types of cancer that are screened for.

OBJECTIVE: To estimate the mean PCDP for open-angle glaucoma.

DESIGN, SETTING, AND PARTICIPANTS: A large population-based screening for open-angle glaucoma was conducted from October 1992 to January 1997 in Malmö, Sweden, including 32 918 participants aged 57 to 77 years. A retrospective medical record review was conducted to assess the prevalence of newly detected cases at the screening, incidence of new cases after the screening, and the expected clinical incidence, ie, the number of new glaucoma cases expected to be detected without a screening. The latter was derived from incident cases in the screened age cohorts before the screening started and from older cohorts not invited to the screening. A total of 2029 patients were included in the current study. Data were analyzed from March 2020 to October 2021.

MAIN OUTCOMES AND MEASURES: The length of the mean PCDP was calculated by 2 different methods: first, by dividing the prevalence of screen-detected glaucoma with the clinical incidence, assuming that the screening sensitivity was 100% and second, by using a Markov chain Monte Carlo (MCMC) model simulation that simultaneously derived both the length of the mean PCDP and the sensitivity of the screening.

RESULTS: Of 2029 included patients, 1352 (66.6%) were female. Of 1420 screened patients, the mean age at screening was 67.4 years (95% CI, 67.2-67.7) . The mean length of the PCDP of the whole study population was 10.7 years (95% CI, 8.7-13.0) by the prevalence/incidence method and 10.1 years (95% credible interval, 8.9-11.2) by the MCMC method.

CONCLUSIONS AND RELEVANCE: The mean PCDP was similar for both methods of analysis, approximately 10 years. A mean PCDP of 10 years found in the current study allows for screening with reasonably long intervals, eg, 5 years.

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